



U.S. Department of the Interior
Bureau of Land Management

Draft Lewistown Resource Management Plan

Volume I: Executive Summary, Abstract, Chapters
1–4, References, Glossary, Index



May 2019

Estimated Lead Agency Total Costs
Associated with Developing and Producing
This EIS
\$3,687,000

The Bureau of Land Management's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

Cover Photo Credit: Ken Dickerson/BLM

BLM/MT/PL-18/001+1610



United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Lewistown Field Office
920 NE Main
Lewistown, Montana 59457
<http://www.blm.gov/mt>



May 2019

Dear Reader:

Attached for your review and comment is the Lewistown Draft Resource Management Plan/Draft Environmental Impact Statement (Draft RMP/EIS). The Bureau of Land Management (BLM) prepared this document in consultation with cooperating agencies, and in accordance with the National Environmental Policy Act of 1969, as amended, the Federal Land Policy and Management Act of 1976, as amended, implementing regulations, the BLM's Land Use Planning Handbook (H-1601-1), and other applicable laws and policies.

The planning area consists of about 12.9 million acres of land which includes about 650,000 surface acres and 1,196,800 acres of federal mineral estate managed by the Lewistown and Butte Field Offices. The Lewistown Field Office (LFO) spans portions Cascade, Chouteau, Fergus, Judith Basin, Meagher, Petroleum, Pondera, and Teton Counties. This plan will also be specific to the northern portion of Lewis and Clark County that is administered by the Butte Field Office (BFO). When approved, this RMP will replace the 1984 Headwaters and 1994 Judith-Valley-Phillips RMPs and will guide the management of public lands administered by the LFO and BFO into the future. The Lewistown Draft RMP/EIS and supporting information is available on the project website at: <https://go.usa.gov/xUPsP>. The BLM encourages the public to provide information and comments pertaining to the analysis presented in the Draft RMP/EIS. Comments will be most useful if they are specific, mention particular pages of the document where appropriate, and address one or more of the following:

- Identify inaccuracies or discrepancies in information
- Identify new information that would have a bearing on the analysis
- Identify new impacts, alternatives, or mitigation measures
- Make suggestions for improving management direction.

The Draft RMP/EIS carries forward the decisions from the Lewistown Field Office Greater Sage-Grouse Approved RMP Amendment in all the alternatives for purposes of comprehensive analysis only, except for certain limited fluid mineral and mineral materials decisions. The BLM will not further address comments on greater sage-grouse management actions outside of these limited actions being considered. Comments containing only opinion or preferences will be considered and included as part of the decision-making process, although they will not receive a formal response from the BLM.

In developing the Proposed RMP/Final EIS, which is the next phase of the planning process, the BLM may select various management decisions from each of the alternatives analyzed in the Draft RMP/EIS for creating a management strategy that best meets the needs of the resources and values in this area under the BLM multiple use and sustained yield mandate. As a member of the public, your timely comments on the Lewistown Draft RMP/EIS will help formulate the Proposed RMP/Final EIS. Comments will be accepted

for ninety (90) calendar days following the Environmental Protection Agency's publication of its Notice of Availability in the Federal Register. The BLM can best utilize your comments and resource information submissions if received within the review period.

Comments may be submitted electronically to blm_mt_Lewistown_rmp@blm.gov. Comments may also be submitted by mail to:

RMP Comments
Bureau of Land Management
Lewistown Field Office
920 NE Main Street
Lewistown, MT 59457

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

Public meetings to provide an overview of the document, respond to questions, and take public comments will be announced by local media, website, and/or public mailings at least 15 days in advance. Public meetings will be held at a time and date to be determined.

Copies of the Draft RMP/EIS have been sent to affected federal, state and local government agencies, and tribal governments. Copies are also available for public inspection at the following BLM locations:

Bureau of Land Management
Montana State Office
5001 Southgate Drive
Billings, MT 59101

Bureau of Land Management
Lewistown Field Office
920 NE Main Street
Lewistown, MT 59457

Thank you for your continued interest in the Lewistown RMP. We appreciate the information and suggestions you contribute to the planning process. For additional information or clarification regarding this document or the planning process, please contact Dan Brunkhorst at (406) 538-1981.

Sincerely,



Brett A. Blumhardt
Lewistown Field Manager

1 Attachment:

1- Draft RMP/EIS

Draft Lewistown Resource Management Plan and Environmental Impact Statement, Montana

1. Responsible Agency: United States Department of the Interior
Bureau of Land Management
2. Type of Action: Administrative (X) Legislative ()
3. Document Status: Draft (X) Final ()
4. Abstract: This Draft Resource Management Plan and Environmental Impact Statement describes and analyzes four alternatives for managing 651,200 surface acres and approximately 1.2 million acres of federal mineral estate in central Montana administered by the Bureau of Land Management Lewistown and Butte Field Offices. The Lewistown Field Office spans portions Cascade, Chouteau, Fergus, Judith Basin, Meagher, Petroleum, Pondera, and Teton Counties. This plan will also be specific to the northern portion of Lewis and Clark County that is administered by the Butte Field Office. The plan alternatives are Alternative A (the “no action” alternative or continuation of the 1984 Headwaters and 1994 Judith-Valley-Phillips resource management plans), Alternative B (emphasizes improving, rehabilitating, and restoring resources and sustaining the ecological integrity of habitats for all priority plant, wildlife, and fish species, while allowing appropriate development scenarios for allowable uses), Alternative C (consists of a mix of uses on BLM-administered lands and mineral estate based on making the most of resources that target social and economic outcomes, while protecting land health), and Alternative D (emphasizes balancing resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape). Alternative C is the BLM’s current preferred alternative. Alternative C is not a final agency decision but instead an indication of the agency’s preliminary preference that reflects the best combination of decisions to achieve BLM goals and policies, meet the purpose and need, address the key planning issues, and consider the recommendations of cooperating agencies and BLM specialists.

Planning issues addressed include categories such as soil and water resources, wild fire, visual resources, travel management, minerals and energy development, livestock grazing, recreation management, lands and realty, wildlife and fish, lands with wilderness characteristics, special designations, and socioeconomics. The draft alternatives also address designation of Areas of Critical Environmental Concern and Wild and Scenic River suitability findings.
5. Review Period: The review period on the Lewistown Draft Resource Management Plan and Draft Environmental Impact Statement is 90 calendar days. The review period began when the Environmental Protection Agency published a Notice of Availability in the Federal Register.
6. For further information contact:

Mr. Dan Brunkhorst
920 NE Main Street
Lewistown, MT 59457
(406) 538-1981
Email: dbrunkho@blm.gov
Website: <https://go.usa.gov/xUPsP>

This page intentionally left blank.

TABLE OF CONTENTS – VOLUME I

TABLE OF CONTENTS

Chapter	Page
EXECUTIVE SUMMARY.....	ES-1
ES.1 Introduction	ES-1
ES.2 Purpose of and Need for the Resource Management Plan	ES-1
ES.3 Scoping, Consultation, and Coordination	ES-2
ES.4 Management Alternatives	ES-2
ES.4.1 Alternative A (No Action Alternative).....	ES-3
ES.4.2 Alternative B	ES-3
ES.4.3 Alternative C (Preferred Alternative)	ES-4
ES.4.4 Alternative D	ES-4
ES.5 Environmental Consequences	ES-4
CHAPTER I. INTRODUCTION	I-1
I.1 Introduction	I-1
I.2 Purpose and Need for the Plan	I-1
I.3 Description of the Planning Area.....	I-2
I.4 Scoping and Issue Identification.....	I-3
I.4.1 Issues Identified for Consideration.....	I-4
I.4.2 Issues Outside the Project Scope	I-5
I.5 Collaboration and Coordination.....	I-5
I.5.1 Intergovernmental and Interagency.....	I-5
I.5.2 Tribal Relationships and Indian Trust Assets	I-6
I.5.3 Montana State Historic Preservation Office Consultation	I-6
I.5.4 US Fish and Wildlife Service Consultation	I-6
I.5.5 Resource Advisory Council Collaboration.....	I-6
I.5.6 Wild and Scenic Rivers Public Input Process	I-6
I.6 Legislative Constraints and Planning Criteria.....	I-7
I.7 RMP Amendments, Implementation-Level Plans, and Related Land Use Plans	I-9
CHAPTER 2. ALTERNATIVES	2-1
2.1 Management Common to All Alternatives.....	2-1
2.2 Alternative A (No Action Alternative).....	2-1
2.3 Alternative B	2-2
2.4 Alternative C (Preferred Alternative)	2-2
2.5 Alternative D	2-2
2.6 Alternatives Considered but Eliminated from Detailed Analysis	2-3
2.6.1 Analyzing an Alternative that Makes All Lands in the Planning Area Unavailable for Livestock Grazing and Eliminates Livestock Forage Allocation.....	2-3
2.6.2 Master Leasing Plan	2-3
2.6.3 Open Off-Highway Vehicle Areas	2-4
2.6.4 Oil Shale and Geothermal Resources.....	2-4
2.6.5 Designating Major Transportation and Energy Corridors.....	2-4
2.6.6 Relocate Bison as Wildlife onto Public Lands	2-5
2.6.7 Designated Leasing Areas for Wind Energy	2-5
2.6.8 Coal.....	2-5
2.7 Alternatives Comparison.....	2-6

TABLE OF CONTENTS *(continued)*

Chapter	Page
CHAPTER 3. AFFECTED ENVIRONMENT.....	3-1
3.1 Introduction	3-1
3.2 Resources	3-1
3.2.1 Air Resources and Climate	3-1
3.2.2 Geology	3-1
3.2.3 Soil Resources	3-2
3.2.4 Water Resources.....	3-2
3.2.5 Vegetation Communities	3-2
3.2.6 Fish and Wildlife.....	3-2
3.2.7 Wildfire Ecology and Management.....	3-3
3.2.8 Cultural and Heritage Resources.....	3-3
3.2.9 Paleontological Resources	3-3
3.2.10 Visual Resources	3-3
3.2.11 Lands with Wilderness Characteristics	3-3
3.2.12 Cave and Karst Resources	3-4
3.3 Resource Uses.....	3-4
3.3.1 Minerals and Energy Resources.....	3-4
3.3.2 Livestock Grazing	3-4
3.3.3 Recreation and Visitor Services	3-4
3.3.4 Travel, Transportation Management, and Access.....	3-5
3.3.5 Lands and Realty	3-5
3.3.6 Renewable Energy	3-5
3.3.7 Withdrawals.....	3-5
3.3.8 Forest, Woodland, and Special Products	3-5
3.4 Special Designations.....	3-6
3.4.1 Areas of Critical Environmental Concern (ACECs) and Outstanding Natural Areas (ONAs).....	3-6
3.4.2 Back Country Byways.....	3-6
3.4.3 National Trails	3-6
3.4.4 Wild and Scenic Rivers.....	3-6
3.4.5 Wilderness Study Areas.....	3-6
3.5 Social and Economic.....	3-7
3.5.1 Social and Economic Conditions (including Environmental Justice)	3-7
3.5.2 Tribal Interests	3-7
3.5.3 Public Safety	3-7
CHAPTER 4. ENVIRONMENTAL CONSEQUENCES	4-1
4.1 Introduction	4-1
4.2 Resources	4-1
4.2.1 Air Resources and Climate	4-1
4.2.2 Soil Resources	4-7
4.2.3 Water Resources.....	4-19
4.2.4 Vegetation Communities	4-32
4.2.5 Fish and Wildlife.....	4-53
4.2.6 Wildfire Ecology and Management.....	4-78
4.2.7 Cultural and Heritage Resources.....	4-87
4.2.8 Paleontological Resources	4-97

TABLE OF CONTENTS *(continued)*

Chapter	Page
4.2.9	Visual Resources 4-101
4.2.10	Lands with Wilderness Characteristics 4-113
4.2.11	Cave and Karst Resources 4-119
4.3	Resource Uses..... 4-122
4.3.1	Minerals and Energy Resources..... 4-122
4.3.2	Livestock Grazing 4-130
4.3.3	Recreation and Visitor Services 4-138
4.3.4	Travel, Transportation Management, and Access..... 4-147
4.3.5	Lands and Realty 4-149
4.3.6	Renewable Energy 4-157
4.3.7	Withdrawals..... 4-161
4.3.8	Forest, Woodland, and Special Products..... 4-161
4.4	Special Designations..... 4-165
4.4.1	Areas of Critical Environmental Concern and Outstanding Natural Areas 4-165
4.4.2	Back Country Byways..... 4-177
4.4.3	National Trails 4-178
4.4.4	Wild and Scenic Rivers..... 4-181
4.4.5	Wilderness Study Areas..... 4-192
4.5	Social and Economic..... 4-192
4.5.1	Social and Economic Conditions..... 4-192
4.5.2	Tribal Interests 4-209
4.6	Unavoidable Adverse Effects..... 4-213
4.7	Irreversible and Irrecoverable Commitment of Resources 4-214
4.8	Relationship Between Local Short-Term Uses and Long-Term Productivity 4-215
REFERENCES..... REFERENCES-I	
GLOSSARY..... GLOSSARY-I	
INDEX..... INDEX-I	

TABLES

TABLES	Page
ES-1	Comparative Summary of Alternatives ES-2
I-1	Land Status within the Planning Area..... I-2
I-2	Mineral Status within the Planning Area by County..... I-3
I-3	Planning Issue Categories and Statements..... I-4
4-1	BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative A..... 4-1
4-2	BLM Source Greenhouse Gas Emissions Under Alternative A..... 4-2
4-3	BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative B 4-3
4-4	BLM Source Greenhouse Gas Emissions Under Alternative B 4-3
4-5	BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative C 4-4
4-6	BLM Source Greenhouse Gas Emissions Under Alternative C..... 4-4
4-7	BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative D 4-5
4-8	BLM Source Greenhouse Gas Emissions Under Alternative D 4-5
4-9	Maximum Cumulative Emissions..... 4-5

TABLES *(continued)*

Page

4-10	Climate Trends.....	4-6
4-11	Alternatives Comparison of Livestock Grazing on Sensitive Soils	4-7
4-12	Alternatives Comparison of Timber Management on Sensitive Soils	4-8
4-13	Alternatives Comparison of Travel Management on Sensitive Soils	4-8
4-14	Alternatives Comparison of Land Use Authorizations on Sensitive Soils	4-8
4-15	Alternatives Comparison of Fluid Minerals Development Stipulations on Sensitive Soils.....	4-9
4-16	Alternatives Comparison of Mineral Development on Sensitive Soils	4-9
4-17	Alternatives Comparison of Fluid Minerals Development Stipulations on Water Resources	4-19
4-18	Alternatives Comparison of Livestock Grazing on Water Resources	4-20
4-19	Alternatives Comparison of Travel Management on Water Resources.....	4-20
4-20	Alternatives Comparison of Land Use Authorizations on Water Resources	4-20
4-21	Comparison of Fire Management Categories by Priority Vegetation Type Under Each Alternative (Acres).....	4-32
4-22	Comparison of VRM Classes by Priority Vegetation Type Under Each Alternative (Acres).....	4-33
4-23	Comparison of Fluid Minerals Leasing Stipulations by Priority Vegetation Type Under Each Alternative (Acres).....	4-34
4-24	Comparison of Grazing Allocations by Priority Vegetation Type Under Each Alternative (Acres)	4-35
4-25	Comparison of Travel Management by Priority Vegetation Type Under Each Alternative (Acres).....	4-35
4-26	Comparison of Rights-of-Way and Special Use Authorization Management by Priority Vegetation Type Under Each Alternative (Acres).....	4-36
4-27	Comparison of ACECs by Priority Vegetation Type Under Each Alternative (Acres)	4-37
4-28	VCC by Greater Sage-Grouse Management Category (Acres)	4-78
4-29	Alternatives Comparison of VCC by Fire Management Category (Acres)	4-79
4-30	Alternatives Comparison of VCC by VRM Class (Acres)	4-81
4-31	Acreage Summary of VRI Class by VRM Class.....	4-101
4-32	Acres Open to Nonenergy Solid Minerals Leasing by VRI Class.....	4-101
4-33	Acres Open to Fluid Minerals Leasing by VRI Class	4-102
4-34	Acres Open to Locatable Mineral Entry by VRI Class.....	4-102
4-35	Acres Open to Mineral Materials Disposal by VRI Class.....	4-103
4-36	Acres Open to Livestock Grazing by VRI Class.....	4-103
4-37	Acres Limited to Designated Routes by VRI Class	4-104
4-38	Acres Open to ROWs with Standard Restrictions by VRI Class	4-104
4-39	Acres Open to Wind ROWs with Standard Restrictions by VRI Class.....	4-105
4-40	Acres Open to Forest Product Sales or Harvest by VRI Class.....	4-105
4-41	Oil and Gas Leasables, Alternative B	4-123
4-42	Oil and Gas Leasables, Alternative C	4-125
4-43	Oil and Gas Leasables, Alternative D	4-127
4-44	Summary of VRM Effects on Back Country Byways.....	4-177
4-45	Allocations that Overlap National Trail Corridors.....	4-178
4-46	Employment by Resource Area, by Alternative	4-193
4-47	Annual Labor Income by Resource Area, by Alternative (Thousands 2010 USD).....	4-193
4-48	Annual LFO Recreation Visits by Type of Trip	4-195
4-49	Areas with Administrative Designation Protection.....	4-197
4-50	Customs and Cultural Interests Indicators, by Alternative	4-203

TABLES <i>(continued)</i>		Page
4-51	Economic Development Indicators, by Alternative.....	4-204
4-52	Healthy Sustainable Resources Indicators, by Alternative.....	4-204
4-53	Open Space Indicators, by Alternative	4-205
4-54	Annual Employment Contributions to Analysis Area Sectors.....	4-208

FIGURES *(see Volume 2)*

1-1	Project Planning Area
1-2	RMP Planning Area and Federal Mineral Estate
2-1	Alternative A: Fire Management
2-2	Alternative B: Fire Management
2-3	Alternative C: Fire Management
2-4	Alternative D: Fire Management
2-5	Alternative A: Visual Resource Management
2-6	Alternative B: Visual Resource Management
2-7	Alternative C: Visual Resource Management
2-8	Alternative D: Visual Resource Management
2-9	Alternative B: Lands with Wilderness Characteristics
2-10	Alternative D: Lands with Wilderness Characteristics
2-11	Alternative A: Nonenergy Solid Leasable Minerals
2-12	Alternative B: Nonenergy Solid Leasable Minerals
2-13	Alternative C: Nonenergy Solid Leasable Minerals
2-14	Alternative D: Nonenergy Solid Leasable Minerals
2-15	Alternative A: Fluid Minerals Leasing
2-16	Alternative B: Fluid Minerals Leasing
2-17	Alternative C: Fluid Minerals Leasing
2-18	Alternative D: Fluid Minerals Leasing
2-19	Alternative A: No Surface Occupancy for Fluid Minerals Leasing
2-20	Alternative B: No Surface Occupancy for Fluid Minerals Leasing
2-21	Alternative C: No Surface Occupancy for Fluid Minerals Leasing
2-22	Alternative D: No Surface Occupancy for Fluid Minerals Leasing
2-23	Alternative A: Controlled Surface Use for Fluid Minerals Leasing
2-24	Alternative B: Controlled Surface Use for Fluid Minerals Leasing
2-25	Alternative C: Controlled Surface Use for Fluid Minerals Leasing
2-26	Alternative D: Controlled Surface Use for Fluid Minerals Leasing
2-27	Alternative A: Locatable Minerals
2-28	Alternative B: Locatable Minerals
2-29	Alternative C: Locatable Minerals
2-30	Alternative D: Locatable Minerals
2-31	Alternative A: Mineral Materials
2-32	Alternative B: Mineral Materials
2-33	Alternative C: Mineral Materials
2-34	Alternative D: Mineral Materials
2-35	Alternatives A, C, and D: Livestock Grazing
2-36	Alternative B: Livestock Grazing
2-37	Alternative A: Recreation Management Areas

FIGURES (see *Volume 2*) (continued)

- 2-38 Alternative B: Recreation Management Areas
- 2-39 Alternative C: Recreation Management Areas
- 2-40 Alternative D: Recreation Management Areas
- 2-41 Alternative A: Travel, Transportation Management, and Access – Motorized and OHV
- 2-42 Alternative B: Travel, Transportation Management, and Access – Motorized and OHV
- 2-43 Alternative C: Travel, Transportation Management, and Access – Motorized and OHV
- 2-44 Alternative D: Travel, Transportation Management, and Access – Motorized and OHV
- 2-45 Alternatives A and C: Travel, Transportation Management, and Access – Mechanized
- 2-46 Alternative B: Travel, Transportation Management, and Access – Mechanized
- 2-47 Alternative D: Travel, Transportation Management, and Access – Mechanized
- 2-48 Alternative B: Over-Snow Vehicle Travel
- 2-49 Alternative C: Over-Snow Vehicle Travel
- 2-50 Alternative D Over-Snow Vehicle Travel
- 2-51 Alternative A: Right-of-Way Exclusion and Avoidance
- 2-52 Alternative B: Right-of-Way Exclusion and Avoidance
- 2-53 Alternative C: Right-of-Way Exclusion and Avoidance
- 2-54 Alternative D: Right-of-Way Exclusion and Avoidance
- 2-55 Alternative A: Disposal
- 2-56 Alternatives B and D: Disposal
- 2-57 Alternative C: Disposal
- 2-58 Alternative A: Wind Energy Development
- 2-59 Alternative B: Wind Energy Development
- 2-60 Alternative C: Wind Energy Development
- 2-61 Alternative D: Wind Energy Development
- 2-62 Alternatives A, B, C, and D: Withdrawn Lands
- 2-63 Alternative A: Forest Products
- 2-64 Alternative B: Forest Products
- 2-65 Alternative C: Forest Products
- 2-66 Alternative D: Forest Products
- 2-67 Alternative A: Special Designations
- 2-68 Alternative B: Special Designations
- 2-69 Alternative C: Special Designations
- 2-70 Alternative D: Special Designations

APPENDICES (see *Volume 2*)

- A Figures
- B Collaboration and Coordination
- C RMP Amendments, Implementation-Level Plans, and Related Land Use Plans
- D Implementation and Monitoring
- E Special Status Species Confirmed or Likely to Inhabit the Planning Area
- F Design Features and Best Management Practices
- G Reclamation
- H Draft Air Resource Management Plan: Adaptive Management Strategy for Oil and Gas Resources
- I Fire and Emergency Stabilization and Rehabilitation
- J Impoundments
- K North Continental Divide Ecosystem Grizzly Bear Conservation Strategy

APPENDICES (see *Volume 2*) (continued)

L	Stipulations and Allocations Applicable to Fluid Minerals Leasing
M	Summary of the Lewistown Field Office Wilderness Characteristics: 2014 Update
N	BLM Standards for Rangeland Health and Guidelines for Livestock Grazing Management
O	Grazing Allotments
P	Drought Policy
Q	Recreation Management Areas
R	Land Ownership Adjustment Categories
S	Withdrawal Segregations
T	Areas of Critical Environmental Concern: Report on the Application of the Relevance and Importance Criteria
U	ACEC Management Actions
V	Draft Wild and Scenic River Report
W	Analysis Assumptions and Cumulative Effect Scenario

ACRONYMS AND ABBREVIATIONS

Full Phrase

ACEC	area of critical environmental concern
AIM	Assessment Inventory and Monitoring
AML	abandoned mine lands
AMP	allotment management plan
AMS	Analysis of the Management Situation
ANS	aquatic nuisance species
APD	Application for Permit to Drill
AQRV	air quality and air quality related value
ARPA	Archaeological Resources Protection Act of 1979
AUM	animal unit month
bbf	oil barrel
BCA	backcountry conservation area
BFO	Butte Field Office
BIA	Bureau of Indian Affairs
BLM	United States Department of the Interior, Bureau of Land Management
BMA	Block Management Area
BMP	best management practice
BOR	United States Department of the Interior, Bureau of Reclamation
CAA	Clean Air Act of 1970
CFR	Code of Federal Regulations
CH ₄	methane
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalents
COA	condition of approval
CSU	controlled surface use
CTTM	comprehensive travel and transportation management
CWA	Clean Water Act 1972
decision area	Public lands and federal mineral estate, managed by the BLM, where management decisions will be determined by the Lewistown RMP
DEIS	draft environmental impact statement
DFC	desired future condition
DLA	designated leasing areas
DOI	United States Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EPA	United States Environmental Protection Agency
ERMA	extensive recreation management area
ES&R	emergency stabilization and rehabilitation
ESA	Endangered Species Act of 1973
ESD	Ecological Site Description
FCRPA	Federal Cave Resources Protection Act of 1988
federal mineral estate	Subsurface mineral estate administered by the BLM

ACRONYMS AND ABBREVIATIONS *(continued)*

Full Phrase

FLPMA	Federal Land Policy and Management Act of 1976
FMU	Fire Management Units
Forest Service	United States Department of Agriculture, Forest Service
GHG	greenhouse gas
GHMA	greater sage-grouse general habitat management area
GIS	geographic information system
GPS	The Global Positioning System
GRSG	Greater-sage grouse
HAP	hazardous air pollutant
HRMP	Headwaters Resource Management Plan
IM	Instruction Memorandum
JVP	Judith-Valley-Phillips
LFO	Lewistown Field Office
LN	lease notice
MAAQS	Montana Ambient Air Quality Standards
MBF	thousand board feet
MCF	thousand cubic feet
MFWP	Montana Fish, Wildlife & Parks
MMBF	million board feet
MSGOT	Montana Sage Grouse Oversight Team
MOU	memorandum of understanding
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NCDE	Northern Continental Divide Ecosystem
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NHT	National Historic Trail
NISC	National Invasive Species Council
N ₂ O	nitrous oxide
NO ₂	nitrogen dioxide
NO ₃	nitrates
NO _x	nitrogen oxide
NOI	notice of intent
NRHP	National Register of Historic Places
NSO	no surface occupancy
NST	National Scenic Trail
NWR	National Wildlife Refuge
NWSRS	National Wild and Scenic River System
OHV	off-highway vehicle
ONA	outstanding natural area

ACRONYMS AND ABBREVIATIONS *(continued)*

Full Phrase

ORV	outstandingly remarkable values
OSV	over-snow vehicle
PCA	Primary Conservation Area
PFC	proper functioning condition
PFYC	Potential Fossil Yield Classification
PHMA	greater sage-grouse priority habitat management area
PILT	payments in lieu of taxes
planning area	Lewistown RMP resource area, including all lands, regardless of landownership
PM _{2.5}	particulate matter with a diameter less than or equal to 2.5 microns
PM ₁₀	particulate matter with a diameter less than or equal to 10 microns
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Determination
RAC	Resource Advisory Council
RDF	required design feature
REA	Rapid Ecoregional Assessment
RFD	reasonable foreseeable development
RMP	resource management plan
RMZ	recreation management zone
ROD	record of decision
ROW	right-of-way
SHPO	state historic preservation office
SO _x	sulphur oxides
SO ₂	sulfur dioxide
SO ₄	sulfates
SoP	sense of place
SRMA	special recreation management area
SRP	special recreation permit
TL	timing limitation
UMRBNM	Upper Missouri River Breaks National Monument
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Department of the Interior, Fish and Wildlife Service
VCC	Vegetation Condition Class
VOC	volatile organic compound
VRI	visual resource inventory
VRM	visual resource management
WNS	white-nose syndrome
WSA	Wilderness Study Area
WSR	wild and scenic river

Executive Summary

ES.1 INTRODUCTION

The United States Department of the Interior (DOI), Bureau of Land Management (BLM) has prepared this draft resource management plan (RMP) revision and environmental impact statement (EIS) for the BLM Lewistown Field Office (LFO) and portions of the Butte Field Office (BFO). The approved RMP will replace the Headwaters RMP, approved in July 1984 (BLM 1984) and the Judith-Valley-Phillips (JVP) RMP, approved in September 1994 (BLM 1994), as amended, and will guide management of public lands administered by LFO and portions of public lands administered by the BFO. The BLM will prepare one RMP/EIS; however, the LFO and the BFO will issue separate records of decision (RODs). Information about the RMP/EIS process can be obtained on the project website at <https://go.usa.gov/xUPsP>.

The Lewistown RMP planning area comprises all or portions of nine counties in central Montana: Cascade, Chouteau, Fergus, Judith Basin, Lewis and Clark, Meagher, Petroleum, Pondera, and Teton. The Lewistown RMP will not include lands in the Upper Missouri River Breaks National Monument (UMRBNM). In the planning area, BLM-administered lands are intermingled with National Forest System land, National Wildlife Refuges (NWR), lands managed by the US Army Corps of Engineers and the US DOI, Bureau of Reclamation (BOR), and state, private, and tribal lands, including federal lands where tribes retain treaty rights. In total, the planning area covers 12,906,800 surface acres, and the decision are covers approximately 651,200 surface acres and 1,196,800 acres of federal mineral estate (**Figure I-1**, Project Planning Area, and **Figure I-2**, RMP Planning Area and Federal Mineral Estate [**Appendix A**, Figures]).

ES.2 PURPOSE OF AND NEED FOR THE RESOURCE MANAGEMENT PLAN

The purpose of this RMP is to ensure that BLM-administered lands and minerals in the planning area are managed in accordance with the multiple use and sustained yield principles stated in the Federal Land Management and Policy Act of 1976 (FLMPA). With the support of new data, this RMP provides planning-level management strategies that are expressed in the form of goals, objectives, allowable uses, and management actions for resources and resource uses. The RMP neither prioritizes certain projects nor describes how particular programs would be implemented; rather, those decisions are deferred to more detailed implementation-level planning.

The need for the RMP revision is to address policies and resource issues that have arisen since the adoption of the previous RMPs. Issues prompting the need for this RMP revision are as follows:

- How can the BLM manage public land uses while maintaining and improving terrestrial and aquatic habitats?
- Which areas should be open to mineral and energy development, and how should the BLM manage such development, while protecting human health and natural and cultural resources?
- How can the BLM manage areas that contain unique or sensitive resources?
- How can the BLM manage increased conflicts between competing resource values and land uses, while accommodating increased demand for resources and activities?

The Lewistown RMP will result in the development of new land use planning decisions for those issues identified through public and internal scoping. Where appropriate, the BLM will incorporate decisions from the existing Headwaters and JVP RMPs. When completed, the Lewistown RMP will provide a comprehensive plan to enhance or maintain resource conditions and to provide for the economic needs of local communities over the long term.

ES.3 SCOPING, CONSULTATION, AND COORDINATION

The formal scoping period began with publication of the Notice of Intent (NOI; 79 Federal Register 7694) on February 10, 2014. The planning issues identified are presented in the Scoping Report (BLM 2014), available at <https://go.usa.gov/xUPsP>. Throughout the planning process, the BLM has actively engaged the public and its cooperating agencies, as well as consulted with the Montana State Historic Preservation Office and US Fish and Wildlife Service. The BLM continues to engage in government-to-government consultation with Native American tribes.

ES.4 MANAGEMENT ALTERNATIVES

The BLM developed four management alternatives to fulfill the purpose and need, to meet the multiple-use mandates of FLPMA, and to address the 21 planning issues. **Chapter 2** describes the four alternatives in detail. **Table ES-I**, Comparative Summary of Alternatives, highlights the meaningful differences among alternatives relative to what they establish.

Table ES-I
Comparative Summary of Alternatives

Allocations	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
Available for Livestock Grazing	636,600 acres (98%)	621,200 acres (95%)	636,600 acres (98%)	636,600 acres (98%)
Unavailable for Livestock Grazing	14,600 acres (2%)	30,000 acres (5%)	14,600 acres (2%)	14,600 acres (2%)
Fluid Minerals -Open	Leasing Restrictions Apply to Alternative A	885,700 acres (74%)	1,086,000 acres (91%)	1,080,000 acres (90%)
Open with Minor/Moderate Stipulations*	Leasing Restrictions Apply to Alternative A	360,200 acres	749,500 acres	902,600 acres
Open with Major Stipulations (NSO)*	Leasing Restrictions Apply to Alternative A	744,000 acres	411,700 acres	472,000 acres
Fluid Minerals - Closed	Leasing Restrictions Apply to Alternative A	311,000 acres (26%)	110,100 acres (9%)	116,800 acres (10%)
Mineral Materials Closed	299,600 acres (25%)	463,100 acres (39%)	4,200 acres (<1%)	399,200 acres (33%)
Mineral Materials Open	897,200 acres (75%)	733,700 acres (61%)	1,192,600 acres (99%)	797,600 acres (67%)
Right-of-Way (ROW) Exclusion	15,700 acres (2%)	278,800 acres (43%)	2,700 acres (<1%)	17,200 acres (3%)
ROW Avoidance	378,700 acres (58%)	341,500 acres (52%)	345,500 acres (53%)	446,600 acres (68%)
Backcountry Conservation Areas (BCAs)	0 acres	228,800 acres (4 units; 35%)	0 acres	0 acres

Allocations	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
Areas of Critical Environmental Concern	22,900 acres (8 ACECs; 3%)	32,000 acres (10 ACECs; 5%)	0 acres (0 ACECs)	26,000 acres (8 ACECs; 4%)
OHV/Motorized Travel Limited	635,500 acres (98%)	442,800 acres (68%)	648,500 acres (99%)	635,500 acres (98%)
Closed to Motorized Travel	15,700 acres (2%)	208,400 acres (32%)	2,700 acres (<1%)	15,700 acres (2%)

Source: BLM GIS 2015a

*Stipulations for fluid mineral leasing may overlap.

ES.4.1 Alternative A (No Action Alternative)

Alternative A meets the requirement that a no action alternative be considered. This alternative continues current management direction and prevailing conditions derived from existing planning documents. Goals and objectives for resources and resource uses are based on the applicable portions of the Headwaters RMP, approved in July 1984 (BLM 1984) and the JVP RMP, approved in September 1994 (BLM 1994), along with associated amendments, activity and implementation level plans, and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would also apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, timber harvesting, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

There is an existing protest resolution decision affecting federal mineral estate in the LFO that does not allow oil and gas leasing of nominated parcels that would require a special stipulation to protect important wildlife values. Existing fluid mineral leases that expire can be re-nominated for leasing but would be deferred.

ES.4.2 Alternative B

Alternative B emphasizes improving, rehabilitating, and restoring resources and sustaining the ecological integrity of habitats for all priority plant, wildlife, and fish species, while allowing appropriate development scenarios for allowable uses (such as mineral leasing, locatable mineral development, recreation, communication sites, and livestock grazing). It particularly targets the habitats needed for the conservation and recovery of federally listed, proposed, or candidate threatened and endangered plant and animal species. In addition, this alternative aims to restore water quality through the greatest level of protection and active restoration of streams and riparian-wetland areas.

Goals and objectives focus on environmental and social outcomes achieved by sustaining relatively unmodified physical landscapes and natural and cultural resource values for current and future generations. This alternative would establish the greatest number of special designation areas such as ACECs and SRMAs. It includes specific measures designed to protect or enhance resource values, such as lands with wilderness characteristics. Appropriate and allowable uses and restrictions would be contingent on minimizing adverse impacts on natural and cultural resources.

Under Alternative B, the following vegetative communities would be priority habitat for management: grasslands, sagebrush/grasslands, ponderosa pine/badlands, montane forest and meadows, and riparian/wetland communities. Priority species for management are listed in **Appendix E**, Special Status Species Confirmed or Likely to Inhabit the Planning Area.

ES.4.3 Alternative C (Preferred Alternative)

The appropriate mix of uses on BLM-administered lands and mineral estate would be based on making the most of resources that target social and economic outcomes, while protecting land health. Management direction would recognize and expand existing uses and would accommodate new uses to the greatest extent possible. The appropriate development scenarios for allowable uses (such as mineral leasing, locatable mineral development, recreation, communication sites, and livestock grazing) would emphasize maximizing resource production in an environmentally responsible manner, while maintaining the basic protection needed to sustain resources. Appropriate and allowable uses and restrictions would emphasize social and economic outcomes, while mitigating impacts on land health. Priority species for management would be focused on special status species.

ES.4.4 Alternative D

Alternative D emphasizes distributing and examining resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. This alternative incorporates varying degrees of protection, restoration, enhancement, and use of resources and serves to meet ongoing programs and land uses. Goals and objectives focus on environmental, economic, and social outcomes achieved by strategically addressing demands across the landscape. Priority vegetation communities and species for management under Alternative D would be the same as those described for Alternative B.

ES.5 ENVIRONMENTAL CONSEQUENCES

The purpose of the environmental consequences analysis in this RMP/EIS is to determine the potential for significant impacts of the federal action on the human environment. The “federal action” is the BLM’s selection of an RMP on which future land use actions will be based for the LFO and BFO. **Chapter 4** objectively evaluates the likely direct, indirect, and cumulative impacts on the human and natural environment in terms of environmental, social, and economic consequences that are projected to occur from implementing the alternatives.

Chapter I. Introduction

I.1 INTRODUCTION

The United States Department of the Interior (DOI), Bureau of Land Management (BLM), Lewistown Field Office (LFO) and Butte Field Office (BFO) are preparing a resource management plan (RMP) to guide management of 651,200 acres of federally managed surface and 1,196,800 acres of BLM-administered federal mineral estate in central Montana. Management decisions in the planning area are currently based on the Headwaters RMP, approved in July 1984 (BLM 1984) and the Judith-Valley-Phillips (JVP) RMP, approved in September 1994 (BLM 1994), as amended. The approved RMP (the Lewiston RMP) will replace these two RMPs. The BLM will prepare one RMP/environmental impact statement (EIS); however, the LFO and the BFO will issue separate records of decision (RODs).

I.2 PURPOSE AND NEED FOR THE PLAN

The purpose of this RMP is to ensure that BLM-administered lands and minerals in the planning area are managed in accordance with the multiple use and sustained yield principles stated in the Federal Lands Management and Policy Act of 1976 (FLPMA; 43 US Code [USC] 1701 et seq.). FLPMA states the BLM shall “develop, maintain, and, when appropriate, revise land use plans” (43 USC, Section 1712 [a]); therefore, this RMP provides planning-level management strategies that are expressed in the form of goals, objectives, allowable uses, and management actions for resources and resource uses. The RMP neither prioritizes certain projects nor describes how particular programs would be implemented; rather, those decisions are deferred to more detailed implementation-level planning.

The 1984 Headwaters RMP and 1994 JVP RMP have guided the BLM’s management of public lands. Resource conditions, public demands, and policies have changed sufficiently to warrant revisiting these decisions. Past plan evaluations (5- and 15-year plan evaluations for Headwaters and an 8-year plan evaluation for the JVP RMP) indicated a need for a plan revision.

Although the JVP RMP was approved in 1994 to guide management of all resources in the LFO, it did not make any specific decisions relative to leasing of fluid minerals; this was due to a protest on the 1992 Final JVP RMP/EIS. Since that time, the LFO has deferred fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. This deferral would continue until a new RMP is completed for the planning area. (Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO through reliance on the leasing decisions made in previous land use plans and programmatic analyses.)

The need for the RMP revision is to address policies and resource issues that have arisen since the adoption of the previous RMPs. Issues prompting the need for this RMP revision are as follows:

- How can the BLM manage public land uses, while maintaining and improving terrestrial and aquatic habitats?
- Which areas should be open to mineral and energy development, and how should the BLM manage such development, while protecting human health and natural and cultural resources?
- How can the BLM manage areas that contain unique or sensitive resources in areas that would require special stipulations to protect wildlife values?

- How can the BLM manage increased conflicts between competing resource values and land uses, while accommodating increased demand for resources and activities?

The decision to be made by the Lewistown RMP is whether new land use planning decisions are necessary for those issues identified through public and internal scoping. Where appropriate, the BLM will incorporate decisions from the existing Headwaters and JVP RMPs; however, the Lewistown RMP will replace the existing RMPs.

1.3 DESCRIPTION OF THE PLANNING AREA

The Lewistown RMP planning area comprises all or portions of nine counties in central Montana: Cascade, Chouteau, Fergus, Judith Basin, Lewis and Clark, Meagher, Petroleum, Pondera, and Teton. Within the planning area, landownership is mixed. BLM-administered lands and minerals are intermingled with National Forest System land; national wildlife refuges (NWR); lands managed by the US Army Corps of Engineers and the US DOI, Bureau of Reclamation (BOR); and state, private, and tribal lands. In total, the planning area covers 12,906,800 surface acres and 1,196,800 acres of federal mineral estate (**Figure I-1**, Project Planning Area [**Appendix A**, Figures]).

The BLM-administered lands and minerals addressed in this RMP revision are referred to as the decision area; these lands are managed by both the LFO and the BFO. This land area totals approximately 651,200 surface acres and 1,196,800 acres of federal mineral estate. (Note: Based on an administrative boundary realignment, effective October 1, 2011, the BFO manages approximately 10,400 surface acres and 62,900 acres of subsurface federal mineral estate in the northern portion of Lewis and Clark County [*Federal Register* Notice of Administrative Boundary Change, Volume 76, Number 237, 12/9/2011]. For purposes of this planning effort, however, the BLM addresses that portion of Lewis and Clark County as part of the Lewistown planning and decision areas.)

Except for several contiguous blocks of land in Fergus and Petroleum Counties, most of the BLM-administered lands in the planning area are scattered tracts, intermingled with private and state lands. **Table I-1**, Land Status within the Planning Area, identifies the acreage of the various landownerships in the planning area.

Table I-1
Land Status within the Planning Area

Land Status	Acres¹	Percentage of Planning Area
Private	8,897,900	69
Forest Service	2,098,300	16
State	840,500	7
BLM	651,200	5
Bureau of Indian Affairs (BIA)	158,700	1
US Fish and Wildlife Service (USFWS)	133,600	1
State Wildlife Areas	62,300	<1
BOR	32,900	<1
Water	28,200	<1
Other (federal and local)	3,200	<1
Total	12,906,800	100

Source: BLM GIS 2015a

¹Rounded to the nearest 100 acres.

Table I-2, Mineral Status within the Planning Area by County, identifies the acreage of mineral estate in the planning area. **Figure I-2**, RMP Planning Area and Federal Mineral Estate (**Appendix A**), is a map of the federal mineral estate in the planning area. The Lewistown RMP does not make decisions for the surface or mineral estates of private- or state-owned lands and minerals or for federal mineral estate within national forests. The BLM will coordinate with national forest managers, as they revise their land use plans, to make joint decisions concerning federal minerals; however, the RMP does provide management decisions for split estate situations involving federal minerals managed by the BLM and overlain by private- or state-owned surface. Oil and gas leasing decisions for federal mineral estate under lands administered by other federal and state agencies within the planning area are considered in the Lewistown RMP in cooperation with those agencies.

Table I-2
Mineral Status within the Planning Area by County

Land Status (acres ¹)	BLM Surface/Federal Minerals	Other Federal Surface/Federal Minerals ²	Private Surface/Federal Minerals	State or Local Surface/Federal Minerals	Total
Cascade County	24,200	4,300	31,100	1,900	61,500
Chouteau County	26,000	0	26,800	0	52,800
Fergus County	208,700	0	102,100	3,100	313,900
Judith Basin County	12,000	0	16,100	1,500	29,600
Lewis and Clark County	10,400	3,300	42,600	6,600	62,900
Meagher County	7,900	0	65,200	1,700	74,800
Petroleum County	320,300	0	71,300	0	391,600
Pondera County	1,100	0	56,300	13,200	70,600
Teton County	17,900	26,500	71,000	23,700	139,100
Total	628,500	34,100	482,500	51,700	1,196,800

Source: BLM Geographic Information System (GIS; 2015a)

¹Rounded to the nearest 100 acres.

²This does not include lands managed by the United States Department of Agriculture, Forest Service (Forest Service).

I.4 SCOPING AND ISSUE IDENTIFICATION

The formal public scoping process for the Lewistown RMP began with the publication of the Notice of Intent (NOI) in the *Federal Register* on February 10, 2014; the BLM also posted the NOI on the project website (<https://go.usa.gov/xUPsP>). It served to notify the public of the BLM's intent to revise the RMP for the Lewistown planning area, provided the location of the public scoping meetings, and identified the preliminary issues to be considered in the RMP revision process. Public notification of the scoping process also included news releases, newsletters, and flyers.

During the weeks of March 4 and April 3, 2014, the BLM hosted scoping meetings at six locations across the planning area. The meetings were to provide the public with an opportunity to ask questions and learn about the project and the planning process and to submit their issues and concerns to the BLM.

The BLM received a total of 48 unique submissions and 5 form letters during public scoping. These submissions contained a total of 526 separate comments (370 unique and 156 duplicate). Detailed information about the comments received and about the public outreach process can be found in the

Lewistown RMP Revised Scoping Report, finalized in August 2014 (BLM 2014), available at <https://go.usa.gov/xUPsP>.

1.4.1 Issues Identified for Consideration

To initiate the RMP process, the BLM identified preliminary planning issues through internal scoping based on RMP evaluations, new program guidance, and staff input. Broadly defined planning issue statements identified in internal and external scoping are listed in **Table 1-3, Planning Issue Categories and Statements**. More detailed information on each planning issue is included in the Lewistown RMP Revised Scoping Report (BLM 2014), available at <https://go.usa.gov/xUPsP>.

**Table 1-3
Planning Issue Categories and Statements**

Issue	Planning Issue Category	Planning Issue Statement
1.	Air resources and climate	How can the BLM prevent degradation of air resources and minimize contributions to variability in climate?
2.	Geology and soil resources	How can the BLM maintain and restore geologic and soil resources?
3.	Water resources	How can land use practices be managed to maintain and improve water resources?
4.	Vegetation communities	How can the BLM maintain and restore vegetation communities?
5.	Fish and wildlife	How can the BLM manage public land uses while maintaining and improving terrestrial and aquatic habitats?
6.	Wildfire and ecology	How can the BLM manage fire and fuels to protect public safety, and natural and cultural resources?
7.	Cultural and heritage resources	How will the BLM provide for the preservation and interpretation of cultural and heritage resources?
8.	Paleontological resources	How can the BLM manage paleontological resources to provide both resource protection and opportunities for public education and study?
9.	Visual resources	How should visual resource management (VRM) classes be determined, and how can current and potential conflicts with managing VRM values be mitigated?
10.	Wilderness characteristics	How will the BLM maintain wilderness values?
11.	Cave and karst resources	What management is needed to manage for cave and karst resources?
12.	Minerals and energy resources (including renewable energy)	Which areas should be open to mineral and energy development and how should the BLM manage such development while protecting human health, and natural and cultural resources?
13.	Livestock grazing	How can the BLM manage livestock use on public lands while protecting natural and cultural resources?
14.	Recreation and visitor services	How can the BLM provide recreation opportunities on public lands while protecting public safety, and natural and cultural resources?
15.	Travel, transportation management, and access	How should travel be managed on BLM-administered lands to allow access and recreation while protecting natural, biological, and cultural resources? What management actions are needed to maintain and improve access to public lands?
16.	Lands and realty (including withdrawals)	What land tenure, withdrawals, and management adjustments are needed to meet access and development needs while protecting natural and cultural resources?
17.	Forest, woodland, and special products	How can the BLM provide forest products while protecting natural and cultural resources?
18.	Special designations	How can the BLM manage areas that contain unique or sensitive resources?

Issue	Planning Issue Category	Planning Issue Statement
19.	Social and economic conditions (including environmental justice)	How can the BLM manage public land use while preserving local traditions and economies that rely on BLM-administered lands and minerals?
20.	Treaty rights and tribal interests	What management actions are required to support tribal interests in the planning area, and how will management be consistent with treaty rights retained by tribes?

I.4.2 Issues Outside the Project Scope

During scoping, commenters raised several concerns regarding issues that would not be addressed in the RMP, as follows:

- Regulations and BLM policy issues involved requests for changes to, or continuation of, state or national BLM policies or existing laws and regulations. These types of policy and regulatory decisions are set at the national level. Examples of this type of comment included requests to increase grazing fees, that the BLM should redefine the terms used for calculating animal unit months (AUMs), or that it should implement broad-scale, recreational user fees on BLM-administered lands.
- Issues outside the scope of the planning process were requests for the BLM to take actions outside of its jurisdiction or manage resources not within the planning area (such as the Upper Missouri River Breaks National Monument [UMRBNM] or National Forest System lands). Examples of comments considered to be outside of the scope are a request to stop the take of animals in the planning area and a request to provide for the restoration of free-roaming bison. The BLM also received multiple comments that supported designation for all potential lands as wilderness areas. The designation of wilderness area status is the sole responsibility of Congress; existing wilderness designated by Congress cannot be changed, and no new wilderness can be created until Congress acts on the existing set of recommendations.
- Planning and public involvement process comments included requests for the BLM to follow the principles of multiple use or to implement required planning statutes (such as the National Environmental Policy Act of 1969 [NEPA] and FLPMA). Some commenters offered recommendations based on personal interpretations of court decisions or research studies. Other commenters provided suggestions on BLM management that were administrative in nature and that do not require further analysis, such as “increase education.” Some commenters simply requested specific data sets be made available to the public or to be notified regarding the status of the RMP project.
- Requests for implementation-level (i.e., project- or site-specific) management actions included requests that cannot be properly addressed at the RMP level. These commenters often requested the establishment of allotment-specific forage objectives, site-specific route designation, or suggestions on the design of timber sales or specific management actions related to cave management.

I.5 COLLABORATION AND COORDINATION

I.5.1 Intergovernmental and Interagency

The BLM is the lead agency for the Lewistown RMP. On August 16, 2013, the BLM wrote to 67 local, state, federal, and tribal representatives, inviting them to participate as cooperating agencies for the Lewistown RMP. Nine representatives agreed to participate in the RMP as designated cooperating

agencies and signed a memorandum of understanding (MOU) with the BLM (see **Appendix B**, Collaboration and Coordination, for more details). The list of preparers for the Lewistown RMP and EIS is also included in **Appendix B**.

1.5.2 Tribal Relationships and Indian Trust Assets

Government-to-government consultation began in February 2014 with the BLM sending requests for consultation letters to all area tribes. The BLM held informational meetings with tribal representatives in April and May 2014. Government-to-government consultation will continue throughout the RMP development process. This is to ensure that management actions are consistent with treaty rights retained by tribes and that the concerns of tribal groups are considered. The BLM has consulted the following state and federal recognized Native American tribes: Blackfeet, Chippewa Cree, Confederated Salish and Kootenai, Crow, Fort Belknap, Fort Peck, Little Shell, Nez Perce, Northern Cheyenne, and Shoshone-Bannock.

1.5.3 Montana State Historic Preservation Office Consultation

The State Historic Preservation Officer (SHPO) has been notified of the status of the Lewistown RMP and will receive a draft EIS/RMP for review. Additional information on SHPO consultation will be added to the Final RMP/EIS.

1.5.4 US Fish and Wildlife Service Consultation

To comply with Section 7(c) of the Endangered Species Act of 1973 (ESA), the BLM consulted the USFWS early in the planning process. The USFWS provided input on planning issues, data collection and review, and alternatives development. The BLM will consult with the USFWS to identify ESA issues and to develop the draft biological assessment.

1.5.5 Resource Advisory Council Collaboration

The BLM first presented to the Central Montana Resource Advisory Council (RAC) the Preparation Plan for the Lewistown RMP on January 9 and 10, 2013. During a subsequent RAC meeting on September 18 and 19, the BLM solicited RAC participation as a subcommittee during preparation of the Lewistown RMP. The RAC did not accept the offer to participate but requested to be informed of progress and issues that require its attention. The LFO will provide the RAC with regular briefings during quarterly meetings to ensure consistency with other local, state, and federal plans. The Lewistown Field Office provided six RMP project briefings to the RAC between 2014 and 2017.

1.5.6 Wild and Scenic Rivers Public Input Process

Public involvement for the wild and scenic rivers (WSR) evaluation process was included as part of the initial scoping for the RMP from February 10 through May 5, 2014, as detailed in the Scoping Report (BLM 2014). The BLM presented the results of its initial identification process, provided educational materials regarding the WSR process, and solicited comments from the public and government agencies. The public was invited to submit comments via mail, facsimile, or email, and the BLM accepted comments until May 5, 2014; however, it received no comments specific to WSR during scoping. The draft RMP will incorporate each of the eligible rivers into one or more alternatives. Additional details are included in the WSR eligibility reports (BLM 2010, 2015).

I.6 LEGISLATIVE CONSTRAINTS AND PLANNING CRITERIA

The BLM developed preliminary planning criteria for focused planning of the Lewistown RMP and to guide decision-making by topic. These criteria were introduced to the public for review in the NOI published on February 10, 2014 (79 *Federal Register* 7694) and at all scoping meetings. The public was encouraged to comment on and suggest additions to these criteria. Additional planning criteria were identified during scoping by individuals, organizations, agencies, and tribes. The planning criteria are as follows:

- The RMP/EIS will be completed in compliance with FLPMA, NEPA, and all other applicable laws, regulations, secretarial and executive orders, and BLM policies and guidance.
- Advance efforts to expand hunting, fishing and recreational opportunities consistent with Secretarial Order 3347, Secretarial Order 3356 and Secretarial Order 3366.
- The planning process will incorporate measures to protect against catastrophic wildfires consistent with Secretarial Order 3372.
- The RMP will establish new guidance and will identify existing guidance that the BLM will rely on in managing public lands within the LFO and the BFO (for the northern portion of Lewis and Clark County).
- The RMP/EIS will incorporate, by reference, the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota; the Off-Highway Vehicle EIS and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota; Montana Forestry Best Management Practices; the Montana Guide to the Streamside Management Zone Law and Rules; the ROD and Approved Resource Management Plan Amendments for the Rocky Mountain Region, including the Greater Sage-Grouse Sub-Region of Lewistown; the ROD on the Vegetation Treatments on Bureau of Lands Management Lands in 17 Western States Programmatic Environmental Impact Statement (BLM 2007); and the ROD on the Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Lands in 17 Western States EIS (BLM 2016).
- The RMP/EIS will incorporate, by reference, 603 Wilderness Study Area (WSA) findings that affect public lands in the planning area.
- The BLM will consult Native American tribes. The Blackfeet Indian Reservation is next to the planning area in Pondera County. Also, other tribes in Montana, Idaho, North and South Dakota, and Wyoming were contacted during the scoping process to determine what level of participation they would like to have during the RMP process. Early consultation and close coordination will take place to ensure that the BLM fulfills its trust responsibilities and that management actions proposed in the RMP/EIS are consistent with treaty rights retained by tribes.
- The BLM will consult the Montana SHPO early on for any potential effect of the plan on cultural resources under provisions of the National Historic Preservation Act of 1966 (NHPA), as amended (16 USC 470f) and under the National Programmatic Agreement. The BLM will invite relevant and interested tribal governments and the SHPO to participate as cooperating agencies.
- The RMP/EIS will incorporate the requirements of the interagency reference guide entitled Reasonably Foreseeable Development Scenarios and Cumulative Effects Analysis developed by the Rocky Mountain Federal Leadership Forum on NEPA, Oil and Gas, and Air Quality.

- The RMP/EIS will recognize the State of Montana’s responsibility to manage wildlife populations, including uses such as hunting and fishing. Coordination with the State of Montana will be conducted pursuant to Secretarial Order 3362 to enhance and improve the quality of big-game winter range and migration corridors on federal lands.
- To the extent possible, goals and objectives in the plan for plants and wildlife (including special status species) will incorporate or respond to goals and objectives from established recovery plans, conservation strategies, and strategic plans.
- To the extent possible, decisions in the RMP/EIS will be compatible with the existing plans and policies of adjacent local, state, tribal, and federal agencies, as long as the decisions conform with legal mandates on public lands management.
- The RMP/EIS will evaluate public access and recreational opportunities when evaluating land-tenure decisions consistent with SO 3373.
- The scope of analysis will be consistent with the level of analysis in approved plans and in accordance with BLM-wide standards and program guidance.
- Geospatial data will be automated in a geographic information system (GIS) to facilitate the affected environment discussions, alternative formulation, and environmental consequences analysis and to display the results.
- The RMP/EIS will promote active management to reduce risk of wildland fire consistent with Secretarial Order 3372 and Executive Order 13855.
- The BLM will add best management practices (BMPs) for oil and gas, road drainage, grazing, water quality for Montana forests, fire rehabilitation and management, wind energy, power lines, and greater sage-grouse conservation.
- During the land use planning process, the BLM will coordinate with administrators of the Lewis and Clark National Historic Trail (NHT), Nez Perce NHT, and Continental Divide National Scenic Trail (NST) to establish national trail management corridors.

The BLM received the following additional criteria in public scoping comments during the scoping period (February 10, 2014, to April 11, 2014) and added them to the list of planning criteria.

- Off-highway vehicle (OHV) management strategies will be consistent with the Final National Management Strategy for Motorized Off-highway Vehicle Use on Public Lands, January 19, 2001 (BLM 2001).
- The RMP/EIS will be consistent with the Montana State Water Plan, Montana Water Supply Initiative—2015 (http://www.dnrc.mt.gov/wrd/water_mgmt/state_water_plan/default.asp).
- The planning process will incorporate the United States Environmental Protection Agency (EPA), United State Department of Agriculture (USDA), and DOI MOU dated June 23, 2011, regarding Air Quality Analyses and Mitigation for Federal Oil and Gas Decisions through the NEPA Process.
- The RMP/EIS will be consistent with the Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS 484, April 2014).
- The RMP/EIS will be consistent with the Federal Lands Hunting, Fishing and Shooting Sports Roundtable MOU (2006).

- The BLM will incorporate key aspects of Water Quality BMPs for Montana Forests (Montana State University Publication EB158) and the Montana Guide to Streamside Management Zone Law and Rules (Montana DNRC 2006).

I.7 RMP AMENDMENTS, IMPLEMENTATION-LEVEL PLANS, AND RELATED LAND USE PLANS

Since the Headwaters RMP (BLM 1984) and JVP RMP (BLM 1994) were developed and approved, the BLM has implemented amendments to provide additional land management direction. These planning documents are presented in **Appendix C**, RMP Amendments, Implementation-Level Plans, and Related Land Use Plans.

The BLM's planning regulations require that RMPs be consistent with officially approved or adopted resource-related plans of other federal, state, local, and tribal governments, to the extent possible. The RMPs also should be consistent with the purposes, policies, and programs of federal laws and regulations applicable to BLM-administered lands and minerals. These plans are discussed in **Appendix C**.

This page intentionally left blank.

Chapter 2. Alternatives

2.1 MANAGEMENT COMMON TO ALL ALTERNATIVES

Allowable uses and management actions from the existing RMPs that remain valid and do not require revision have been carried forward to all of the proposed alternatives. This is because the existing decisions or management actions remain responsive to current issues. These decisions are common to all four alternatives because a range of alternative decisions is not necessary for every resource or resource use. Other decisions are common only to the action alternatives (Alternatives B, C, and D).

All action alternatives would involve collaboration through partnerships and communication with other agencies and interested parties to implement the RMP, including outreach and education, monitoring, and project-specific activities (e.g., trail development). Although each alternative emphasizes a slightly different mix of resources and resource uses, all four alternatives contain some common elements. For example, all alternatives contain the management actions from the Lewistown Field Office Greater Sage-Grouse Approved RMP Amendment (BLM 2015a); however, the 2015 Greater Sage-Grouse Approved RMP Amendment did not address unleased fluid mineral decisions. Therefore, unleased fluid mineral decisions for Greater Sage-Grouse are considered in the action alternatives. In addition, this plan considers changes from the 2015 Greater Sage-Grouse Approved RMP Amendment related to mineral materials and does not carry forward the recommended mineral withdrawal for Sagebrush Focal Areas (see 82 *Federal Register* 195, October 11, 2017, p. 47248). Management actions common to all four alternatives are indicated by a single cell across the table row of the applicable resource or resource use programs in **Section 2.7**.

This RMP/EIS recommends an adaptive management strategy. This process is flexible and generally involves four phases: planning, implementation, monitoring, and evaluation. The BLM would periodically review monitoring results, and any management objectives or actions that may need to be changed or adjusted would be open to public review and comment through an environmental review process before decisions are made. **Appendix D**, Implementation and Monitoring, provides more information on implementation and monitoring.

2.2 ALTERNATIVE A (NO ACTION ALTERNATIVE)

Alternative A meets the requirement that the BLM consider a no action alternative. This alternative continues current management direction and prevailing conditions derived from existing planning documents. Goals and objectives for resources and resource uses are based on the applicable portions of the Headwaters RMP, approved in July 1984 (BLM 1984) and the JVP RMP, approved in September 1994 (BLM 1994), along with associated amendments, activity- and implementation-level plans, and other management decision documents. Laws, regulations, and BLM policies that supersede RMP decisions would apply.

Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to activities such as mineral leasing and development, recreation, timber harvesting, construction of utility corridors, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

There is an existing protest resolution decision affecting federal mineral estate in the LFO that does not allow oil and gas leasing of nominated parcels that would require a special stipulation to protect important wildlife values. Existing fluid mineral leases that expire can be renominated for leasing but would be deferred in areas that would require special leases for renomination depending on location.

2.3 ALTERNATIVE B

Alternative B emphasizes improving, rehabilitating, and restoring resources and sustaining the ecological integrity of habitats for all priority plant, wildlife, and fish species, while allowing appropriate development scenarios for allowable uses (such as mineral leasing, locatable mineral development, recreation, communication sites, and livestock grazing). It particularly targets the habitats needed for the conservation and recovery of federally listed, proposed, or candidate threatened and endangered plant and animal species. In addition, this alternative aims to restore water quality through the greatest level of protection and active restoration of streams and riparian-wetland areas.

Goals and objectives focus on environmental and social outcomes achieved by sustaining relatively unmodified physical landscapes and natural and cultural resource values for current and future generations. This alternative would establish the greatest number of special designation areas, such as areas of critical environmental concern (ACECs) and special recreation management areas (SRMAs). It includes specific measures designed to protect or enhance resource values, such as lands with wilderness characteristics. Appropriate and allowable uses and restrictions would be contingent on minimizing adverse effects on natural and cultural resources.

Under Alternative B, the following vegetative communities would be priority habitat for management: grasslands, sagebrush/grasslands, ponderosa pine/badlands, montane forest and meadows, and riparian-wetland communities. Priority species for management are listed in **Appendix E**, Special Status Species Confirmed or Likely to Inhabit the Planning Area.

2.4 ALTERNATIVE C (PREFERRED ALTERNATIVE)

The appropriate mix of uses on BLM-administered lands and mineral estate would be based on making the most of resources that target social and economic outcomes, while protecting land health. Management direction would recognize and expand existing uses and would accommodate new uses to the greatest extent possible. The appropriate development scenarios for allowable uses (such as mineral leasing, locatable mineral development, recreation, communication sites, and livestock grazing) would emphasize maximizing resource production in an environmentally responsible manner, while maintaining the basic protection needed to sustain resources. Appropriate and allowable uses and restrictions would emphasize social and economic outcomes, while mitigating effects on land health. Priority species for management would be focused on special status species.

2.5 ALTERNATIVE D

Alternative D emphasizes distributing and examining resources and resource use among competing human interests, land uses, and the conservation of natural and cultural resource values, while sustaining and enhancing ecological integrity across the landscape, including plant, wildlife, and fish habitat. This alternative incorporates varying degrees of protection, restoration, enhancement, and use of resources and serves to meet ongoing programs and land uses. Goals and objectives focus on environmental, economic, and social outcomes achieved by strategically addressing demands across the landscape. Priority vegetation communities and species for management under Alternative D would be the same as those described for Alternative B.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

2.6.1 Analyzing an Alternative that Makes All Lands in the Planning Area Unavailable for Livestock Grazing and Eliminates Livestock Forage Allocation

No issues or conflicts have been identified during this land use planning project to warrant the complete elimination of livestock grazing across the planning area. The analysis of an alternative entirely eliminating grazing is not needed; this is because the BLM has considerable discretion through its grazing regulations to determine and adjust stocking levels, seasons-of-use, and grazing management activities and to allocate forage to uses of the public lands in RMPs.

From 1956 through 1972, the BLM conducted a classification of public lands to estimate the amount of available forage in the planning area. These are typically referred to as the Missouri River Basin Surveys. From this project, the BLM generated multiple subbasin reports, which provided the carrying capacities by AUMs for all BLM-administered lands at the time of survey. The BLM, in cooperation with grazing advisory boards, used the information to make adjustments to the AUMs allocated to grazing permits and leases. This cooperation resulted in making appropriate changes to grazing permits in the planning areas. Generally, livestock allocation levels were estimated to be approximately 30 to 50 percent of the annual vegetation production of area landforms. These changes were implemented before 1975.

These historical grazing allocations have been adjusted over time and were subsequently included in the 1984 and 1994 RMPs and are carried forward in the current analysis. The historical forage allocations are validated periodically, which can occur independently or can coincide with the renewal of each 10-year grazing permit or lease.

The BLM fully analyzed eliminating livestock grazing in the LFO Greater Sage-Grouse Proposed RMP Amendment/Final EIS (BLM 2015b). The analysis was done for priority habitat management areas (PHMA) and general habitat management areas (GHMA). These areas constitute 337,165 acres of BLM-administered lands occurring throughout Chouteau, Fergus, Judith Basin, Meagher, and Petroleum Counties, with 69,408 associated AUMs, all of which are in this planning area.

Current resource conditions on BLM-administered land, including range vegetation, watershed, and wildlife habitat, as reflected in land health assessments, do not warrant an area-wide prohibition of livestock grazing. Following initial surveyed forage allocations, the basis for increasing or decreasing permitted use has been land health evaluations, inventories, and monitoring data (vegetative and levels of use). Suitable measures, which could include reducing or eliminating livestock grazing, are provided for in this RMP/EIS. They could become necessary in specific situations where livestock grazing causes or contributes to conflicts with protecting or managing other resource values or uses. Such determinations would be made during site-specific activity planning or permit renewal and their associated environmental review.

2.6.2 Master Leasing Plan

During public scoping for the Lewistown RMP, the Montana Wilderness Association submitted the following proposal to produce three master leasing plans within the planning area:

- Southeast portion of the planning area. This is the area south of Highway 200 and east of Highway 87. This includes the Elk Creek, Pike Creek, Cemetery Road, Cat Creek, and

Cottonwood Creek potential lands with wilderness characteristics units.¹ This area has recognized conflicts between recreational opportunities and oil and gas development.

- North-central portion of the planning area. This is the area north of Winifred, including Chimney Bend, Woodhawk Creek, Dry Armells, and Armells Creek potential lands with wilderness characteristics units. This region has recognized conflicts between wildlife and habitat and oil and gas development, and between oil and gas development and recreational opportunities.
- Western portion of the planning area along the Rocky Mountain Front. This area includes Blind Horse Creek, Ear Mountain, Chute Mountain, Deep Creek/Battle Creek, and Beaver Meadows potential lands with wilderness characteristics units, and the North Fork Sun River WSA. This area has recognized conflicts between oil and gas development and wildlife habitat, and between oil and gas development and recreational opportunities.

The BLM rescinded its Master Leasing Plan policy on January 31, 2018, and will not initiate any new Master Leasing Plans.

2.6.3 Open Off-Highway Vehicle Areas

During scoping, commenters requested that the BLM provide open or play areas for Off-Highway Vehicle (OHV) recreation opportunity and trail bikes, where acceptable in selected areas. This designation is within the scope of the RMP revision. However, no specific areas were recommended, and the BLM was unable to identify any portion of the decision area suitable for this use. Therefore, an alternative considered but not analyzed would be to designate a portion of the planning area as open to cross-country OHV travel. This decision is also in accordance with the 2003 Off-Highway Vehicle ROD and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota (BLM 2003a). Cross-country OHV travel (open) is prohibited in the planning area, except in those limited circumstances described on page 4 of the ROD. OHVs must, therefore, remain on existing travel routes at all times, unless travel is for an administrative use or an exception as described in the ROD.

2.6.4 Oil Shale and Geothermal Resources

Development of oil shale and geothermal resources has never been proposed or permitted in the planning area. Because the development potential for these resources is minimal to nonexistent in the planning area, these actions were considered but not analyzed in detail in the RMP/EIS.

2.6.5 Designating Major Transportation and Energy Corridors

Major transportation and energy corridors were considered but not analyzed in detail. Because federal lands are scattered in a checkerboard land pattern interspersed with private and state lands in most of the planning area, a major transportation or energy corridor would not be feasible to implement. However, in consideration of corridors, the RMP/EIS does state in the *Lands and Realty, Land Use Authorizations* alternatives, “require the placement of new facilities or upgrades to existing facilities in areas with previous disturbance and existing facilities, as determined practical, consistent with other

¹For public scoping the BLM identified potential lands with wilderness characteristics to be inventoried for such characteristics. The master leasing plan proposal submitted by the Montana Wilderness Association used these units for reference.

resource values” (Alternative B) and “encourage applicants to locate new facilities within previously disturbed areas or adjacent similar rights-of-way (ROWs)” (Alternatives C and D).

2.6.6 Relocate Bison as Wildlife onto Public Lands

On BLM-administered lands, primary authority and responsibility for managing fish and resident wildlife rests with the state (43 Code of Federal Regulations [CFR] 24.4[c]). If public lands are proposed for bison restoration, the BLM would work closely with the State of Montana through the BLM’s established planning processes. Any consideration of placing wild bison on BLM-administered lands would also include full involvement by tribal and local governments and the public. At this time, the State of Montana has not proposed to reintroduce wild bison on any BLM-administered lands managed by the LFO and BFO.

The Department of the Interior Bison Conservation Initiative (DOI 2008) provides guidance to address the health and genetic composition of the bison herds in seven NWRs and five national parks, all of which are outside of the planning area. While the initiative does mention that the “Charles M. Russell NWR is in the early stages of considering devoting part of the refuge to bison habitat with adjoining landowners,” the BLM has not received a proposal or recommendation from the refuge to manage any BLM-administered land for bison.

Privately owned bison are considered livestock and, as such can be permitted by the BLM (43 CFR 4130.6-4). The primary test in making this distinction is whether the owner of the animals qualifies as an applicant under the requirements of the grazing regulations. The grazing regulations define qualified applicants and apply equally to all qualified applicants, regardless of the class of livestock. Privately owned bison may be authorized to graze under the regulations, provided it is consistent with multiple-use objectives. As with other classes of livestock, bison may be permitted to graze where environmental review indicates no conflict with resource objectives or attainment of Standards for Rangeland Health (BLM 1997).

2.6.7 Designated Leasing Areas for Wind Energy

While the LFO contains wind resources that could be developed if interest existed, the availability of private or other non-federal lands coupled with the lack of transmission and paucity of pre-application discussion and interest in the field office indicate that demand to develop renewable energy on BLM-administered lands is very low. Given this low demand, identification of designated leasing areas for wind and solar that would be made available through a competitive process, as provided for under the 43 CFR 2800 regulations finalized in January 2017, is not warranted in the Lewistown RMP.

2.6.8 Coal

There is no known coal development potential within the planning area. Under the first regulatory screening procedure at 43 CFR 3420.1-4(e), only the areas that have development potential may be identified as acceptable for further consideration for leasing. A coal lease application could still be submitted to the BLM, but the applicant must be able to adequately demonstrate development potential and the merit of their data. If the application is determined to be adequate and passes the remaining screening and unsuitability assessment procedures required by regulation, a plan amendment would be required before issuing a coal lease.

2.7 ALTERNATIVES COMPARISON

Use the hyperlinks in the following table to access the applicable section of the alternatives matrix.

Areas of Critical Environmental Concern (ACECs) (p. 2-54)	Nonenergy Solid Leasable Minerals (p. 2-35)
Air Resources (p. 2-7)	Paleontological Resources (p. 2-28)
Back Country Byways (p. 2-55)	Recreation and Visitor Services (p. 2-42)
Cave and Karst Resources (p. 2-34)	Renewable Energy (p. 2-50)
Climate (p. 2-7)	Social and Economic – Tribal Interests (p. 2-59)
Cultural and Heritage Resources (p. 2-26)	Soil Resources (p. 2-8)
Fish and Wildlife (p. 2-17)	Special Status Species (p. 2-19)
Fluid Leasable Minerals (p. 2-35)	Stipulations and Restrictions for Biological Resources and Special Travel, Transportation Management, and Access (p. 2-43)
Status Vegetation Species (p. 2-21)	Vegetation Communities (p. 2-12)
Forest, Woodland, and Special Products (p. 2-51)	Visual Resources (p. 2-29)
Lands and Realty (p. 2-47)	Water Resources (p. 2-10)
Land Use Authorizations (p. 2-47)	Wild and Scenic Rivers (WSRs) (p. 2-56)
Land Tenure (p. 2-49)	Wilderness Study Areas (WSAs) (p. 2-58)
Lands with Wilderness Characteristics (p. 2-30)	Wildfire Ecology and Management (p. 2-23)
Livestock Grazing (p. 2-38)	Withdrawals (p. 2-51)
Locatable Minerals (p. 2-37)	
Mineral Materials (p. 2-37)	
National Trails (p. 2-55)	

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
1.	Management Common to All Alternatives			
2.	Apply conditions of approval (COAs), BMPs, and mitigation measures (shown in Appendix F , Design Features and Best Management Practices), and other site-specific design features to all resource uses to promote rapid reclamation, maximize resource protection, and minimize soil erosion.			
3.	As described in Appendix G , Reclamation, reclamation would be required for surface-disturbing activities.			
4.	Resources			
5.	Air Resources			
6.	Goal: Comply with National Ambient Air Quality Standards (NAAQS) and Montana Ambient Air Quality Standards (MAAQS).	Goal: Maintain compliance with the NAAQS, MAAQS, and the Montana State Implementation Plan.		
7.	Objective: Protect existing air quality by the use of BMPs (Appendix A of the JVP RMP) and best available control technology.	Objective: Reduce air quality and air quality-related value (AQRV) effects, including visibility and acid deposition, by including technically and economically feasible management actions to reduce emissions of criteria and hazardous air pollutants.		
8.	Action: No similar action.	Action: Implement an air quality adaptive management strategy to assess future air quality and AQRVs (Appendix H , Draft Air Resource Management Plan: Adaptive Management Strategy for Oil and Gas Resources).		
9.	Action: No similar action.	Action: Implement design features, construction techniques, or control measures to minimize fugitive dust emissions from BLM-authorized or -permitted surface-disturbing activities.		
10.	Action: No similar action.	Action: Apply engine and stationary source emission control requirements needed to ensure compliance with NAAQS, MAAQS, and the Montana State Implementation Plan.		
11.	Action: No similar action.	Action: Incorporate additional emission control design features if unacceptable air quality or AQRV degradation trends are identified at the project scale.		
12.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION Controlled Surface Use (CSU) for Tier IV engines to ensure compliance with Nitrous Dioxide (NO ₂) NAAQS		
13.	Climate			
14.	Goal: Provide for diverse, healthy ecosystems that are resilient to climate stressors.			
15.	Objective: No similar objective.	Objective: Apply ecosystem-level climate adaptation management strategies where climate conditions necessitate (as indicated by changes to plant communities, drought conditions, and similar events).		
16.	Action: No similar action.	Action: Manage for connectivity between habitats and sustainability of resource uses by: <ul style="list-style-type: none"> • Conducting quantitative monitoring to inform an adaptive management framework • Utilizing integrated monitoring protocols, such as the Assessment Inventory and Monitoring (AIM) strategy • Considering the data and future forecasts/trends produced by the Rapid Ecoregional Assessment (REA), including step-down recommendations or analysis updates • Using adaptive management strategies to identify specific climate vulnerabilities • Working cooperatively with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations • Considering potential changes in climate when proposing restoration seeding of native plants. Consider collection from the warmer component of the species' current range when selecting native seed 		

Alternative A (No Action)		Alternative B	Alternative C (Preferred)	Alternative D
		<ul style="list-style-type: none"> Using the State and Transition models from approved Ecological Site Descriptions (ESD) to evaluate potential changes in water resources and vegetation communities when completing land health assessments Promoting vegetative capture and storage of carbon, with consideration for resource objectives, by using Standards for Rangeland Health (BLM 1997) and Montana Forestry/Rangeland BMP guidelines at the project planning and implementation levels 		
17.	Goal: No similar goal.	Goal: Reduce greenhouse gas (GHG) emissions from authorized activities to the lowest practical levels that are technically and economically feasible based on current technologies.		
18.	Objective: No similar objective.	Objective: Evaluate the observed and anticipated long-term dynamic of climate variability and reduce GHG emissions from projects when feasible.		
19.	Action: No similar action.	Action: For oil and gas activities, reduce GHG emissions on a unit-production basis.		
20.	Action: No similar action.	Action: Identify opportunities for geophysical carbon sequestration on federal lands where federal mineral ownership exists as outlined in national guidance.		
21.	Action: No similar action.	Action: Consider applying BMPs to BLM-authorized activities to reduce emissions of GHGs.		
22.	Action: No similar action.	Action: Place priority on actions such as: enhanced energy efficiency, use of lower GHG-emitting technologies or renewable energy, planning for carbon capture and sequestration, and the capture or beneficial use of fugitive methane emissions.		
23.	Action: No similar action.	Action: Adjust the timing of BLM-authorized activities, as needed to accommodate long-term changes in weather patterns, while considering the effects on other resources and resource uses.		
24.	Action: No similar action.	Action: Use the State and Transition models from approved ESDs to evaluate potential changes in water resources and vegetative communities when completing land health assessments.		
25.	Soil Resources			
26.	Goal: Maintain, improve, or restore soil quality, productivity, and stability; prevent or minimize erosion and compaction while supporting multiple-use management while meeting proper functioning condition (PFC) and the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota (BLM 1997).			
27.	Objective: Maintain and/or improve soil productivity by increasing vegetation cover and reducing soil compaction and erosion.	<p>Objective: Maintain and/or improve soil productivity by increasing vegetation cover and reducing soil compaction and erosion for all land areas. Prioritize designated areas for resource protection and minimize ground disturbance. Prioritize previously degraded areas for restoration of soils.</p> <p>Incorporate soil protection consistent with soil resource capabilities in management actions and objectives for other resources/uses.</p>	<p>Objective: Maintain and/or improve soil productivity by increasing vegetation cover and reducing soil compaction and erosion for all land areas. Maximize land areas available for resource uses.</p> <p>Ensure surface disturbances do not cause accelerated erosion (e.g., rills, soil pedestals, and actively eroding gullies).</p>	<p>Objective: Maintain and/or improve soil productivity by increasing vegetation cover and reducing soil compaction and erosion for all land areas while prioritizing other areas for resource protection. Consider restoration of soils in previously degraded areas.</p> <p>Incorporate soil protection consistent with soil resource capabilities in management actions and objectives for other</p>

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		Ensure surface disturbances do not cause accelerated erosion (e.g., rills, soil pedestals, and actively eroding gullies).		resources/uses. Ensure surface disturbances do not cause accelerated erosion (e.g., rills, soil pedestals, and actively eroding gullies).
28.	Allowable Use: No similar use.	Allowable Use: Manage sensitive soils (302,700 acres) as ROW avoidance areas.	Allowable Use: No similar use.	
29.	Action: Apply mitigation measures and BMPs, if necessary.	Action: Apply COAs, BMPs, and design features as described in Appendix F . Apply reclamation, as described in Appendix G .		
30.	Action: No similar action.	Action: Authorized surface-disturbing activities would include plans for reclamation (Appendix G).		
31.	Action: No similar action.	Action: Any proposed activities that are located in sensitive soils would incorporate BMPs and other mitigation measures.		
32.	Action: No similar action.	Action: Avoid and mitigate disturbance to biologic soil crusts that are determined to be key in sustaining PFC of upland soil health.		
33.	Action: No similar action.	Action: Do not authorize activities in areas where erosion could not be effectively controlled or mitigated.		
34.	Action: No similar action.	Action: Use BMPs and Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota (BLM 1997) at the project level to assess and mitigate effects on fragile and unstable soils prone to slumping.		
35.	Allowable Use: Prior to authorizing any surface-disturbing activity (including but not limited to range improvements, mineral development, or ROW location), the BLM would evaluate the activity and if necessary apply mitigating measures, require reclamation, deny the authorization, or relocate the activity to a more suitable soil type. Site-specific measures would be developed for soils with high erosion susceptibility, steep slopes, sparse vegetation, and shallow soil depth. Activity plans would include mitigation to protect ground cover and streambank stability and to reduce sediment yields from surface-disturbing activities. All surface-disturbing activities are subject to an on-site evaluation to develop mitigations to reduce erosion and soil compaction and improve soil stability and salinity control.			
36.	Action: No similar action.	Action: Implement emergency stabilization and rehabilitation (ES&R) in a cost-effective manner to minimize negative effects of fire on soil, vegetation, and water resources (see Appendix I , Fire and Emergency Stabilization and Rehabilitation).		
37.	Allowable Use: STIPULATION Timing Limitation (TL) Wet Periods	Allowable Use: No similar allowable use.		
38.	Allowable Use: STIPULATION CSU Slope	Allowable Use: STIPULATION No Surface Occupancy (NSO) Slopes Susceptible to Mass Failure	Allowable Use: No similar allowable use.	
39.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Sensitive Soils	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION CSU Soils - Sensitive Soils

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
40.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Soils-Badlands, Rock Outcrop	Allowable Use: No similar allowable use.	Allowable Use: Same as Alternative B.
41.	Water Resources			
42.	Goal: Policy guidance given in the BLM Water Quality Manual (M-7240) is to manage water quality on BLM-administered lands so that the “quality can meet both federal and state standards” (BLM 2015c).	Goal: Manage surface and groundwater quality on BLM-administered lands to maintain, improve, or restore the chemical, physical, and biological integrity of waters to protect beneficial uses. Manage water quantity and quality to achieve or make significant and measurable progress toward achieving Montana State water quality standards, while ensuring that sufficient water quantity and quality are available to support BLM resources and resource uses.		
43.	Objective: Surface and groundwater quality would be maintained to meet or exceed state and federal water quality standards. Maintain or improve water quality in accordance with state and federal standards, including consultation with state agencies on proposed projects that may significantly affect water quality.	Objective: Maintain functioning hydrologic systems and provide a scientific, landscape approach to natural and human-influenced water systems. Increase the percentage of lotic riparian-wetland miles in the potential natural community, or at their capability, from approximately 63 percent to 80 percent by 2038 on all streams, including those streams listed as water quality impaired.	Objective: Increase the percentage of lotic riparian-wetland miles in PFC, or at their capability, to 80 percent by 2036 on all streams, including those streams listed as water quality impaired.	Objective: Maintain functioning hydrologic systems and provide a scientific, landscape approach to natural and human-influenced water systems. Increase the percentage of lotic riparian-wetland miles in PFC and/or desired future condition (DFC), or at their capability from approximately 63 percent to 80 percent by 2038 on all streams, including those streams listed as water quality impaired.
44.	Objective: No similar objective.	Objective: Maintain or increase water quantity availability for natural instream flow to benefit fish, wildlife, riparian-wetland areas, and water quality while providing current and future water needs for BLM programs and users.		
45.	Objective: No similar objective.	Objective: Maintain the beneficial use class of groundwater.		
46.	Objective: No similar objective.	Objective: Reduce known sources of non-point source pollution that are contributing to water quality impairment.		
47.	Action: Design management actions on public land in municipal watersheds to protect water quality and quantity.	Action: BLM actions or authorized activities would be designed to ensure that state and federal water quality standards are met or exceeded, and water quantity is both physically and legally available to meet the BLM’s current or future water resource needs for multiple-use management.		
48.	Action: Design management actions on public land in municipal watersheds to protect water quality and quantity.	Action: Identify, prioritize, and correct known sources of water quality impairment or non-point source pollution.	Action: BLM actions or authorized activities would be designed to ensure that state and federal water quality standards are met or exceeded, and water quantity is both physically and legally available.	
49.	Action: No similar action.	Action: Manage the number of surface water impoundments for	Action: Manage the number of surface water impoundments for	Action: Manage impoundments and supplemental water to provide

Alternative A (No Action)		Alternative B	Alternative C (Preferred)	Alternative D
		stock and wildlife to decrease the percentage of watershed disconnected by impoundments within the following watersheds: Armells Creek, Blood Creek, Carroll Coulee, Cottonwood Creek, Crooked Creek, Dovetail Creek, Drag Creek, Sand Creek, and Two Calf Creek.	stock and wildlife to maintain the amount of watershed necessary to protect existing water rights within the following watersheds: Armells Creek, Blood Creek, Carroll Coulee, Cottonwood Creek, Crooked Creek, Dovetail Creek, Drag Creek, Sand Creek, and Two Calf Creek.	resource values that support the BLM's multiple-use objectives in a manner that minimizes adverse effects on water quality, riparian habitat, and watershed function. Manage the number of surface water impoundments for stock and wildlife to maintain or decrease the percentage of watershed disconnected by impoundments within the following watersheds: Armells Creek, Blood Creek, Carroll Coulee, Cottonwood Creek, Crooked Creek, Dovetail Creek, Drag Creek, Sand Creek, and Two Calf Creek. Consider the feasibility of available alternatives to surface water development, such as groundwater wells, before increasing the percent of watershed disconnected by impoundments within the above watersheds.
50.	Action: No similar action.	Action: Manage the reservoirs according to the direction provided in Appendix J , Impoundments.		
51.	<p>Action: Claim possessory interests in water rights in the name of the United States for water uses on public lands. This would take place when the water right is needed to implement and preserve options for multiple use management. Purchase or lease essential water rights, when needed to meet management objectives and water is not otherwise available.</p> <p>Provided that the developments are compatible with BLM resource objectives, places of use associated with privately owned water rights would be allowed on BLM-administered land through a cooperative agreement (e.g., a stock water tank fed by a groundwater well on private property) and at the cooperators' expense, unless a water use agreement is signed to ensure a continued water supply to the places of use on BLM-administered lands.</p>			
52.	Allowable Use: STIPULATION NSO Floodplains	<p>Allowable Use: STIPULATION NSO Water, Riparian, Wetland, and Floodplains</p> <p>ALLOWABLE USE NL State-designated Source Water</p>	Allowable Use: Same as Alternative A.	<p>Allowable Use: STIPULATION NSO Water, Riparian, Wetland, and Floodplains</p> <p>STIPULATION NSO State-designated Source Water</p>

Alternative A (No Action)		Alternative B	Alternative C (Preferred)	Alternative D
		Protection Areas STIPULATION CSU Madison Aquifer		Protection Areas
53.	Allowable Use: Roads and utility corridors would avoid riparian zones to the extent practicable.	Allowable Use: Riparian-wetland areas would be managed as ROW exclusion areas for roads and utility corridors, except for existing ROW corridors.	Allowable Use: Same as Alternative A.	Allowable Use: Roads and utility corridors would avoid riparian zones, unless there is no practical alternative.
54.	Vegetation Communities			
55.	<i>General Vegetation</i>			
56.	Goal: Manage priority vegetative resources to maintain a diversity of ecological conditions within the planning area while providing for a variety of multiple uses that are economically and biologically feasible.			
57.	Objective: Provide plant communities that reflect the desired plant community appropriate for the ecological site. Where appropriate, active management techniques consistent with <i>Secretarial Orders 3362 and 3372</i> , would be used to achieve, maintain, and restore disturbance regimes supporting healthy functioning vegetation conditions.			
58.	Action: Design vegetation treatments to enhance vegetative health and/or habitat diversity consistent with desired conditions for vegetation and wildlife habitat.			
59.	Action: Grass seed or hay may be sold from BLM-administered land if an interdisciplinary environmental analysis finds it to be in the best interest of the public. Hay or seed cutting may be used as a land treatment to improve production of crested wheatgrass.	Action: No similar action.	Action: Selling grass seed, hay, or other vegetative products may be authorized. Hay or seed cutting may be used as a land treatment to improve production of crested wheatgrass provided it is not in conflict with wildlife or wildlife habitat values.	Action: No similar action.
60.	Allowable Use: No similar action.	Allowable Use: Consider commercial seed harvesting in all areas, except ACECs, WSAs, occupied special status plant species habitat.	Allowable Use: Consider commercial seed harvesting in all areas.	Allowable Use: Same as Alternative B.
61.	Action: No similar action.	Action: When reseeding surface disturbances, native plant species common to the site's natural plant community would be used. Use of introduced species would only be allowed where difficult site stabilization or wildlife concerns prevail. Locally collected seed should be emphasized following seed collection procedures outlined in the <i>Seeds of Success Protocol (BLM 2014a)</i> to create sources of native plant materials.		
62.	<i>Sagebrush/Grasslands</i>			
63.	Goal: Maintain and increase a diverse community of native sagebrush/grassland species.			
64.	Objective: No similar objective.	Objective: Improve or maintain the ecological status of BLM-administered land in the sagebrush/grasslands to achieve Standards for Rangeland Health (BLM 1997) on at least 80 percent of the BLM-administered land by 2038.		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
65.	Objective: No similar objective.	Objective: Minimize fragmentation of large intact blocks of sagebrush/grasslands. The necessary habitat, biological processes, and disturbance regimes would be allowed to maintain, enhance, or restore sagebrush/grassland species.		
66.	Action: No similar action.	Action: Restore 15 percent of existing crested wheatgrass stands to native grass, forb, and sagebrush species by 2038. Restoration priority locations would be consistent with special status species objectives.	Action: Manage existing crested wheatgrass seedings as spring use pastures, where feasible to defer native rangeland grazing.	Action: Manage existing crested wheatgrass seedings as spring use pastures, where feasible to defer native rangeland grazing. Where native restoration of old crested wheatgrass seedings is desired, farming and herbicide use could be authorized for up to 5 years in order to help destroy the crested wheatgrass seed bank. Fire may also be used to assist with restoration of native grassland/shrublands, where needed.
67.	<i>Grasslands</i>			
68.	Objective: No similar objective.	Objective: Improve or maintain the ecological status of BLM-administered land in the grasslands to Standards for Rangeland Health (BLM 1997) on at least 80 percent of the BLM-administered land by 2038.		
69.	Action: No similar action.	Action: Use wildfire, prescribed fire, and mechanical methods to improve or maintain ecological conditions in grassland habitats.	Action: Use a combination of wildfire, prescribed fire, and mechanical methods to improve or maintain ecological conditions in the grasslands with emphasis on achieving land health objectives.	
70.	<i>Ponderosa Pine Breaks/Badlands</i>			
71.	Objective: No similar objective.	Objective: Treat areas of high departure (Vegetation Condition Class [VCC] 3) or moderate departure (VCC 2) to improve VCC. Treatments should maintain VCC 1.		
72.	Objective: No similar objective.	Objective: One hundred twenty-five thousand acres within ponderosa pine and grassland National Vegetation Classification System macro-groups would be burned within the Breaks Fire Management Unit over the 20-year plan. (Fire frequency is 12-20 years for the system—acres for each treatment/burn would be counted, so some areas would be counted multiple times and some areas would receive no vegetation disturbance.)		
73.	Objective: No similar objective.	Objective: Improve or maintain the ecological status of BLM-administered land in the ponderosa pine breaks/badlands to achieve Standards for Rangeland Health (BLM 1997) on at least 90 percent of the BLM-administered land by 2038.		
74.	Action:			
	<ul style="list-style-type: none"> • Complete inventory and health assessment of forested stands within the planning area during the life of the plan. • Monitor forest health indicators, including populations of insects, and apply management methods that promote natural function based on the forest type. • Silvicultural prescriptions would be consistent with accepted methods related to site, species, habitat types, and the individual requirements of forest stands. • Manage old forest structure in a sustainable manner. (Note: Old forest structure is defined by the presence of the following: large, old trees; large snags; coarse woody debris on the forest floor; multiple canopy layers with a developed, patchy understory.) 			

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
75.	Action: No similar action.	Action: Use wildfire, prescribed fire, and mechanical methods to improve or maintain ecological conditions on ponderosa pine breaks/badlands. Management emphasis would rely on planned prescribed fire and unplanned wildfire occurrences to reduce fuel accumulations and to restore and maintain land health.	Action: Use a combination of wildfire, prescribed fire, and mechanical methods to improve or maintain ecological conditions on ponderosa pine breaks/badlands with emphasis on achieving land health objectives and reducing unwanted ignitions, resource threats, and fuel accumulations.	
76.	<i>Montane Forest and Meadows</i>			
77.	Goal: Maintain, enhance, or restore forest and woodland community health, composition, and diversity to a desired mosaic, considering factors such as density, basal area, canopy cover, age class, stand health, and understory species diversity.			
78.	Objective: No similar objective.	Objective: Manage both dry and moist forest types to contain healthy stands with diverse age classes, densities, and structure. Treatments are designed to maintain or improve VCC and reduce conditions conducive to insect and disease epidemics.		
79.	Objective: No similar objective.	Objective: Maintain, enhance, or increase deciduous, shrubland and meadow communities.		
80.	Objective: No similar objective.	Objective: Maintain and protect characteristics of mature forests and woodland communities.		
81.	Objective: No similar objective.	Objective: Maintain, enhance or increase five-needle pine communities.		
82.	Objective: No similar objective.	Objective: Maintain stands that support 35-100 year fire frequency with mixed to high severity that promote a mosaic of grasslands and mixed seral stages.		
83.	Action: <ul style="list-style-type: none"> • Complete inventory and health assessment of forested stands within the planning area during the life of the plan. • Monitor health indicators, including populations of insects, and apply forest management methods that promote natural function based on the forest type. • Silvicultural prescriptions would be consistent with accepted methods related to site, species, habitat types, and the individual requirements of forest stands. • Manage old forest structure in a sustainable manner. (<i>Note: Old forest structure is defined by the presence of the following: large, old trees; large snags; coarse woody debris on the forest floor; multiple canopy layers with a developed, patchy understory.</i>) 			
84.	Action: No similar action.	Action: Emphasize the use of natural disturbances to restore historical composition within montane forests and meadows.	Action: Emphasize the use of prescribed fire and appropriate silvicultural methods to restore historical composition within montane forests and meadows.	
85.	Action: No similar action.	Action: Restore areas where five-needle pine habitats are being affected by mountain pine beetle, white pine blister rust, or lack of fire. Silvicultural treatments would attempt to mimic natural disturbance regimes and	Action: Restore areas where five-needle pine habitats are being affected by mountain pine beetle, white pine blister rust, or lack of fire. Silvicultural treatments would involve commercial and pre-commercial thinning of competing trees, pruning infected tree limbs, and planting rust-resistant seedlings from appropriate seed zones.	

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		primarily utilize prescribed fire and non-mechanized thinning treatments.		
86.	<i>Riparian/Wetland Communities</i>			
87.	Goal: Achieving or making significant and measurable progress toward Lewistown Rangeland Standard #2.	Goal: Riparian and wetland areas would be managed to achieve, or make significant and measurable progress toward PFC, as well as DFCs based upon site potential. The DFCs would give consideration to restoring and/or promoting natural communities and complex riparian conditions valuable to water quality and fish and wildlife habitat.		
88.	<p>Objective: Maintain and/or improve the riparian-wetland areas in existing, proposed, and potential allotment management plans (AMPs) along with wetlands in non-AMP areas based on PFC and desired plant community.</p> <p>Improve or maintain riparian-wetland areas to PFC. Achieve or maintain the desired plant community to provide wildlife habitat and increase waterfowl habitat by 30 percent, and improve watershed conditions.</p>	<p>Objective: Increase the percent of lotic riparian-wetland miles in potential natural community, or at their capability, to 80 percent by 2038.</p> <p>Increase the percent of lentic riparian-wetland acres in potential natural community, or at their capability, to 80 percent by 2038.</p>	<p>Objective: Increase the percent of lotic riparian-wetland miles in PFC, or at their capability, to 80 percent by 2038.</p> <p>Increase the percent of lentic riparian-wetland acres in PFC, or at their capability, to 80 percent by 2038.</p>	<p>Objective: Increase the percent of lotic riparian-wetland miles in PFC and/or DFC, or at their capability, to 80 percent by 2038. DFCs are described in the <i>Glossary</i>.</p> <p>Increase the percent of lentic riparian-wetland acres in PFC and/or DFC, or at their capability, to 80 percent by 2038.</p>
89.	Action: Streamside green strips would be left along perennial streams. Skidding through streams would not be allowed.	<p>Action: Establish riparian management zones for forested and non-forested streams. Riparian management zone descriptions are provided in the <i>Glossary</i>.</p> <p>The condition and importance of riparian resources to natural systems locally would serve as primary emphasis for management activities and uses. At the Field Office scale, projects in riparian management zones would generally be designed to protect or restore the ecological function of riparian areas and streams.</p>	Action: Follow Montana's Streamside Management Zone laws.	<p>Action: Establish riparian management zones for forested and non-forested streams. Riparian management zone descriptions are provided in the <i>Glossary</i>.</p> <p>Each project would incorporate specific design features to maintain the key ecological function of the riparian management zones.</p> <ul style="list-style-type: none"> Commercial timber harvest would be allowed in riparian management zones to meet riparian restoration or maintenance objectives and only if adequate woody material

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		<ul style="list-style-type: none"> Commercial timber harvest would not be allowed in riparian management zones. Livestock grazing would be allowed in riparian management zones in accordance with Standards for Rangeland Health (BLM 1997). 		<p>remains in the riparian area to meet site-specific (project level) riparian objectives.</p> <ul style="list-style-type: none"> Livestock grazing would be allowed in riparian management zones in accordance with Standards for Rangeland Health (BLM 1997).
90.	Allowable Use: Roads and utility corridors would avoid riparian zones to the extent practicable	Allowable Use: Manage riparian-wetland areas as ROW exclusion areas for roads and utility corridors, except for existing ROW corridors.	Allowable Use: Same as Alternative A.	
91.	Allowable Use: No similar allowable use in current RMPs.	Allowable Use: STIPULATION NSO Water, Riparian, Wetland, and Floodplains STIPULATION NSO Riparian-Wetland Areas	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Water, Riparian, Wetland, and Floodplains
92.	Allowable Use: STIPULATION NSO Floodplains	Allowable Use: CSU Alluvial Materials	Allowable Use: Same as Alternative A.	Allowable Use: STIPULATION CSU Riparian, Wetlands
93.	Allowable Use: No similar allowable use.	Allowable Use: LEASE NOTICE (LN) Grasslands-Wetlands		
94.	<i>Invasive Plant Species</i>			
95.	Objective: Control, eradicate or contain noxious plants to maintain native rangelands.	Objective: Manage for healthy plant communities by reducing, preventing expansion of, or eliminating the occurrence of noxious/invasive species.		
96.	Action: Manage invasive species in accordance with the most current vegetation treatment EIS or amendment.			
97.	Action: The primary tool would be the use of integrated pest management.	Action: Use integrated weed and pest management and education and awareness of staff, cooperators, and the public, for pest management: <ul style="list-style-type: none"> inventory of public and cooperator lands for noxious weeds; control of noxious weeds by various methods that include cultural, physical, biological, and chemical controls or other land practices; and monitoring of treatment areas. 		
98.	Action: Focus control efforts on leafy spurge and knapweeds.	Action: Focus control efforts on the Montana State Noxious Weed List; county noxious weed lists; neighboring states' noxious weed lists; and BLM invasive species list.		
99.	Action: Initiate control measures in conjunction with other landowners in areas with mixed landownership.	Action: Issue all grazing permits with a term and condition requiring entering a cooperative range improvement agreement for control of noxious weeds, where appropriate, on permittee(s), lessee(s), or allotment(s).		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
100.	Action: No similar action.	Action: Cooperate with local, state, and federal agencies on the control of non-weed, invasive pest species.		
101.	Action: No similar action.	Action: Planned or permitted surface-disturbing activities would not be allowed on BLM-administered lands with infestations.	Action: Planned or permitted surface-disturbing activities would be considered with BMPs on BLM-administered lands with infestations (see Appendix F).	
102.	Action: No similar action.	Action: Using “Early Detection Rapid Response,” treatment areas would be prioritized in publicly-accessible areas, riparian areas, ES&R areas, and special status species habitat areas. The remaining BLM-administrated lands in the planning area would be the next priority.		
103.	Fish and Wildlife			
104.	Goal: Ensure habitat for native wildlife is of sufficient quantity and quality to enhance biological diversity and sustain ecological, economic, and social values.			
105.	Objective: No similar objective.	Objective: Manage native, naturalized and exotic species to maintain or improve the biological and genetic diversity of natural ecosystems. Intentional exotic species introduction will not adversely affect natural ecosystems or their biological diversity.		
106.	Action: No similar action.	Action: Species introductions or reestablishment may be considered throughout the planning area.		
107.	Objective: No similar objective.	Objective: Manage habitats to support Montana Fish, Wildlife & Parks (MFWP) big game herd unit objectives, fish management objectives, and well-distributed, healthy populations of fish and wildlife species consistent with the MFWP’s State Wildlife Action Plan (MFWP 2015) and strategic population plans, and to achieve the stated purpose of designated wildlife habitat management areas.		
108.	Action: No similar action.	Action: Species transplants or augmentations may be allowed on all BLM-administered lands on a case-by-case basis in cooperation with the Fish and Wildlife Service (FWS) and/or State of Montana. Site-specific analysis would be required at that time.		
109.	Objective: Maintain and enhance suitable habitat for all wildlife species with an emphasis on present and potential habitat for nesting waterfowl, crucial wildlife winter ranges, non-game habitat, and fisheries.	Objective: Necessary habitat, biological processes, and disturbance regimes are present to maintain, enhance, or restore priority wildlife habitat and populations of special status species. Land use maintains habitat quality and large intact blocks of habitat. Habitat quality and land use allow wildlife species movement between large blocks of habitat and between seasonal habitats on a localized- and landscape-scale.	Objective: Maintain and enhance suitable habitat for all wildlife species with an emphasis on maintaining, enhancing, or restoring habitat availability and condition for special status species, and minimize habitat loss.	Objective: Maintain and enhance connectivity and large, intact blocks of habitat for wildlife species. Emphasis for habitat maintenance and restoration would be placed on present and potential habitat for priority species, such as sensitive, threatened, and endangered species.
110.	Fish and Aquatic Communities			
111.	Goal: Provide for aquatic, riparian, and wetland habitats for abundance and diversity of fish and aquatic wildlife with self-sustaining populations.			
112.	Objective: No similar objective.	Objective: Maintain and improve BLM-administered lands for cold-	Objective: Maintain and improve BLM-administered lands for highly	Objective: Maintain and improve BLM-administered lands for cold-

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		water or warm-water aquatic priority habitats for native species.	valued cold- and warm-water species where management for these species does not conflict with management of special status fish.	water or warm-water aquatic priority habitats for native species, with the exceptions of reservoirs managed in coordination with MFWP for recreational fisheries for native or desired nonnative species.
113.	Objective: No similar objective.	Objective: Maintain habitats sufficient to fulfill the life cycle requirements of diverse fish and wildlife species. Manage to protect important breeding, and natal or parturition habitats for terrestrial and aquatic species.		
114.	Action: Design and install bridges and culverts to maintain adequate fish passage.			
115.	<i>Wildlife and Habitat</i>			
116.	Action: No similar action.	Action: Coordinate with MFWP on all vegetation treatments in priority species habitat, crucial big game winter range and large vegetation treatments (>100 acres).		
117.	Action: Power line construction follows recommendations in Suggested Practices for Raptor Protection on Power Lines (Olendorff et al. 1981).	Action: Power lines and substations authorized by the BLM comply with the most current raptor protection standards (currently Reducing Avian Collisions with Power Lines: The State of the Art in 2012 [Avian Power Line Interaction Committee 2012]). Correct and modify existing power lines, which have been identified as having problems with collision or electrocution of wildlife and do not meet Avian Power Line Interaction Committee standards, to prevent future wildlife collision threats or electrocution. Maintain and upgrade power lines that are in good working order as deemed necessary.		
118.	Action: Identify, maintain, and manage areas that can support woody vegetation establishment and respond to rest.	Action: Improve or maintain woody vegetation. Short-term treatment effects may be allowed if long-term benefits are expected.		
119.	Action: No similar action.	Action: Management actions will focus on 1) migratory bird populations, habitat restoration, and enhancement where actions can benefit specific ecosystems and migratory birds that depend on them; and 2) recognize that actions that may provide long-term benefits to migratory bird populations may also have negative effects on individual birds. Effects on individuals will be considered in relation to overall, long-term desired conditions.		
120.	Action: Improve or maintain woody vegetation within 1.5 miles of sharp-tailed grouse leks.	Action: Improve or maintain woody vegetation. Short-term treatment effects may be allowed if long-term benefits are expected.		
121.	Action: Existing fences may be modified and build new fences to allow wildlife passage.	Action: Existing fences may be modified or removed to enhance wildlife movements. Build new fences to allow wildlife passage.		
122.	<i>Bighorn Sheep</i>			
123.	Action: Prohibit domestic sheep grazing from overlapping bighorn sheep habitat to ensure no contact between domestic and bighorn sheep.	Action: No new sheep or goat allotments or conversions would be allowed in occupied wild bighorn sheep habitat. New sheep/goat allotments or conversion from cows	Action: No new sheep or goat allotments or conversions would be allowed in occupied wild bighorn sheep habitat. Allotments between current occupied wild	Action: Domestic sheep/goats would not be allowed within 9 miles of wild bighorn sheep populations. Between 9 and 20 miles, domestic sheep and goats

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		to sheep/goats would not be allowed within 20 miles of occupied wild bighorn sheep habitat. Exact distances between domestic sheep and bighorn sheep would be based on habitat and movement potential.	bighorn sheep habitat and current sheep allotments would be reviewed and reclassified based on habitat, movement potential, and current science and guidelines to minimize contact between domestic sheep and bighorn sheep.	may be considered if mechanisms are in place to achieve effective separation from wild sheep.
124.	Action: Provide 66,187 acres of habitat on BLM-administered land to maintain and expand bighorn sheep in the planning area.	Action: Provide habitat on BLM-administered land to maintain and expand bighorn sheep in the planning area. Allow for new bighorn sheep populations in unoccupied habitat, where suitable conditions are available.		
125.	Action: No similar action.	Action: Do not allow pack goats in bighorn sheep habitat areas See Figure 3-17, Big Game Habitat (Appendix A) .		
126.	Special Status Species			
127.	Goal: Manage for the biological integrity and habitat function to facilitate the conservation, recovery, and maintenance of populations of fish, wildlife, and plant special status species.			
128.	Objective: Maintain and enhance suitable habitat for all wildlife species with an emphasis on present and potential habitat for sensitive, threatened and/or endangered species.	Objective: Protect or enhance areas of ecological importance for special status species. Manage for no net loss of habitat for special status species.		
129.	Action: No action, as stated in the approved Judith RMP (page 16), would be initiated on BLM-administered land that would jeopardize any candidate or federally listed threatened and endangered plant or animal. Effects on state-designated species of special interest would be evaluated and applicable mitigation developed prior to any action on BLM-administered land.	Action: Require surveys for the presence of BLM sensitive species before authorizing surface-disturbing and disruptive activities. Authorize activities only if protective measures can mitigate adverse effects on species and their habitat.	Action: Same as Alternative A.	
130.	Objective: No similar objective.	Objective: Manage and recover special status species by determining and implementing strategies, restoration opportunities, use restrictions, and management actions.		
131.	Action: No similar action.	Action: Upon designation of special status species, identify distribution, key habitat areas, and special management needs to be used in watershed assessments.		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
132.	Action: No similar action.	Action: Develop site-specific design features for BLM-authorized activities, such as those identified in Appendix F, to protect threatened, endangered, sensitive species and migratory birds.		
133.	Action: No similar action.	Action: Caves and other structures utilized by bats would be managed for public access following the Montana white-nose syndrome response strategy (MFWP 2016).		
134.	Objective: No similar objective.	Objective: Develop and implement habitat management plans, activity plans, or use other mechanisms to protect special status species.		
135.	Action: Whenever possible, design management activities in habitat for threatened and endangered species to benefit those species through habitat improvement.			
136.	<i>Grizzly Bear</i>			
137.	Action: To the extent practicable, management actions within occupied grizzly bear habitat would be consistent with the goals and objectives contained in the Grizzly Bear Recovery Plan (USFWS 1993) and the guidelines developed through the Interagency Rocky Mountain Front Wildlife Monitoring/Evaluation Program for mineral exploration and development.	Action: While the grizzly bear is listed, to the extent practicable, management actions within occupied grizzly bear habitat would be consistent with the goals and objectives contained in the Grizzly Bear Recovery Plan (USFWS 1993) and the guidelines developed through the Interagency Rocky Mountain Front Wildlife Monitoring/Evaluation Program for mineral exploration and development (BLM 1987). If the grizzly bear is delisted, manage habitat in accordance with the Northern Continental Divide Ecosystem (NCDE) Grizzly Bear Conservation Strategy (Appendix K , Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy).		
138.	Action: No similar action.	Action: Implement a food storage order on BLM-administered lands within the grizzly bear recovery zone and Zone I for public and commercial activities immediately consistent with the NCDE Grizzly Bear Conservation Strategy (Appendix K).	Action: Implement a food storage order on BLM-administered lands within the grizzly bear recovery zone for public and commercial activities immediately consistent with the NCDE Grizzly Bear Conservation Strategy (Appendix K).	Action: Same as Alternative B.
139.	<i>Prairie Dog Habitat</i>			
140.	Action: Maintain 71 acres of prairie dog towns.	Action: Maintain abundance and distribution of prairie dogs. Acreages of active prairie dog towns would range between 41,400 and 30,600 acres (36,000 acres plus or minus 15 percent) in the planning area for the next 20 years (or until revised/amended) and would consist of:	Action: Category 3 prairie dog towns would be scattered throughout the historical prairie dog range in the planning area. No specific size or distance criteria for towns.	Action: Same as Alternative B.

Alternative A (No Action)		Alternative B	Alternative C (Preferred)	Alternative D
		<ul style="list-style-type: none"> At least one Category 2 complex of 1,000 or more acres of active prairie dog towns following the 7-kilometer rule; and Category 3 prairie dog towns would be scattered throughout the historical prairie dog range in the planning area. 		
141.	<i>Greater Sage-Grouse (see 2015 Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region for all other goals, objectives, allowable uses, and management actions [BLM 2015d])</i>			
142.	Allowable Use: No similar allowable use.	Allowable Use: Apply NSO stipulations to greater sage-grouse PHMA.		
143.	Allowable Use: No similar allowable use.	Allowable Use: Apply NSO stipulations within 0.6 miles of a lek within GHMA.		
144.	Allowable Use: No similar allowable use.	Allowable Use: Apply CSU stipulations within 2 miles of a lek within GHMA.		
145.	Allowable Use: MR-1.9 of the LFO Greater Sage-Grouse ARMPA (BLM 2015a) (i.e., PHMA are closed to new mineral material sales; however, these areas remain “open” to free use permits and the expansion of existing active pits, only if the specified criteria are met.)	Allowable Use: Same as Alternative A.	Allowable Use: PHMA are open to new mineral material sales for both free and commercial use following disturbance guidelines and other applicable conservation measures.	Allowable Use: Same as Alternative A.
146.	Action: Follow the 2015 Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region in regards to mitigation.	Action: No similar action. (Follow current BLM policy on mitigation.)		
147.	Stipulations and Restrictions for Biological Resources and Special Status Vegetation Species			
148.	<i>Stipulations for Fluid Minerals (see Appendix L, Stipulations and Allocations Applicable to Fluid Minerals, for detailed description of stipulations and waivers, exceptions, and modifications.) Note: For Alternative A, there is an existing protest resolution decision affecting federal mineral estate in the decision area that does not allow oil and gas leasing of nominated parcels that would require a special stipulation to protect important wildlife values. Existing fluid mineral leases that expire can be renominated for leasing but would be deferred. New leasing of areas with important wildlife values cannot occur until the BLM completes this EIS and issues a ROD.</i>			
149.	Allowable Use: STIPULATION NSO Fisheries	Allowable Use: STIPULATION NSO Fisheries	Allowable Use: No similar allowable use.	Allowable Use: Same as Alternative B.
150.	Allowable Use: STIPULATION NSO Fisheries	Allowable Use: STIPULATION NSO Fisheries and Aquatic Species		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
151.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Special Status Fisheries	Allowable Use: No similar allowable use.	Allowable Use: Same as Alternative B.
152.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Water Bird Nesting Colony		
153.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION TL Water Bird Nesting Colony		
154.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Crucial Winter Range		
155.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION CSU Winter Range (pronghorn, elk, moose, bighorn sheep, mule and whitetail deer)		
156.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION CSU Elk Calving Grounds		
157.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Sharp-tailed Grouse Lek		
158.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION TL Sharp-tailed Grouse Lek		
159.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Bats	Allowable Use: No similar allowable use.	Allowable Use: Same as Alternative B.
160.	Allowable Use: No similar allowable use.	Allowable Use: LEASE NOTICE LN Special Status Species		
161.	Allowable Use: No similar allowable use.	Allowable Use: LEASE NOTICE LN Migratory Bird Treaty Act.		
162.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Raptors		
163.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION TL Raptors		
164.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Bald Eagle		
165.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Peregrine Falcon		
166.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Piping Plover		
167.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Prairie Dog Habitat		
168.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Bighorn Sheep Lambing		
169.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION CSU Bighorn Sheep Range		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
170.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO <i>Pallid Sturgeon</i>		
171.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO <i>Mountain Plover</i>		
172.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION TL <i>Mountain Plover</i>		
173.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION TL <i>Sprague’s Pipit</i>		
174.	Allowable Use: No similar allowable use.	Allowable Use: LEASE NOTICE LN <i>Sprague’s Pipit</i>		
175.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO <i>Greater Sage-Grouse Priority Habitat Management Areas (PHMAs)</i>		
176.	Allowable Use: No similar allowable use.	Allowable Use: LEASE NOTICE LN <i>Greater Sage-Grouse</i>		
177.	<i>Surface-Disturbing Activities (Non-Fluid Minerals Activities; see Fluid Leasable Minerals alternatives below for restrictions for fluid minerals activities)</i>			
178.	Allowable Use: No similar allowable use.	Allowable Use: Apply appropriate BMPs, conservation actions, and design features as outlined in Appendix F to all site-specific surface-disturbing or disrupting activities during implementation-level project analysis.		
179.	Wildfire Ecology and Management			
180.	Goal: Protect human life and property, reduce the risk and cost of severe wildfire, sustain ecological health and function of fire-adapted ecosystems, minimize adverse effects of wildfire suppression, and use fuels management methods to reduce hazardous fuels while meeting other resource objectives (BLM 2003b).	Goal: Manage fire and fuels to protect life and property and to protect or enhance resource values.		
181.	Objective: The resource objectives identified in the RMP would provide the guidelines, direction, and degree of suppression to be used.	Objective: Having provided for firefighter and public safety, which is the first priority (2009 Guidance for Implementation of Federal Wild Fire Management Policy, p. 10), manage wildfires to protect property and meet resource objectives described in the vegetation section.		
182.	Action: See Appendix I for a description of the management associated with each fire management category.	Action: Manage the Big Open and Prairie Forests Fire Management Units (FMUs) as Category B (Appendix I). Suppress wildfires in areas with resource values that would	Action: Manage the Big Open, Front, Island Ranges, and Prairie Forests FMUs as Category B (Appendix I). Suppress wildfires in areas with resource values that	Action: Manage the Big Open and Prairie Forests FMUs as Category B (Appendix I). Suppress wildfires in areas with resource values that would be damaged by fire, including

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	<p>Manage the Big Open, Island Ranges, and Prairie Forests as Category B.</p> <p>Manage the Breaks and Front as Category C.</p> <p>Apply intensive suppression to areas with high resource values, structures, improvements, oil and gas developments, commercial forest values, sagebrush and juniper areas, fire-sensitive woody riparian areas (soil subgroups 6 and 17), and cultural values that require aggressive suppression action.</p> <p>Codify modified suppression areas when the Normal Year Fire Plan is reviewed, based on the criteria in the Headwaters Resource Management Plain (HRMP).</p>	<p>be damaged by fire, including structures, improvements, oil and gas developments, commercial forest values, Wyoming big sagebrush (<i>Artemisia tridentata</i> spp. <i>wyomingensis</i>), fire-sensitive riparian areas, and cultural values. The initial response to BLM wildfires would be to suppress using direct and indirect tactics. Fires adjacent to, or near, wildland-urban interface areas have the highest priority for fire suppression.</p> <p>Manage the Breaks FMU as Category C.</p> <p>Use an interdisciplinary approach and a decision support process to guide and document wildfire management decisions. The process would provide situational assessment, analyze hazards and risk, define implementation actions, and document decisions and rationale for those decisions.</p>	<p>would be damaged by fire, including structures, improvements, oil and gas developments, commercial forest values, Wyoming big sagebrush (<i>Artemisia tridentata</i> spp. <i>wyomingensis</i>), fire-sensitive riparian areas, and cultural values. The initial response to BLM wildfires would be to suppress using direct and indirect tactics. Fires adjacent to, or near, wildland-urban interface areas have the highest priority for fire suppression.</p> <p>Manage the Breaks FMU as Category C.</p> <p>Use an interdisciplinary approach and a decision support process to guide and document wildfire management decisions. The process would provide situational assessment, analyze hazards and risk, define implementation actions, and document decisions and rationale for those decisions.</p>	<p>structures, improvements, oil and gas developments, commercial forest values, Wyoming big sagebrush (<i>Artemisia tridentata</i> spp. <i>wyomingensis</i>), fire-sensitive riparian areas, and cultural values. The initial response to BLM wildfires would be to suppress using direct and indirect tactics. Fires adjacent to, or near, wildland-urban interface areas have the highest priority for fire suppression.</p> <p>Manage the Font, Breaks, and Island Ranges FMUs as Category C.</p> <p>Use an interdisciplinary approach and a decision support process to guide and document wildfire management decisions. The process would provide situational assessment, analyze hazards and risk, define implementation actions, and document decisions and rationale for those decisions.</p>
183.	<p>Action: Fire management of BLM-administered lands guided by following categories within the planning area (Figure 2-1, Alternative A: Fire Management [Appendix A])</p> <ul style="list-style-type: none"> • Category A: Fire is not desired (0 acres) • Category B: Unplanned fire would cause negative effects (426,500 acres) 	<p>Action: Fire management of BLM-administered lands would be guided by the following categories (Figure 2-2, Alternative B: Fire Management [Appendix A]):</p> <ul style="list-style-type: none"> • Category A: Fire is not desired (0 acres) • Category B: Unplanned fire would cause negative effects (322,900 acres) 	<p>Action: Fire management of BLM-administered lands would be guided by the following categories (Figure 2-3, Alternative C: Fire Management [Appendix A]):</p> <ul style="list-style-type: none"> • Category A: Fire is not desired (0 acres) • Category B: Unplanned fire would cause negative effects (452,800 acres) 	<p>Action: Fire management of BLM-administered lands would be guided by the following categories (Figure 2-4, Alternative D: Fire Management [Appendix A]):</p> <ul style="list-style-type: none"> • Category A: Fire is not desired (0 acres) • Category B: Unplanned fire would cause negative effects (322,900 acres)

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	<ul style="list-style-type: none"> • Category C: Fire is desired to manage ecosystems, but current vegetative condition creates constraints on use (223,600 acres) • Category D: Fire is desired; few or no constraints on its use (0 acres). (BLM 2003b) 	<ul style="list-style-type: none"> • Category C: Fire is desired to manage ecosystems, but current vegetative condition creates constraints on use (129,900 acres) • Category D: Fire is desired; few or no constraints on its use (197,300 acres). 	<ul style="list-style-type: none"> • Category C: Fire is desired to manage ecosystems, but current vegetative condition creates constraints on use (197,300 acres) • Category D: Fire is desired; few or no constraints on its use (0 acres). 	<ul style="list-style-type: none"> • Category C: Fire is desired to manage ecosystems, but current vegetative condition creates constraints on use (327,200 acres) • Category D: Fire is desired; few or no constraints on its use (0 acres).
184.	Objective: No similar objective.	Objective: Use of prescribed fire, mechanical treatment, and chemical treatment to protect, maintain, and enhance resources across the landscape; and to function in its ecological role, where appropriate.		
185.	Action: Prescribed burning would continue to be used in support of resource management objectives.	Action: Use of prescribed fire, pile burns, mechanical treatment, and chemical treatment to restore and maintain fire regimes, land health, and to reduce hazardous fuels accumulations. Approved prescribed fire implementation plans would be used for any planned fire ignition. Continue to use prescribed fire in support of resource objectives.		
186.	Action: Prescribed fire allowed to burn only under specific conditions. Planned fires used in accordance with approved activity plans. Prescribed burning administered on an individual basis in grassland, sagebrush, and/or conifer types to improve wildlife habitat and vegetation production. Prescribed burns held in abeyance in WSAs. Prescribed burning addressed in the individual recreation activity plans for each designated wilderness area.	<p>Action: Plan and prioritize vegetation and fuels treatments on BLM-administered lands based on values at risk and land health assessments, including VCC assessments. In conjunction with forestry, wildlife, riparian, and range management priorities, mechanical and prescribed fire, and other appropriate treatments may be used in all fire management units.</p> <p>Prescribed fire and fuels treatments may be applied in accordance with Manual 6330, Management of BLM Wilderness Study Areas (BLM 2012a).</p>		
187.	Action: Anticipated level of treatment per decade would follow Fire/Fuels management plan environmental assessment/ plan amendment for the Montana/ Dakotas (BLM 2003b).	<p>Action: Mechanical, chemical, and prescribed fire treatments would be used to comply with BLM-sponsored initiatives that build resilience to climate variability and improve fire regime/VCC, DFC, native rangelands, wildlife habitat, forest health, and healthy lands. Appropriate weather patterns are key factors influencing actual treatment accomplishments.</p> <p>Unplanned wildfire to meet resource objectives and agency initiatives would be used, when appropriate, with the approved planning documents and agency coordination in place.</p>		
188.	Action: No similar action.	Action: In partnership with local, state, and federal partners, build capacity within communities bordering federal lands to reduce risks and threats from wildfire.		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
189.	Cultural and Heritage Resources (for National Historic Trails see National Trails alternatives section in this table; for cultural ACECs see ACECs alternatives section in this table)			
190.	Goal: Identify, preserve, and protect significant cultural resources and ensure that they are available for appropriate uses by present and future generations (FLPMA, Section 103 (c), 201(a) and (c); NHPA, Section 110(a); Archaeological Resources Protection Act, Section 14(a)).			
191.	Objective: Assign cultural resources to particular uses and assess and establish thresholds for determining cultural property significance. The cultural resource management plan would establish the management prescriptions best suited for fulfilling management goals and objectives.			
192.	<p>Allowable Uses: Categorizing cultural resources according to their potential uses is the culmination of the identification process and the bridge to protection and utilization decisions. Use categories establish what needs to be protected, and when or how use should be authorized. All cultural resources have uses, but not all should be used in the same way (BLM 8110 Manual, BLM 2004). All recorded cultural resources would be assessed according to six use categories for prehistoric and historic resources, as identified below:</p> <ul style="list-style-type: none"> • Scientific Use: Scientific Use properties include sites similar in composition to: <ul style="list-style-type: none"> – Smith River Chert Quarries (Meagher County). This area is important because of the extent of the chert quarries, and the dispersal of the material across Montana. • Public Use: Public Use properties include sites of similar composition to: <ul style="list-style-type: none"> – Wartzluft Homestead (24FR0408). This homestead represents a type and period of development representing early 20th century activity in central Montana. Restoration and interpretive work at the Wartzluft Homestead showcase this as a recreational opportunity in the field office. – Lewistown Satellite Airfield/Bombing Range (24PT0236). This National Register of Historic Places (NRHP)-listed property represents a unique World War II site type. – Lewistown Satellite Airfield/Gunnery Range (Fergus County) This NRHP-eligible property represents a unique World War II site type. • Conservation for Future Use: Conservation for Future Use properties include sites of similar composition to: <ul style="list-style-type: none"> – Square Butte (Chouteau County, multiple site #s). This area has numerous cultural and archaeological sites, including vision quests, campsites, and quarry sites that could constitute a district. – Black Butte (Fergus County, multiple site #s). This area has numerous cultural and archaeological sites, including stone circles, vision quests, and lithics that could constitute a district. – Nordahl Cemetery (24PT0217) This homestead-era cemetery has one finished headstone and other unmarked graves, with stories associated with the local history. – Arrow Creek Burial (24FR0364). This site has reportedly been used historically as a Native American burial site, and also a local landmark with historic graffiti (stone carvings). – Sun River Complex (Teton/Lewis & Clark counties). This area near the Rocky Mountain Front contains numerous rock alignments, stone circles, and cairns, with reported buffalo jumps and notable geographic features visible. This area is a proposed ACEC. • Experimental Use: No Experimental Use properties have been identified at this time. • Traditional Use: Traditional Use properties include sites of similar composition to: <ul style="list-style-type: none"> – Ear Mountain (Teton County). This is a noted landmark on the Rocky Mountain Front and is in a proposed ACEC. • Discharged from Management: No Discharged from Management properties have been identified at this time. 			
193.	Action: Complete proactive inventory (NHPA Section 110), as time and funding allow.	Action: Systematically complete proactive inventory (NHPA Section 110) over all public lands within the planning area.	Action: Prioritize NHPA Section 106 compliance inventory, completing Section 110 inventory as time and funding allow.	Action: Continue to emphasize the value of proactive (NHPA Section 110) cultural resource inventories in high priority areas, and in areas with

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
				limited inventory. High priority areas include the Rocky Mountain Front and NHT corridors.
194.	Goal: Seek to reduce imminent threats and resolve potential conflicts from natural or human-caused deterioration, or potential conflict with other resource uses (FLPMA, Section 203(c), NHPA, Section 106, 110(a; 2)) by ensuring that all authorizations for land use and resource use would comply with the NHPA, Section 106.			
195.	Objective: Identify special areas or historical properties and develop activity plans identified as high risk for adverse effects.			
196.	Allowable Use: LEASE NOTICE MT-CR 16-1 Cultural Resources Lease			
197.	Allowable Use: STIPULATION No Surface Occupancy (NSO) National Register Sites	Allowable Use: NO LEASING (NL) NL Cultural Resources	Allowable Use: STIPULATION NSO Cultural Resources	Allowable Use: NO LEASING NL Cultural Resources STIPULATION NSO Cultural Resources
198.	Allowable Use: No similar allowable use.	Allowable Use: LEASE NOTICE LN Cultural Resources		
199.	Allowable Use: No similar allowable use.	Allowable Use: LEASE NOTICE LN Sacred and Historic Properties		
200.	Allowable Use: No similar allowable use.	Allowable Use: Close NRHP-eligible and -listed historical properties and cultural sites allocated to conservation for future use, traditional use, and public use to nonenergy solid mineral leasing and mineral material disposal.	Allowable Use: No similar allowable use.	Allowable Use: Close NRHP-listed historical properties to nonenergy solid mineral leasing and mineral material disposal.
201.	Allowable Use: No similar allowable use.	Allowable Use: Manage NRHP-eligible and -listed historical properties and cultural sites allocated to conservation for future use, traditional use, and public use as ROW exclusion (including for wind and solar).	Allowable Use: No similar allowable use.	Allowable Use: Manage NRHP-listed historical properties as ROW exclusion areas (including for wind and solar). Manage NRHP-eligible historical properties and cultural sites allocated to conservation for future use, traditional use, and public use as ROW avoidance (including for wind and solar).

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
202.	Objective: Provide and promote research opportunities that would contribute to understanding of the ways humans have used and influenced the landscape.			
203.	Action: Identify documented sites and site types through the allocation process that are conducive to research.	Action: Allow research on sites, excluding research that is destructive in nature (including site excavation).	Action: Same as Alternative A.	Action: Allow research on sites, excluding research that is destructive in nature, unless consultation with outside agencies and tribes results in concurrence with research design.
204.	Goal: Enhance public understanding of, and appreciation for, cultural resources through educational outreach and heritage tourism opportunities.			
205.	Objective: The purposes of this program are to analyze the scientific and sociocultural values of cultural resources, to provide a basis for allocation of cultural resources, to make cultural resources an important part of the planning system, and to identify information needed when existing documentation is inadequate to support a reasonable cultural resource-based land use allocation.			
206.	Action: Monitor sites internally and with site stewards, using the information gained in adaptive management decisions.	Action: Same as Alternative A. Additionally, all eligible sites would be placed on a monitoring schedule.	Action: Monitor sites when potential conflicts with proposed undertakings surface.	Action: Same as Alternative A.
207.	Action: Nominate eligible historical properties to the NRHP, as time and funding allow.	Action: Nominate Square Butte Archaeological District, Lewistown Satellite Airfield Boundary Increase IV (Gunnery Range), and the Wartzluft Homestead to the NRHP, and identify other opportunities for future nominations.	Action: Prioritize NRHP nominations as mitigation for adverse effects on eligible historic properties, preparing nominations as time and funding allow.	Action: Same as Alternative B.
208.	Paleontological Resources			
209.	Goal: Identify, preserve, and protect significant paleontological resources, and ensure that they are available to present and future generations for appropriate uses such as scientific studies and public education.			
210.	Objective: Protect major paleontological resources of scientific interest.	Objective: Ensure that proposed land uses initiated or authorized by the BLM avoid inadvertent damage to paleontological resources. Paleontological resources are fossils that have paleontological interest, except when they are found in an archaeological context and are archaeological resources, or are cultural items under the Native American Graves Protection Act of 1990 (NAGPRA), or are determined to lack paleontological interest. Fossils that are considered to have paleontological interest include most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils because they: 1) are unique, unusual, or rare; 2) are diagnostic; 3) are stratigraphically important; or 4) add to the existing body of scientific knowledge.		
211.	Action: Casual collection of common invertebrate and plant fossils is allowed for noncommercial purposes without a permit, as allowed by existing statute.	Action: Casual collection of common invertebrate and plant fossils is allowed for noncommercial purposes without a permit, as allowed by existing statute, except that it is not allowed in the following locations: Blacktail Paleontological Withdrawal and Sun River.		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
212.	Action: No similar action (the Sun River is not designated as an ACEC).	Action: Designate 4,900 acres as the Sun River ACEC for the protection of rare paleontological resources (see the ACECs alternatives section in this table).	Action: No similar action (the Sun River would not be designated as an ACEC).	Action: Same as Alternative B.
213.	Action: Blacktail Paleontological Withdrawal: 320 acres were withdrawn from settlement, sale, location, or entry under the general land laws, including the US mining laws, but not from leasing under the mineral leasing laws, via PLO 6674, extended by PLO 7695, expiring on April 26, 2028.	Action: Designate 1,200 acres as the Blacktail Creek ACEC for the protection of rare paleontological resources (see the ACECs alternatives section in this table).	Action: No similar action.	
214.	Action: No similar action.	Action: Promote the stewardship, conservation, and appreciation of paleontological resources through appropriate educational and public outreach programs.		
215.	Allowable Use: No similar allowable use.	Allowable Use: NO LEASING NL Egg Mountain	Allowable Use: STIPULATION NSO Paleontological Areas	Allowable Use: Same as Alternative C.
216.	Allowable Use: No similar allowable use.	Allowable Use: Close Egg Mountain to mineral material disposal.	Allowable Use: Close Egg Mountain and the Blacktail Paleontological Area to mineral material disposal.	Allowable Use: Same as Alternative B.
217.	Allowable Use: No similar allowable use.	Allowable Use: LEASE NOTICE LN Paleontological Resource Inventory Requirement		
218.	Visual Resources			
219.	Goal: Maintain the scenic quality and natural aesthetics of river canyons, open space landscapes, dark night skies, cultural landscapes, and other areas with high-quality visual resources that are considered important as social, economic, and environmental benefits.			
220.	Objective: No similar objective.	Objective: Manage visual resources for overall multiple use in accordance with Visual Resource Management (VRM) classification objectives (currently described in the BLM Visual Resource Inventory Handbook (H-8410-1; BLM 1986).		
221.	Allowable Use: Adopt the VRM classes as follows (Figure 2-5 , Alternative A: Visual Resource Management [Appendix A]). <ul style="list-style-type: none"> • Class I: 15,700 acres • Class II: 105,000 acres • Class III: 193,300 acres • Class IV: 280,500 acres • Unassigned: 56,700 acres 	Allowable Use: Adopt the VRM classes as follows (Figure 2-6 , Alternative B: Visual Resource Management [Appendix A]). <ul style="list-style-type: none"> • Class I: 16,900 acres • Class II: 329,500 acres • Class III: 92,400 acres • Class IV: 212,400 acres 	Allowable Use: Adopt the VRM classes as follows (Figure 2-7 , Alternative C: Visual Resource Management [Appendix A]). <ul style="list-style-type: none"> • Class I: 2,700 acres • Class II: 14,100 acres • Class III: 292,900 acres • Class IV: 341,500 acres 	Allowable Use: Adopt the VRM classes as follows (Figure 2-8 , Alternative D: Visual Resource Management [Appendix A]). <ul style="list-style-type: none"> • Class I: 15,900 acres • Class II: 125,300 acres • Class III: 235,600 acres • Class IV: 274,400 acres

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
222.	Action: No similar action.	Action: Develop user facilities (e.g., trailheads, nonmotorized trails, campgrounds, roads, utilities, and interpretive areas) to take advantage of views of scenic and historical landscapes in such a way that visual quality is protected.		
223.	Action: No similar action.	Action: Design and implement fuel treatments with an emphasis on protecting VRM classifications. Closely evaluate the benefits of the fuel breaks against the loss of landscape characteristics.		
224.	Action: No similar action.	Action: All fire break lines within VRM I must be rehabilitated in order to meet VRM I characteristics. If the fire break line is in a WSA (VRM I), the rehabilitated line must meet non-impairment standards and native seeds/plants must be used.		
225.	Allowable Use: To maintain esthetic values, all surface-disturbing activities, semipermanent and permanent facilities may require special design.	Allowable Use: STIPULATION CSU VRM Class II		
226.	Allowable Use: No similar allowable use.	Allowable Use: Manage VRM Class I areas as closed to forest product sales and/or harvest.	Allowable Use: No similar allowable use.	Allowable Use: Same as Alternative B with the following exception: Provide opportunities for small sales of forest products to the public on a case-by-case basis (5450-permit). Small sales would only occur where sufficient physical access currently exists. No new permanent roads would be constructed to meet the demands of the small sale program.
227.	Objective: No similar objective.	Objective: Manage permitted activities to reduce alteration of natural night sky light and maintain dark, clear skies for stargazing and other nighttime activities.		
228.	Action: No similar action.	Action: Prohibit permanent outdoor lighting in VRM Class I areas.		
229.	Action: No similar action.	Action: Prohibit structural lighting in excess of the minimum safety requirements.	Action: Prevent or reduce effects on dark night skies by using BMPs that reduce skyward projection of lighting, minimizing illumination and off-site projection of lighting, and by designing required lighting to be downward directing.	
230.	Lands with Wilderness Characteristics (see Appendix M, Summary of Lewistown Field Office Wilderness Characteristics: 2014 Update)			
231.	Goal: No similar goal.	Goal: Manage lands with wilderness characteristics to emphasize other multiple uses while applying management restrictions to reduce effects on wilderness characteristics.	Goal: Manage lands with wilderness characteristics to emphasize other multiple uses as a priority over protecting wilderness characteristics.	Goal: Same as Alternative B.
232.	Objective: No similar objective.	Objective: Identify lands with wilderness characteristics and manage	Objective: Identify lands with wilderness characteristics but do	Objective: Identify lands with wilderness characteristics. In

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		lands with wilderness characteristics to maintain: a high degree of naturalness; outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation.	not manage to maintain those characteristics.	specific areas, manage activities to maintain the natural quality of the area and to maintain opportunities for solitude and primitive recreation where they occur in these areas.
233.	Action: No similar action.	Action: Manage 202,400 acres in the following areas to emphasize other multiple uses while applying management restrictions to reduce effects on wilderness characteristics (Figure 2-9 , Alternative B: Lands with Wilderness Characteristics [Appendix A]): <ul style="list-style-type: none"> • Armells Creek (1,100 acres) • Big Snowies Tack-On B-1 (150 acres) • Big Snowies Tack-On B-2 (310 acres) • Big Snowies Tack-On B-3 (110 acres) • Big Snowies Tack-On B-4 (40 acres) • Biggett (5,000 acres) • Blind Horse Creek (4,900 acres) • Blood Creek (20,800 acres) • Carroll Coulee (6,900 acres) • Carter Coulee (12,400 acres) • Cemetery Road (10,900 acres) • Chain Buttes (7,700 acres) • Chimney Bend (2,600 acres) • Chute Mountain (3,200 acres) • Cottonwood (13,100 acres) • Deep Creek/Battle Creek (3,100 acres) • Dog Creek South (3,000 acres) • Dovetail Creek (15,900 acres) 	Action: No similar action. (Lands would be managed to emphasize other multiple uses as a priority over protecting wilderness characteristics.)	Action: Manage 100,370 acres in the following areas to emphasize other multiple uses while applying management restrictions to reduce effects on wilderness characteristics (Figure 2-10 , Alternative D: Lands with Wilderness Characteristics [Appendix A]): <ul style="list-style-type: none"> • Carroll Coulee (6,900 acres) • Chain Buttes (7,700 acres) • Dovetail Creek (15,900 acres) • Drag Creek (22,000 acres) • Dunn Ridge (10,100 acres) • Fort Musselshell Tack-On B (610 acres) • Horse Camp Trail (11,900 acres) • Spear Coulee (5,000 acres) • West Crooked Creek (20,300 acres)

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		<ul style="list-style-type: none"> • Drag Creek (22,000 acres) • Dunn Ridge (10,100 acres) • Ear Mountain A (1,000 acres) • Ear Mountain B (760 acres) • Fargo Coulee (640 acres) • Fort Musselshell Tack-On A (1,400 acres) • Fort Musselshell Tack-On B (610 acres) • Horse Camp Trail (11,900 acres) • Little Crooked Creek (12,200 acres) • Missouri River Island MT-075-126 (20 acres) • Spear Coulee (5,000 acres) • Thompson Coulee (5,400 acres) • West Crooked Creek (20,300 acres) 		
234.	Action: No similar action.	<p>Action: Apply the following management to areas to emphasizing other multiple uses while applying management restrictions to reduce effects on wilderness characteristics:</p> <ul style="list-style-type: none"> • VRM Class II • ROW exclusion (including for wind, solar, and hydropower projects) • Closed to construction of new roads • Closed to motorized and mechanized travel • Prohibit route maintenance • Prohibit new or expanded range improvements (structural and nonstructural) • Closed to wood product sales or harvest 	<p>Action: No similar action. (Lands would be managed to emphasize other multiple uses as a priority over protecting wilderness characteristics.)</p>	<p>Action: Apply the following management to areas to emphasizing other multiple uses while applying management restrictions to reduce effects on wilderness characteristics :</p> <ul style="list-style-type: none"> • VRM Class II • ROW avoidance. (ROWs would only be granted where mitigation could be applied to protect wilderness characteristics) • ROW exclusion area for wind, solar, and hydropower projects • OHV limited area • Limit mechanized travel to designated routes, except for game retrieval • Allow route maintenance (e.g., washouts) in a manner consistent

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		<ul style="list-style-type: none"> • Closed to mineral material disposal • Closed to nonenergy solid mineral leasing • Recommend to the Secretary of the Interior withdrawal from locatable mineral entry • Allow construction of new non-range related structures and facilities in a manner consistent with the long-term preservation of wilderness characteristics • Vegetation treatments and prescribed fire would be allowed to maintain or improve naturalness in the long term. Prescribed fire would be emphasized over mechanical treatments. 		<p>with the long-term preservation of wilderness characteristics</p> <ul style="list-style-type: none"> • Permit new range improvement projects to support land health objectives only if it can be shown that they would maintain and not degrade wilderness characteristics over the long term • Allow maintenance of existing range improvement facilities in a manner consistent with the long-term preservation of wilderness characteristics • Allow vegetation treatments using fire and mechanical techniques in a manner that would maintain and not degrade wilderness characteristics over the long term, while protecting the wildland-urban interface. • Closed to commercial wood product sales or harvest (allow harvest for personal use under 5450-5 permits) • Closed to mineral material disposal • Closed to nonenergy solid mineral leasing • Require a mine plan for locatable mineral development
235.	Allowable Use: No similar allowable use in current RMPs.	Allowable Use: NO LEASING NL Lands with Wilderness Characteristics	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Lands with Wilderness Characteristics
236.	Action: Identify wilderness characteristics on acquired lands.	Action: Identify wilderness characteristics on acquired lands. <ul style="list-style-type: none"> • If acquired lands are found to possess wilderness characteristics, 	Action: Same as Alternative A.	Action: Identify wilderness characteristics on acquired lands. <ul style="list-style-type: none"> • If acquired lands are found to possess wilderness

Alternative A (No Action)		Alternative B	Alternative C (Preferred)	Alternative D
		<p>manage those lands to protect wilderness characteristics.</p> <ul style="list-style-type: none"> Consider adjacent other federal lands to determine whether the acquired lands if combined with the other federal lands constitute a piece that possesses wilderness characteristics. If so, then manage those lands to protect wilderness characteristics. 		<p>characteristics, determine whether to manage to protect wilderness characteristics on a case-by-case basis consistent with BLM Manuals 6310, Conducting Wilderness Characteristics Inventory on BLM Lands (BLM 2012b), and 6320, Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process (BLM 2012c).</p> <ul style="list-style-type: none"> Consider other adjacent federal lands to determine whether the acquired lands, if combined with the other federal lands, constitute a piece that possesses wilderness characteristics. If so, then determine whether to manage to protect wilderness characteristics on a case-by-case basis consistent with BLM Manuals 6310 (BLM 2012b) and 6320 (BLM 2012c).
237.	Cave and Karst Resources			
238.	Goal: Manage all cave resources as mandated by Federal Cave Resources Protection Act of 1988 (FCRPA) to protect unique, nonrenewable, and fragile biological, geological, hydrological, cultural, paleontological, scientific, and recreational values for present and future users.			
239.	Objective: Manage significant cave resources containing biota; cultural, historical, and paleontological values; geologic and mineralogic features; hydrology; recreational value; and educational or scientific value.	Objective: Cave and karst resources would be managed to provide opportunities for scientific research, educational study, and recreational experiences that are compatible and consistent with protection of resources associated with caves and karst landforms.		
240.	Action: Manage the Tate-Poetter Cave in the Judith Mountains to protect significant values.	Action: Manage the Tate-Poetter Cave to protect significant values. Modify identified relevant and important values for the Collar Gulch	Action: Same as Alternative A.	Action: Same as Alternative B.

Alternative A (No Action)		Alternative B	Alternative C (Preferred)	Alternative D
		ACEC to also recognize significant cave resources (see ACECs alternatives section in this table).		
241.	Action: No similar action.	Action: Develop Cave Management Plan for Crystal Cave and Tate-Poetter Cave.		
242.	Action: No similar action.	Action: Manage 4,800 acres as the Judith Mountains Scenic ACEC to protect significant cave values (see ACEC alternatives section in this table).	Action: No similar action (the cave would not be included in an ACEC).	
243.	Action: Maintain the Crystal Cave withdrawal from locatable mineral entry.			
244.	Action: No similar action.	Action: Coordinate access to Crystal Cave and Lick Creek Cave with the State of Montana and Forest Service, respectively.		
245.	Resource Uses			
246.	Nonenergy Solid Leasable Minerals			
247.	Goal: Provide opportunities for exploration and development of nonenergy solid leasable minerals consistent with other resource goals.			
248.	Objective: Provide opportunities for nonenergy leasable exploration and/or development in accordance with existing regulations (43 CFR 3500).			
249.	Allowable Use: Manage 108,500 acres of federal mineral estate as closed to nonenergy solid mineral leasing in accordance with withdrawal orders (see <i>Withdrawals</i> section in <i>Lands and Realty</i> alternatives section in this table (Figure 2-11 , Alternative A: Nonenergy Solid Leasable Minerals, Figure 2-12 , Alternative B: Nonenergy Solid Leasable Minerals, Figure 2-13 Alternative C: Nonenergy Solid Leasable Minerals, and Figure 2-14 , Alternative D: Nonenergy Solid Leasable Minerals [Appendix A]).			
250.	Allowable Use: Manage WSAs (1,900 acres) as closed to nonenergy solid mineral leasing in accordance with BLM policy (see BLM Manual 6330, BLM 2012a; Figures 2-11, 2-12, 2-13, and 2-14; Appendix A).			
251.	Allowable Use: Manage 283,700 acres of federal mineral estate as administratively closed to nonenergy leasable mineral exploration and/or development (Figure 2-11; Appendix A).	Allowable Use: Manage 445,400 acres of federal mineral estate as administratively closed to nonenergy leasable mineral exploration and/or development (Figure 2-12; Appendix A).	Allowable Use: Manage 283,700 acres of federal mineral estate as administratively closed to nonenergy leasable mineral exploration and/or development (Figure 2-13; Appendix A).	Allowable Use: Manage 381,800 acres of federal mineral estate as administratively closed to nonenergy leasable mineral exploration and/or development (Figure 2-14; Appendix A).
252.	Fluid Leasable Minerals (oil and gas)			
253.	Goal: Ensure dependable and environmentally-responsible production of leasable minerals by identifying lands appropriate for lease and development.			
254.	Objective: <i>Oil and Gas</i> Based on protests received in January 1993 on the proposed JVP RMP/Final EIS (1992), the BLM would prepare a supplemental EIS to address an alternative that would avoid oil and gas leasing in areas with valuable wildlife habitat. A separate ROD and approved plan would be issued for	Objective: Provide opportunities for exploring, leasing, and developing fluid mineral resources, while applying the appropriate lease stipulations and conditions of approval to mitigate environmental effects from development.		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	oil and gas leasing. Until then, oil and gas leasing would continue under the current management guidance as described under Alternative A of the proposed JVP RMP/Final EIS (1992) and the BLM's decision on the September 1988 National Wildlife Federation's protest of the issuance of oil and gas leases in the State of Montana (November 28, 1988).			
255.	Allowable Use: Manage 108,500 acres of federal mineral estate as closed to fluid mineral leasing in accordance with withdrawal orders (see <i>Withdrawals section in Lands and Realty alternatives section in this table</i> ; Figure 2-15 , Alternative A: Fluid Minerals Leasing, (Figure 2-16 , Alternative B: Fluid Minerals Leasing, Figure 2-17 , Alternative C: Fluid Minerals Leasing, and Figure 2-18 , Alternative D: Fluid Minerals Leasing [Appendix A]).			
256.	Allowable Use: Manage WSAs (1,900 acres) as closed to fluid mineral leasing in accordance with the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (30 USC 181; (Figures 2-15, 2-16, 2-17, and 2-18; Appendix A).			
257.	Action: Manage 0 acres of federal mineral estate as administratively closed to fluid mineral leasing (Figure 2-15; Appendix A).	Action: Manage 200,600 acres of federal mineral estate as administratively closed to fluid mineral leasing (Figure 2-16; Appendix A).	Action: Manage 0 acres of federal mineral estate as administratively closed to fluid mineral leasing (Figure 2-17; Appendix A).	Action: Manage 6,400 acres of federal mineral estate as administratively closed to fluid mineral leasing (Figure 2-18; Appendix A).
258.	Action: Manage 1,086,300 acres of federal mineral estate as open to fluid mineral leasing on a case-by-case basis (Figure 2-15; Appendix A).	Action: Manage 885,700 acres of federal mineral estate as open to fluid mineral leasing (Figure 16; Appendix A).	Action: Manage 1,086,300 acres of federal mineral estate as open to fluid mineral leasing (Figure 2-17; Appendix A).	Action: Manage 1,080,000 acres of federal mineral estate as open to fluid mineral leasing (Figure 2-18; Appendix A).
259.	Action: Manage 379,000 acres of federal mineral estate as open to fluid mineral leasing, subject to standard stipulations.	Action: Manage 118,800 acres of federal mineral estate as open to fluid mineral leasing, subject to standard stipulations.	Action: Manage 636,300 acres of federal mineral estate as open to fluid mineral leasing, subject to standard stipulations.	Action: Manage 269,700 acres of federal mineral estate as open to fluid mineral leasing, subject to standard stipulations.
260.	Allowable Use: Apply NSO stipulations to fluid mineral leases on 58,300 acres of federal mineral estate (Figure 2-19 , Alternative A: No Surface Occupancy for Fluid Minerals Leasing [Appendix A]).	Allowable Use: Apply NSO stipulations to fluid mineral leases on 744,000 acres of federal mineral estate (Figure 2-20 , Alternative B: No Surface Occupancy for Fluid Minerals Leasing [Appendix A]).	Allowable Use: Apply NSO stipulations to fluid mineral leases on 411,700 acres of federal mineral estate (Figure 2-21 , Alternative C: No Surface Occupancy for Fluid Minerals Leasing [Appendix A]).	Allowable Use: Apply NSO stipulations to fluid mineral leases on 472,000 acres of federal mineral estate (Figure 2-22 , Alternative D: No Surface Occupancy for Fluid Minerals Leasing [Appendix A]).
261.	Allowable Use: Apply CSU stipulations to oil and gas leases on 281,700 acres of federal mineral	Allowable Use: Apply CSU stipulations to fluid mineral leases on 241,400 acres of federal mineral	Allowable Use: Apply CSU stipulations to fluid mineral leases on 133,200 acres of federal mineral	Allowable Use: Apply CSU stipulations to fluid mineral leases on 632,900 acres of federal mineral

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	estate (Figure 2-23 , Alternative A: Controlled Surface Use for Fluid Minerals Leasing [Appendix A]).	estate (Figure 2-24 , Alternative B: Controlled Surface Use for Fluid Minerals Leasing [Appendix A]).	estate (Figure 2-25 , Alternative C: Controlled Surface Use for Fluid Minerals Leasing [Appendix A]).	estate (Figure 2-26 , Alternative D: Controlled Surface Use for Fluid Minerals Leasing [Appendix A]).
262.	Allowable Use: Apply TL stipulations to fluid mineral leases as described in Appendix L .			
263.	Allowable Use: May recommend modifications or disapprove a proposed activity that is likely to adversely affect federally listed threatened or endangered species or their critical habitat; or contribute to a need to list other species.			
264.	Locatable Minerals			
265.	Goal: Provide land use opportunities contributing to economic opportunities while protecting or minimizing adverse effects on other resources.			
266.	Objective: Provide for locatable mineral entry in accordance with existing laws and regulations (43 CFR 3700 and 3800).			
267.	Allowable Use: Manage 23,200 acres of BLM surface as withdrawn from locatable mineral entry in accordance with withdrawal orders (see <i>Withdrawals section in Lands and Realty</i> ; Figure 2-27 , Alternative A: Locatable Minerals; Figure 2-28 , Alternative B: Locatable Minerals; Figure 2-29 , Alternative C: Locatable Minerals; and Figure 2-30 , Alternative D: Locatable Minerals [Appendix A]). Under the appropriate authority, withdrawals would be maintained.			
268.	Action: Allow mineral exploration and development (locatable minerals) under the General Mining Law of 1872 on 628,000 acres of BLM surface not withdrawn from locatable mineral entry (Figures 2-27, 2-28, 2-29, and 2-30; Appendix A). Regulate locatable mineral exploration and development on BLM-administered land under 43 CFR 3800.			
269.	Allowable Use: No similar allowable use.	Allowable Use: Propose 198,400 acres of BLM surface for withdrawal from locatable mineral entry (Figure 2-28; Appendix A).	Allowable Use: No similar allowable use.	Allowable Use: Propose 5,400 acres of BLM surface for withdrawal from locatable mineral entry (Figure 2-30; Appendix A).
270.	Mineral Materials			
271.	Goal: Provide for the extraction of mineral materials to meet public demand while minimizing adverse effects on other resource values.			
272.	Objective: Provide for mineral material sales in accordance with existing laws and regulations (43 CFR 3600).			
273.	<p>Action: Consider mineral material permits on a case-by-case basis and issue at the discretion of the Field Manager. Continue to meet the demand of local governments for sand and gravel needed for road surfacing and maintenance.</p> <p>All lands not withdrawn are available for mineral material disposal.</p> <p>Process applications for the removal of common variety mineral</p>	<p>Action:</p> <ul style="list-style-type: none"> • Issue sales contracts for mineral materials (sand, gravel, stone, limestone, and clay) where disposal is deemed to be in the public interest, while providing for reclamation of mined lands and preventing unnecessary or undue effects on other resources. All lands not withdrawn or discretionally closed are available for mineral material disposal. Mineral material permits are considered on a case-by-case basis and issued at the discretion of the BLM Authorized Officer. • Free use permits may be issued. Materials obtained by a free use permit may not be bartered or sold. • Mineral material sale contracts are valued according to the BLM statewide general appraisal schedule or through individual site-specific appraisals. • Common use areas or community pits would be designated if the level of localized activity warrants. New mineral material sites would be evaluated on a case-by-case basis. • Mineral material sales would be processed on a case-by-case basis. Salable mineral sites would have an approved mining and reclamation plan and an environmental review prior to being opened. Where resource conflicts cannot be adequately mitigated, a permit would be denied. Operating stipulations to protect other resource 		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	materials, including sand and gravel, on a case-by-case basis. Attach stipulations to protect important surface values based on interdisciplinary review of each proposal.	values would be included in mineral material permits.		
274.	Allowable Use: Manage 897,200 acres of federal mineral estate as open for mineral material disposal (Figure 2-31 , Alternative A: Mineral Materials [Appendix A]).	Allowable Use: Manage 733,700 acres of federal mineral estate as open for mineral material disposal (Figure 2-32 , Alternative B: Mineral Materials [Appendix A]).	Allowable Use: Manage 1,192,600 acres of federal mineral estate as open for mineral material disposal (Figure 2-33 , Alternative C: Mineral Materials [Appendix A]).	Allowable Use: Manage 797,600 acres of federal mineral estate as open for mineral material disposal (Figure 2-34 , Alternative D: Mineral Materials [Appendix A]).
275.	Allowable Use: Manage 299,600 acres of federal mineral estate as closed to mineral material disposal (Figure 2-31 ; Appendix A).	Allowable Use: Manage 463,100 acres of federal mineral estate as closed to mineral material disposal (Figure 2-32 ; Appendix A).	Allowable Use: Manage 4,200 acres of federal mineral estate as closed to mineral material disposal (Figure 2-33 ; Appendix A).	Allowable Use: <ul style="list-style-type: none"> Manage 399,200 acres of federal mineral estate as closed to mineral material disposal (Figure 2-34; Appendix A).
276.	Livestock Grazing			
277.	Goal: Provide opportunities for livestock grazing to support and sustain local communities while providing habitat for native plants, fish, and animals (including special status species).			
278.	Objective: No similar objective.	Objective: Meet the forage demands of livestock operations based on current permitted use (AUMs), with an emphasis on other resources for forage demand (e.g., wildlife).	Objective: Meet the forage demands of livestock operations based on current permitted use (AUMs active and suspended).	
279.	Action: Make 636,600 acres available for livestock grazing (Figure 2-35 , Alternatives A, C, and D: Livestock Grazing [Appendix A]).	Action: Make 621,200 acres available for livestock grazing (Figure 2-36 , Alternative B: Livestock Grazing [Appendix A]). Periodically evaluate acres available, permitted use (i.e., AUMs), and permit terms and conditions (e.g., periods of use and class of livestock) and adjust as needed based on monitoring and land health conditions.	Action: Make 636,600 acres available for livestock grazing (Figure 2-35 ; Appendix A). Periodically evaluate acres available, permitted use (i.e., AUMs), and permit terms and conditions (e.g., periods of use and class of livestock) and adjust as needed based on monitoring and land health conditions.	
280.	Action: Manage 14,600 acres as unavailable for livestock grazing.	Action: Manage 30,000 acres as unavailable for livestock grazing, which includes portions of allotments	Action: Manage 14,600 acres as unavailable for livestock grazing. All other lands, including parcels not currently authorized for grazing use and certain other tracts similarly unauthorized for grazing use, are available	

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	Most unallocated parcels would remain available for livestock grazing. These are mainly isolated small tracts. An environmental assessment (EA) would be prepared for areas not previously grazed by livestock.	and unallotted land. All parcels not currently authorized for grazing use and certain other tracts similarly unauthorized for grazing use would be unavailable.	for livestock grazing.	
281.	Action: About 40 percent of the vegetation would continue being allocated to livestock. 126,042 AUMs are allocated to livestock.	Action: Establish allotment stocking rates for watershed function and cover/forage by wildlife. This action corresponds with a light (21 to 40 percent) forage level. Additional forage may be allocated to livestock, depending on site-specific forage availability. Allocate up to 63,021 AUMs to livestock.	Action: Establish allotment stocking rates to maintain and maximize utilization of forage in areas preferred by livestock. This action generally corresponds with a moderate (41 to 60 percent) utilization level. An allocation of 126,042 AUMs to livestock would be continued across the planning area. Increases in allotment-specific allocations based on forage availability would be considered, not to exceed 63,201 additional AUMs, across the planning area.	Action: Establish stocking rates in areas preferred by livestock that allow for appropriate forage levels by livestock adjusted for the anticipated intensity of use necessary to provide sufficient forage and cover to support and maintain healthy diverse wildlife and vegetative communities. Forage levels may vary based on the implementation of a comprehensive grazing strategy as needed to maintain or achieve vegetation objectives. Allocate up to 126,042 AUMs to livestock.
282.	Action: Exclude developed recreation sites from livestock grazing, except where grazing is needed to maintain the desired plant community. For example, sheep or goat grazing may be needed to control leafy spurge. Manage grazing by horses and other livestock used by recreationists in developed recreation sites through specific activity plans.			
283.	Action: In allotments where Standards for Rangeland Health (BLM 1997; Appendix N) are not met and livestock grazing is a causal factor and site-specific analyses demonstrated that Standards for Rangeland Health could be achieved, issue grazing permits with specific grazing seasons and livestock numbers and other terms and conditions designed to make progress toward meeting the Standards for Rangeland Health. A list of grazing allotments is provided	Action: Allotments where Standards for Rangeland Health (BLM 1997; Appendix N) are not met for two consecutive rangeland health evaluation determinations (including determinations made prior to implementation of this RMP), and livestock grazing is a causal factor in the failure to meet these standards, would be unavailable for livestock grazing.	Action: In allotments where Standards for Rangeland Health (BLM 1997; Appendix N) are not met, livestock grazing was a causal factor in the failure to meet these standards, and there was no progress toward meeting the standards in the allotments within 5 years of making management changes, suspend use and do not reauthorize until standards and habitat objectives are attained. Once standards and habitat objectives are met, reauthorize use at levels to maintain resource objectives. Allotments would be unavailable for grazing if standards and habitat objectives could not be met by any level of authorized use.	

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	in Appendix O , Grazing Allotments.			
284.	Action: All vegetation increases resulting from livestock grazing management and/or land treatments within an allotment would be allocated to watershed, until the soil and vegetation resource is stabilized at a satisfactory condition as determined by an interdisciplinary team.	Action: All vegetation increases within an allotment would be allocated to watershed. These increases could come from, but are not limited to, livestock grazing, wildfire rehabilitation areas, prescribed burn areas, and vegetation treatment areas.	Action: All vegetation increases within an allotment would be allocated to watershed, until the soil and vegetation resource is stabilized at a satisfactory condition as determined by an interdisciplinary team. These increases could come from, but are not limited to, livestock grazing, wildfire rehabilitation areas, prescribed burn areas, and vegetation treatment areas. Once stabilized, forage would be allocated to livestock grazing.	
285.	Action: No similar action.	Action: Do not consider the yearling factor on permits/leases.	Action: Do not consider the yearling factor on new permits/leases. Remove yearling factors on permits/leases that currently employ one as the permits/leases are renewed.	
286.	Action: Implement short-term livestock grazing reductions as necessary during drought or other emergencies.	Action: As appropriate, line managers would follow the drought policy in Appendix P , Drought Policy.		
287.	Action: Grazing allocations on newly acquired land would be based on management needs and objectives for the acquisition. The allocation may range from zero to full capacity and would be monitored after completion of the activity plan to adjust grazing as needed, to meet objectives.	Action: Newly acquired lands After designating reserve common allotments, develop AMPs or activity plans to determine management based on resource conditions. After designating reserve common allotments, develop AMPs or activity plans to determine management based on resource conditions.		
288.	Action: A minimum rest period from livestock grazing of two growing seasons would be required after any major disturbance. More rest may be required, depending on the situation. Major disturbances are defined as mechanical manipulation of the range, such as chiseling and seeding. Requirements for rest following fire (wild or prescribed) would depend on a variety of factors including the type	Action: A minimum rest period from livestock grazing of 2 years would be required after any major disturbance (including fire).	Action: In priority vegetation, there would be no minimum rest period from livestock grazing following disturbances. Site-specific requirements for resting or deferring areas from livestock grazing following major disturbance would depend on a variety of factors, including resource objectives, the type of fuel, time and intensity of burn, accessibility of the burned area to livestock,	Action: Rest periods of less than two growing seasons may be desirable in some circumstances, and would be determined through site-specific interdisciplinary team planning, monitoring, and environmental review. Livestock grazing on disturbed areas (e.g., a fire event, reclamation of disturbed lands, seedings, and surface-disturbing vegetation treatments) would be deferred or excluded

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	of fuel, time of burn, accessibility of the burned area to livestock and climatic factors post-burn. Specific timing and the type of rest would be determined at the site-specific EA phase.		and post-burn climatic factors.	until site-specific analysis and/or monitoring data indicates that vegetative cover, species composition, and litter accumulation are adequate to support and protect watershed values, meet vegetation objectives, and sustain grazing use.
289.	<p>Action: Prohibit domestic sheep grazing from overlapping bighorn sheep habitat to ensure no contact between domestic and bighorn sheep.</p>	<p>Action: No new sheep or goat allotments or conversions would be allowed in occupied wild bighorn sheep habitat. New sheep/goat allotments or conversion from cows to sheep/goats would not be allowed within 20 miles of occupied wild bighorn sheep habitat. Exact distances between domestic sheep and bighorn sheep would be based on habitat and movement potential.</p>	<p>Action: No new sheep or goat allotments or conversions would be allowed in occupied wild bighorn sheep habitat. Allotments between current occupied wild bighorn sheep habitat and current sheep allotments would be reviewed and reclassified based on habitat, movement potential, and current science and guidelines to minimize contact between domestic sheep and bighorn sheep.</p>	<p>Action: Domestic sheep/goats would not be allowed within 9 miles of wild bighorn sheep populations. Between 9 and 20 miles, domestic sheep and goats may be considered if mechanisms are in place to achieve effective separation from wild sheep.</p> <p>Sheep and goat allotments in areas with risk of contact (between 9 and 20 miles) with bighorn sheep and domestic sheep and/or goats in the planning area would be reviewed and managed, or reclassified if necessary, to achieve effective separation (both temporal and/or spatial) between domestic sheep and/or goats and bighorn sheep. Contact risk would be based on habitat, distance between bighorn sheep range (current and anticipated), sheep and goat allotments, movement potential, and current science and guidelines. Domestic sheep/goats would not be allowed within occupied wild bighorn sheep habitat unless mechanisms are in place to achieve effective separation from wild sheep.</p>

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
290.	Recreation and Visitor Services			
291.	Goal: Maintain and/or enhance the recreational quality of BLM-administered land and resources to ensure enjoyable recreational experiences.	Goal: Pursuant to Secretarial Orders 3347 and 3356, the recreation program will increase opportunities for outdoor recreation that add to the participant’s quality of life while contributing to local economies.		
292.	Objective: No similar objective.	Objective: <ul style="list-style-type: none"> • Visitor Services Resource Protection Objective: Increase awareness, understanding, and sense of stewardship in recreational activity participants so their conduct safeguards cultural and natural resources. • Visitor Health and Safety Objective: Ensure that visitors are not exposed to unhealthy or unsafe human-created conditions (defined by a repeat or recurring incident in the same year, of the same type, in the same location, due to the same cause). • Use/User Conflict Objective: Achieve a minimum level of conflict between recreation participants and (1) other resource/resource uses sufficient to enable the achievement of identified land use plan goals, objectives, and actions; (2) private landowners sufficient to curb illegal trespass and property damage; and (3) other recreation participants sufficient to maintain a diversity of recreation activity participation. 		
293.	Action: Do not construct undeveloped or developed recreation sites based strictly on local use, unless these sites can be realized through partnerships with other government entities, local service organizations, etc., unless these sites can be realized through enacting a fee-based program at developed recreation sites, partnerships with other government entities, local service organizations, etc.			
294.	Allowable Use: STIPULATION NSO Recreational Areas	Allowable Use: STIPULATION NSO Recreation Areas	Allowable Use: No similar allowable use.	Allowable Use: Same as Alternative B.
295.	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Developed Recreation Sites	Allowable Use: No similar allowable use.	Allowable Use: STIPULATION NSO Developed Recreation Sites
296.	Allowable Use: STIPULATION NSO Fisheries	Allowable Use: STIPULATION NSO Fisheries and Aquatic Species	Allowable Use: STIPULATION NSO Fisheries and Aquatic Species	Allowable Use: Same as Alternative B.
297.	<i>Special Recreation Management Areas (SRMA-specific outcomes-focused objectives, proposed recreation setting characteristics [RSCs], and the management framework for each can be found in Appendix Q, Recreation Management Areas).</i>			
298.	Action: Continue to manage the three existing SRMAs (Figure 2-37 , Alternative A: Recreation Management Areas [Appendix A]): <ul style="list-style-type: none"> • Judith Mountains (19,200 acres) • Judith River (10,100 acres) • Snowy Mountains (470 acres) 	Action: No similar action (no SRMAs would be designated in this alternative).	Action: Designate four SRMAs (Figure 2-39 , Alternative C: Recreation Management Areas [Appendix A]): <ul style="list-style-type: none"> • Judith Mountains (19,200 acres) <ul style="list-style-type: none"> ○ Limekiln Canyon Recreation Management Zone (4,800 acres) ○ Judith Peak/Red Mountain Recreation Management Zone 	Action: Designate three SRMAs (Figure 2-40 , Alternative D: Recreation Management Areas [Appendix A]): <ul style="list-style-type: none"> • Durfee Hills (3,800 acres) • Judith Mountains (19,200 acres) <ul style="list-style-type: none"> ○ Limekiln Canyon Recreation Management Zone (4,800 acres) ○ Judith Peak/Red Mountain

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
			(14,400 acres) <ul style="list-style-type: none"> • Lowry Bridge (80 acres) • North Moccasin (3,200 acres) • Snowy Mountains (470 acres) 	Recreation Management Zone (14,400 acres) <ul style="list-style-type: none"> • Lowry Bridge (80 acres)
299.	<i>Extensive Recreation Management Area (ERMAs) (ERMA-specific objectives and the management framework for each can be found in Appendix Q.)</i>			
300.	Action: Continue to manage the two existing ERMAs (Figure 2-37; Appendix A): <ul style="list-style-type: none"> • Judith (1,100 acres; 11 reservoirs) • Nez Perce NHT (3 miles) 	Action: Designate four ERMAs (Figure 2-38, Alternative B: Recreation Management Areas [Appendix A]): <ul style="list-style-type: none"> • Arrow Creek backcountry conservation area ([BCA]; 12,800 acres) • Cemetery Road BCA (13,400 acres) • Crooked Creek BCA (183,500 acres) • Judith Mountains BCA (19,100 acres) 	Action: Designate four ERMAs (Figure 2-39; Appendix A): <ul style="list-style-type: none"> • Arrow Creek (12,800 acres) • Cemetery Road (13,400 acres) • Crooked Creek (183,500 acres) • Judith (10 reservoirs; 1,000 acres) 	Action: Designate three ERMAs (Figure 2-40; Appendix A): <ul style="list-style-type: none"> • Judith (8 reservoirs; 800 acres) • North Moccasin (3,200 acres) • Snowy Mountains (470 acres)
301.	<i>Special Recreation Permits (SRPs)</i>			
302.	Action: Do not allow SRPs in priority habitat unless they are consistent with the goals and objectives for that habitat or species.			
303.	<i>Target Shooting</i>			
304.	Action: No similar action. Note: Discharge of firearms is prohibited in all developed recreation sites (campgrounds, trailheads, picnic areas, etc.) per 43 CFR 8365.2-5(a).	Action: Prohibit target shooting in dispersed recreation sites. Note: Discharge of firearms is prohibited in all developed recreation sites (campgrounds, trailheads, picnic areas, etc.) per 43 CFR 8365.2-5(a).	Action: Same as Alternative A.	
305.	Travel, Transportation Management, and Access			
306.	Goal: Manage both motorized and nonmotorized travel to support the BLM’s mission, achieve resource management objectives, and provide appropriate, sustainable public and administrative access.			
307.	Objective: Close specific areas to protect the resource values in ACECs, preserve and protect the wilderness characteristics in the WSA, protect vegetation and soils to maintain watersheds and water quality, reduce user conflicts, and reduce harassment of wildlife and provide habitat security.	Objective: Maintain and improve land health while promoting responsible use through active travel management. Within each travel management area, designate a comprehensive travel management system that achieves resource management objectives; provides appropriate, sustainable public and administrative access; communicates with the public about opportunities; and monitors the effects of use.		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
308.	Action: No similar action.		Action: Manage specific areas to protect resource values in special designations, preserve and protect wilderness characteristics, protect vegetation and soils to maintain watersheds and water quality, reduce user conflicts, and reduce harassment of wildlife and provide habitat security. In areas designated as limited, restrict public cross-country OHV use on BLM-administered land yearlong or seasonally to existing routes.	
309.	Action: No similar action.		Action: Existing and/or new individual routes would be designated using criteria described in 43 CFR 8342.1 rather than just using all the inherited routes.	
310.	Action: No similar action.		Action: The BLM would emphasize management of the transportation system to reduce effects on natural resources from authorized roads, primitive roads, and trails. The BLM would also consider, through travel management planning, closing and restoring unauthorized routes to prevent resource damage.	
311.	Action: No similar action.		Action: Resource considerations would be assessed in determining designation criteria. All designations would be based on the protection of resources, safety of all users, and the minimization of conflicts among various uses (43 CFR 8342.1). The following elements to be considered during route selection fall within the designation criteria: administrative access for the BLM and BLM-authorized activities; at-risk watersheds; cultural resources; current maintenance agreements; DFC; elimination of route redundancy; energy development; erodible soils; forest resources; low bearing strength soils (saline); paleontological resources; potential for adverse or positive economic effects; prescriptions for land use allocations including SRMAs; public health and safety; emergency services; recreation opportunities, experiences, settings, benefits; riparian resources, assessment of PFC; rights-of-way, easements and inholdings; Standards for Rangeland Health (BLM 1997); user preferences and conflicts of use; vegetation (at-risk vegetative sites, relic vegetation); visual resources; watershed resources; wilderness characteristics; WSAs; wildlife resources (greater sage-grouse habitat, raptor nesting locations, sensitive species habitats, winter range, big game habitat, prairie dog habitat).	
312.	Action: No similar action.		Action: Motorized wheeled cross-country travel for lessees and permittees is limited to the administration of a federal lease or permit (BLM 2003a). Any authorized or permitted activity, such as a grazing permit or SRP, that involves motorized access to public lands must describe how access would be managed, both on and off the existing or designated route system, as part of the permit or authorization.	
313.	Action: New permanent routes would be constructed subject to environmental review and approved engineering standards, following criteria described in this section. Consideration would be given to use demands, location, safety, and resource constraints when determining the level of road necessary (BLM Manuals 9113 [BLM 2015e], 9114, 9115 [BLM 2012d], and associated handbooks). If an existing route is substantially contributing to resource effects, the route would be considered for redesign, rerouting, decommissioning, or closure to minimize the adverse effects.			
314.	Action: No similar action.		Action: The BLM would pursue opportunities to conduct restoration of routes not designated during travel management planning, with priority given to areas with special management concerns. This includes routes that have not been designated as “primitive routes” within WSAs and those that have been closed within areas that are being managed to protect or enhance wilderness characteristics or special status species such as the greater sage-grouse. Applicable requirements such as specific seed mixes or transplanting recommendations would also be applied where special status species or issues are a concern (e.g., mitigation for greater sage-grouse).	

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
315.	Action: BLM regulations (43 CFR 8341.2 and 8364.1) allow for area or road closures where OHVs are causing, or would cause, considerable adverse effects on soil, vegetation, wildlife, threatened or endangered species, wildlife habitat, cultural resources, other authorized uses, public safety, or other resources. The BLM Authorized Officer can immediately close the area or road affected until the effects are eliminated and measures are implemented to prevent future recurrence.			
316.	Action: Manage 2,700 acres as closed to motorized travel* (Figure 2-41 , Alternative A: Travel, Transportation Management, and Access – Motorized and OHV [Appendix A]).	Action: Manage 209,000 acres as closed to motorized travel* (Figure 2-42 , Alternative B: Travel, Transportation Management, and Access – Motorized and OHV [Appendix A]).	Action: Manage 2,700 acres as closed to motorized travel* (Figure 2-43 , Alternative C: Travel, Transportation Management, and Access – Motorized and OHV, and Figure 2-44 , Alternative D: Travel, Transportation Management, and Access – Motorized and OHV [Appendix A]).	
317.	<p>Allowable Use: Allocate the decision area as follows for OHV travel (Figure 2-41 [Appendix A]):</p> <ul style="list-style-type: none"> • 13,000 acres closed* • 487,700 acres limited yearlong • 147,800 acres limited seasonally <p><i>*Closed to OHV travel means closed to those modes of travel that meet the OHV definition, including exclusions, at 8340.0-5(a).</i></p>	<p>Allowable Use: Allocate the decision area as follows for OHV travel (Figure 2-42 [Appendix A]):</p> <ul style="list-style-type: none"> • 0 acres closed* • 413,500 acres limited yearlong • 28,700 acres limited seasonally <p><i>*See areas closed to motorized travel in row above; 209,000 acres are closed to motorized travel, but 0 acres are closed to modes of travel that meet the OHV definition, including exclusions, at 8340.0-5(a).</i></p>	<p>Allowable Use: Allocate the decision area as follows for OHV travel (Figure 2-43 [Appendix A]):</p> <ul style="list-style-type: none"> • 0 acres closed* • 500,600 acres limited yearlong • 147,800 acres limited seasonally <p><i>*Closed to OHV travel means closed to those modes of travel that meet the OHV definition, including exclusions, at 8340.0-5(a).</i></p>	<p>Allowable Use: Allocate the decision area as follows for OHV travel (Figure 2-44 [Appendix A]):</p> <ul style="list-style-type: none"> • 13,000 acres closed* • 487,700 acres limited yearlong • 147,800 acres limited seasonally <p><i>*Closed to OHV travel means closed to those modes of travel that meet the OHV definition, including exclusions, at 8340.0-5(a).</i></p>
318.	Action: Manage 487,700 acres as limited to designated routes yearlong for OHV travel.	Action: Manage 413,500 acres as limited to designated routes yearlong for OHV travel.	Action: Manage 500,600 acres as limited to designated routes yearlong for OHV travel.	Action: Manage 487,700 acres as limited to designated routes yearlong for OHV travel.
319.	<p>Action: Seasonally limit OHV travel to designated routes in 147,800 acres. The seasonal limitation, September 1 through December 1, is based on the big game hunting season. If the hunting season were to change, the seasonal limitation would be modified accordingly.</p> <ul style="list-style-type: none"> • This area includes the Missouri Breaks, Chain Buttes, Two Calf, Armells Creek, Fargo Coulee, 	<p>Action: Seasonally limit OHV travel and promote nonmotorized travel in the Chain Buttes and East Indian Butte Block Management Areas (BMAs; 28,700 acres*).</p> <p>The seasonal limitation, September 1 through December 1, is based on the big game hunting season. Travel would be limited from 10 am to 2 pm for game retrieval only. If the hunting season were to change, the seasonal</p>	<p>Action: Seasonally limit OHV travel and promote nonmotorized travel in the Chain Buttes and East Indian Butte BMAs (147,800 acres).</p> <p>The seasonal limitation, September 1 through December 1, is based on the big game hunting season. Travel would be limited from 10 am to 2 pm for game retrieval only. If the hunting season were to change, the seasonal limitation</p>	<p>Action: Seasonally limit OHV travel and promote nonmotorized travel in the Chain Buttes and East Indian Butte BMAs (147,800 acres*).</p> <p>The seasonal limitation, September 1 through December 1, is based on the big game hunting season. Travel would be limited from 10 am to 2 pm for game retrieval only. If the hunting season were change, the</p>

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	<p>Indian Buttes, Crooked Creek, Dunn Ridge, Dog Creek and Woodhawk. (JVP)</p> <ul style="list-style-type: none"> • Blacktail Coulee and Yellow Water areas. 	<p>limitation would be modified accordingly as an implementation-level decision.</p> <p><i>*Portions of the Chain Buttes and East Indian Butte BMAs overlap areas that are closed to OHV travel in this alternative. Those acres are not included in the total seasonal limitation.</i></p>	<p>would be modified accordingly as an implementation-level decision.</p>	<p>seasonal limitation would be modified accordingly as an implementation-level decision.</p> <p><i>*Portions of the Chain Buttes and East Indian Butte BMAs overlap areas that are closed to OHV travel in this alternative. Those acres are not included in the total seasonal limitation.</i></p>
320.	<p>Allowable Use: Allocate the decision area as follows for mechanized travel (Figure 2-45, Alternatives A and C: Travel, Transportation Management, and Access – Mechanized [Appendix A]):</p> <ul style="list-style-type: none"> • 648,500 acres open • 2,700 acres limited (WSAs) 	<p>Allowable Use: Allocate the decision area as follows for mechanized travel (Figure 2-46, Alternative B: Travel, Transportation Management, and Access – Mechanized [Appendix A]):</p> <ul style="list-style-type: none"> • 446,100 acres open • 205,100 acres closed 	<p>Allowable Use: Allocate the decision area as follows for mechanized travel (Figure 2-45, [Appendix A]):</p> <ul style="list-style-type: none"> • 648,500 acres open • 2,700 acres closed 	<p>Allowable Use: Allocate the decision area as follows for mechanized travel (Figure 2-47, Alternative D: Travel, Transportation Management, and Access – Mechanized [Appendix A]):</p> <ul style="list-style-type: none"> • 503,700 acres open • 2,700 acres closed • 144,800 acres limited
321.	<p>Action: Prohibit motorized cross-country over-snow vehicle (OSV) travel on 0 acres.</p>	<p>Action: Prohibit motorized cross-country OSV travel in the following locations (220,200 acres; Figure 2-48, Alternative B: Over-Snow Vehicle Travel [Appendix A]):</p> <ul style="list-style-type: none"> • Lands managed to protect wilderness characteristics • WSAs • ACECs: <ul style="list-style-type: none"> ○ Blind Horse ○ Chute Mountain ○ Deep Creek/Battle Creek ○ Ear Mountain • Areas with winter restrictions • Crucial wildlife winter range 	<p>Action: Prohibit motorized cross-country OSV travel in the following locations (18,200 acres; Figure 2-49, Alternative C: Over-Snow Vehicle Travel [Appendix A]):</p> <ul style="list-style-type: none"> • WSAs • Crucial wildlife winter range 	<p>Action: Prohibit motorized cross-country OSV travel in the following locations (30,700 acres; Figure 2-50, Alternative D: Over-Snow Vehicle Travel [Appendix A]):</p> <ul style="list-style-type: none"> • WSAs • ACECs: <ul style="list-style-type: none"> ○ Blind Horse ○ Chute Mountain ○ Deep Creek/Battle Creek ○ Ear Mountain • Areas with winter restrictions • Crucial wildlife winter range
322.	<p>Allowable Use: Allow motorized cross-country OSV travel on 651,200 acres.</p>	<p>Allowable Use: Motorized cross-country OSVs (with the exception of administrative and emergency use) are subject to the following management guidelines: Avoid locations where wind or topographic conditions may have reduced snow depth and created situations where damage to vegetation or soils could occur, or where the</p>		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		majority of vegetation is taller than the protective snow cover. Sensitive areas could be closed to motorized OSV travel if resource damage is found to be occurring in these areas.		
323.	Action: Continue to allow fixed-wing aircrafts and helicopters to land on designated 2-tracks and roads.	Action: Manage the Durfee Hills area as closed to motorized travel.	Action: Same as Alternative A.	Action: Manage the Durfee Hills SRMA to support recreational opportunities (primarily big-game hunting) for fixed-wing aircraft and helicopters.
324.	Action: Complete travel planning in the following Travel Management Areas.			
325.	Action: No similar action.	Action: Where private landowners have demonstrated willingness to provide public access across their lands, the BLM would manage for public access from BLM-administered lands across such private lands in travel plans. Exceptions include routes that the BLM has proposed as closed or are known to be posted or otherwise closed to the public by private property owners. The BLM has no control over private road traveling through private land onto BLM-administered lands. Access across private land is subject to change. Where public motorized access is contingent upon the governing consent of adjoining landowner(s), the BLM would exercise a reciprocal “All or None” road use policy. This means that as long as the public is allowed access to these roads, no changes in travel management would occur; however, should the adjacent landowner refuse public access, then the BLM would reciprocate by closing its roads to their use as well.		
326.	Action: No similar action	Action: Obtain legal public or administrative access over nonfederal lands from willing landowners or state or other federal agencies, as appropriate, on a case-by-case basis as the need or as the opportunity arises and using criteria and direction in the <i>Land Tenure</i> alternatives (see <i>Land Tenure</i> section below). Methods used to acquire access include easements acquired through purchase, exchange, or donation; reciprocal ROWs; land exchanges; fee title purchase; cooperative agreements; reservations; permits; donation of fee land; covenant language in patents or deeds; or long-term land use agreements.		
327.	Lands and Realty			
328.	Goal: Meet resource needs while providing public use authorizations such as ROWs, permits, and leases.			
329.	<i>Land Use Authorizations</i>			
330.	Objective: Address the needs of industry, utilities, the public, or government entities for land use authorizations while minimizing adverse effects on other resource values.			
331.	Allowable Use: Manage 15,700 acres as ROW exclusion areas; Figure 2-51 , Alternative A: Right-of-Way Exclusion and Avoidance [Appendix A].	Allowable Use: Manage 278,800 acres as ROW exclusion areas; Figure 2-52 , Alternative B: Right-of-Way Exclusion and Avoidance [Appendix A].	Allowable Use: Manage 2,700 acres as ROW exclusion areas; Figure 2-53 , Alternative C: Right-of-Way Exclusion and Avoidance [Appendix A].	Allowable Use: Manage 18,000 acres as ROW exclusion areas; Figure 2-54 , Alternative D: Right-of-Way Exclusion and Avoidance [Appendix A].
332.	Allowable Use: Manage 378,700 acres as ROW avoidance areas (Figure 2-51 ; Appendix A).	Allowable Use: Manage 341,500 acres as ROW avoidance (Figure 2-52 ; Appendix A).	Allowable Use: Manage 345,500 acres as ROW avoidance (Figure 2-53 ; Appendix A).	Allowable Use: Manage 446,600 acres as ROW avoidance areas (Figure 2-54 ; Appendix A).

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
			Roads and utility corridors would avoid riparian zones to the extent practicable.	Roads and utility corridors would avoid riparian zones to the extent practicable.
333.	Allowable Use: STIPULATION NSO Occupied Buildings	Allowable Use: STIPULATION NSO City Limits or Residential Structures	Allowable Use: STIPULATION NSO Residential Structures	Allowable Use: No similar allowable use.
334.	Allowable Use: STIPULATION CSU Highways, County Roads, Trails	Allowable Use: No similar allowable use		
335.	Allowable Use: No similar allowable use	Allowable Use: LEASE NOTICE LN Land Use Authorizations		
336.	Allowable Use: Judith Peak and the South Moccasin Mountains would be used for existing and future communications facilities. All future facilities in the South Moccasin Mountains placed in one building.	Allowable Use: Communications sites would be confined to the Judith Peak and the South Moccasin Mountains communication sites. Judith Peak and the South Moccasin Mountains would be used for existing and future communications facilities. Future management at these sites would conform to the most recent individual site plans.		
337.	Action: Encourage applicants to locate new facilities within existing corridors.	Action: Co-locate new ROWs, including those associated with valid existing rights, within existing ROWs or where it best minimizes effects. Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then authorize to the minimum standard necessary any new road constructed to an approved BLM standard.		
338.	Allowable Use: The decision area (JVP) is closed to cabin site leases. The decision area (JVP) is open to non-cabin site leases on a case-by-case basis for short-term authorizations (3 years or less).	Allowable Use: Close the decision area to new cabin site leases. Open the decision area (JVP) to non-cabin site leases on a case-by-case basis for short-term authorizations (3 years or less), which may be renewed.		
339.	Action: Consider Section 302(b) leases (other than cabin site leases) on an individual basis.	Action: Consider Section 302(b) leases and permits for short-term (3 years or less) authorizations with no authorization of use exceeding 3 years.	Action: Consider Section 302(b) non-cabin site leases/permits on a case-by-case basis for renewable short-term authorizations (3 years or less).	
340.	Allowable Use: No similar allowable use	Allowable Use: LEASE NOTICE LN Setback from Human-Occupied Residences		
341.	Allowable Use: No similar allowable use	Allowable Use: LEASE NOTICE LN Cemeteries		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
342.	Land Tenure			
343.	Objective: Attain a BLM land pattern that blends multiple resource values and brings about better manageability.	Objective: Attain a BLM land pattern that blends multiple resource values and brings about better manageability. Strive for no net loss (acres/value) of BLM-administered lands.	Objective: Attain a BLM land pattern that blends multiple resource values and brings about better manageability. Consistent with Secretarial Order 3373, ensure that public access and recreational opportunities are important consideration of any land tenure adjustment (See land tenure criteria listed in Appendix R).	
344.	Allowable Use: Manage 27,300 acres as closed to disposition under the public land laws (unless and until the withdrawal is lifted; see <i>Withdrawals</i> alternatives section in this table) ² .			
345.	Action: Site-specific decisions regarding landownership adjustments in the resource area would be made based largely on consideration of criteria, which are derived from State Director guidance.	Action: Base management of landownership adjustments on three categories of BLM-administered land as described in Appendix R , Land Ownership Adjustment Categories.		
346.	Action: No similar action.	Action: Identify 55,800 acres as Category I - Retention (Figure 2-56 , Alternatives B, C, and D: Disposal [Appendix A]).		
347.	Action: No similar action.	Action: Identify 585,700 acres as Category 2 – Retention-Limited Disposal (Figure 2-56; Appendix A).	Action: Identify 595,500 acres as Category 2 – Retention-Limited Disposal (Figure 2-57; Appendix A).	Action: Same as Alternative B.
348.	Action: Identify 40,900 acres for disposal (Figure 2-55 Alternative A: Disposal [Appendix A]).	Action: Identify 9,800 acres as Category 3 - Disposal (Figure 2-56; Appendix A).	Action: Identify 0 acres as Category 3 - Disposal (Figure 2-57; Appendix A).	Action: Same as Alternative B (Figure 2-56; Appendix A).
349.	Action: Pursue acquisitions, as opportunities arise, through exchange or purchase with willing proponents and/or sellers.	Action: Pursue acquisitions, as opportunities arise, through exchange or purchase with willing proponents and/or sellers. Any new acquisitions should have to include permanent administrative access to those parcels as well as include at least seasonal access to the public.		
350.	Action: Public land within retention areas generally would remain in public ownership and be managed by the BLM. Transfers to other public	Action: Transfers to other public agencies would be considered where improved management efficiency would result, with the exception of lands acquired with LWCF funds. Minor adjustments involving sales or exchanges, or both may be permitted based on site-specific application of the landownership adjustment criteria. Acquisition of land should:		

²Total withdrawal acres are less than the sum of each of the withdrawals because some withdrawals overlap more than one resource.

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	<p>agencies would be considered where improved management efficiency would result, with the exception of lands acquired with funds from the Land and Water Conservation Fund (LWCF). Minor adjustments involving sales or exchanges, or both may be permitted based on site-specific application of the adjustment criteria.</p> <p>Land to be acquired by the BLM through exchanges generally must be located in retention areas.</p>	<ul style="list-style-type: none"> • provide new legal access or facilitate improved access to public land and resources, • block up parcels of federally owned land for management efficiency, • maintain or enhance important public values and uses, • maintain or enhance local social and economic values, or • facilitate implementation of other aspects of this RMP. <p>Manage newly acquired lands for the purpose for which they were acquired. Lands acquired within special management areas with specific congressional mandates (such as national trails and wilderness areas) would be managed in conformance with established guidelines for those areas. Manage lands acquired within administratively designated special management areas that have fragile or unique resources (such as ACECs and SRMAs) the same as the special management area. Lands acquired without special values or management goals would be managed in the same manner as comparable surrounding public lands.</p>		
351.	<p>Action: Public lands within disposal areas generally would be made available for disposal or exchanges. Exchanges would be the preferred method of disposal. Public land to be sold must meet the disposal criteria identified in State Director Guidance.</p>	<p>Action: Disposal areas would generally be made available for disposal through exchanges. Exchanges would be the method of disposal. The disposal criteria would be the same as for Alternative A.</p>	<p>Action: Disposal areas would generally be made available for disposal through sales or exchanges or both. Exchanges would be the preferred method of disposal. The disposal criteria would be the same as for Alternative A.</p>	
352.	<p>Renewable Energy (<i>wind, solar, hydro, and biomass; see the Fluid Minerals alternatives section in this table for geothermal</i>)</p>			
353.	<p>Goal: No similar goal.</p>	<p>Goal: Provide opportunities for the development of renewable energy resources (from sources such as wind and solar) while minimizing adverse effects on other resource values.</p>		
354.	<p>Objective: No similar objective.</p>	<p>Objective: Allow renewable energy development to the extent consistent with other goals, objectives, and requirements of this plan.</p>		
355.	<p>Action: No similar action.</p>	<p>Action: Analyze proposals for solar and hydrological energy and biomass development on a case-by-case basis and authorize those that are consistent with resource management goals and objectives.</p>		
356.	<p>Action: Adopt BMPs and policies related to wind energy development (see Appendix F).</p>			
357.	<p>Allowable Use: Manage 236,300 acres as exclusion areas for wind energy (Figure 2-58, Alternative A: Wind Energy Development [Appendix A]).</p>	<p>Allowable Use: Manage 477,900 acres as exclusion areas for wind energy (Figure 2-59, Alternative B: Wind Energy Development [Appendix A]).</p>	<p>Allowable Use: Manage 263,300 acres as exclusion areas for wind energy (Figure 2-60, Alternative C: Wind Energy Development [Appendix A]).</p>	<p>Allowable Use: Manage 387,200 acres as exclusion areas for wind energy (Figure 2-61, Alternative D: Wind Energy Development [Appendix A]).</p>
358.	<p>Allowable Use: Manage 117,500 acres as avoidance areas for wind energy (Figure 2-58; Appendix A).</p>	<p>Allowable Use: Manage 118,600 acres as avoidance areas for wind energy (Figure 2-59; Appendix A).</p>	<p>Allowable Use: Manage 269,200 acres as avoidance areas for wind energy (Figure 2-60; Appendix A).</p>	<p>Allowable Use: Manage 110,900 acres as avoidance areas for wind energy (Figure 2-61; Appendix A).</p>

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
359.	Allowable Use: Manage 297,400 acres as open for wind energy development (i.e., areas outside of exclusion and avoidance areas for wind energy development; Figure 2-58; Appendix A).	Allowable Use: Manage 54,700 acres as open for wind energy development (i.e., areas outside of exclusion and avoidance areas for wind energy development). In open areas, manage 46,900 acres as potential wind development areas (Figure 2-59; Appendix A). These areas are open for wind energy development, where wind speed data collected at 120 meters exhibit wind speeds of 7 meters/second or greater.	Allowable Use: Manage 118,700 acres as open for wind energy development (i.e., areas outside of exclusion and avoidance areas for wind energy development). Within open areas, manage 102,300 acres as potential wind development areas (Figure 2-60; Appendix A). Potential wind development areas are open for wind energy development, where wind speed data collected at 120 meters exhibit wind speeds of 7 meters/second or greater.	Allowable Use: Manage 153,100 acres as open for wind energy development (i.e., areas outside of exclusion and avoidance areas for wind energy development) Within open areas, manage 137,200 acres as potential wind development areas (Figure 2-61; Appendix A). Potential wind development areas are open for wind energy development, where wind speed data collected at 120 meters exhibit wind speeds of 7 meters/second or greater.
360.	Withdrawals (See the locatable minerals section for acres proposed for withdrawal; all proposed withdrawals are for locatable minerals.)			
361.	Goal: No similar goal.	Goal: Protect significant resources or significant government investment.		
362.	Objective: No similar objective.	Objective: Utilize withdrawal actions with the least restrictive measures and of the minimum size necessary to accomplish the required purpose.		
363.	Allowable Use: Manage 147,100 acres of federal mineral estate as withdrawn under one or more types of segregations (Figure 2-62, Alternatives A, B, C, and D: Withdrawn Lands [Appendix A] and Appendix S, Withdrawal Segregations).			
364.	Action: Recommend the revocation of all BLM withdrawals for water power and water storage pending site evaluation for water power potential.	Action: No similar action (withdrawals would be maintained).	Action: Consider revocations of withdrawals on a case-by-case basis pending evaluation of water power potential and possible land tenure adjustments. Maintain all other types of withdrawals.	
365.	Forest, Woodland, and Special Products			
366.	Goal: Provide opportunities for traditional and nontraditional uses of forest products by incorporating sound ecological principles while contributing to the economic stability of the local communities.			
367.	Objective: No similar objective.	Objective: Provide woody and non-woody biomass consistent with other resource uses as part of an ecologically healthy system and consistent with the principles of multiple use.		
368.	Objective: No similar objective.	Objective: Develop management strategies and implement treatments to improve the health, sustainability, resiliency, and productivity of forests, woodlands, and the desired vegetative community based on scientifically sound principles and an environmentally responsible level of timber sales.		
369.	Objective: No similar objective.	Objective: Manage forest vegetation structure, species composition, patch size, pattern, and distribution in a manner that reduces the occurrence of severe wildfires and forest insect and disease outbreaks.		
370.	Objective: No similar objective.	Objective: Implement selective treatments on forests and woodlands that mimic natural disturbance regimes to enhance resiliency to wildfires and insect and disease outbreaks. Manage forest resources to improve resilience to disturbance and maintain and enhance their ability for the long-term sequestration of carbon.		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
371.	Objective: No similar objective.	Objective: Maintain and promote forest stand structures with large trees appropriate to forest types and successional stages.		
372.	Objective: No similar objective.	Objective: Promote forest and woodland vegetation regeneration and recovery on forested lands after management treatments, insect and disease outbreaks, and wildfire events.		
373.	<p>Management Actions Common to All Alternatives</p> <ul style="list-style-type: none"> • An inventory and health assessment of forested stands within the planning area would be completed during the life of the plan. • Coordinate with appropriate entities pertaining to forest health and/or other administrative concerns. • Consider removal of suitable biomass on a case-by-case basis. • Stewardship contracting opportunities would be considered on a case-by-case basis. • Nontraditional forest products would be managed according to sustainability limits and where removal of these products is consistent with other resource management objectives. • Due to whitebark pine species decline, protect all healthy whitebark from prescribed burning and forest management activities when feasible. 			
374.	<p>Action: Allow the harvest of forest products within the average allowable cut of 650 thousand board feet per year for the Judith, Valley, and Phillips Resource Areas and would meet the demand for minor forest products, as feasible. Forest products would be sold at fair market value and cutting plans would be coordinated with adjacent landowners when possible. Timber sales would be with wildlife habitat objectives in mind.</p>	<p>Action: Meet the public demand for commercial forest products. Probable sale quantity is estimated at 2.7 million board feet of wood products per year as a result of treatments on 925 acres. Probable sale quantity is based on the following criteria:</p> <ul style="list-style-type: none"> • 185,000 acres of montane forest and meadows on a 100-year rotation (1,850 acres annually) • 50 percent of 1850 (925 acres) would be excluded from treatment due to various environmental factors (slope, riparian areas, special designations, access) 	<p>Action: Meet the public demand for commercial forest products. Probable sale quantity is estimated at 4.9 million board feet of wood products per year as a result of treatments on 1,665 acres. Probable sale quantity is based on the following criteria:</p> <ul style="list-style-type: none"> • 185,000 acres of montane forest and meadows on a 100-year rotation (1,850 acres annually) • 10 percent of 1850 (185 acres) would be excluded from treatment due to various environmental factors (slope, riparian areas, special designations, access) 	<p>Action: Meet the public demand for commercial forest products. Probable sale quantity is estimated at 4.1 million board feet of wood products per year as a result of treatments on 1,388 acres. Probable sale quantity is based on the following criteria:</p> <ul style="list-style-type: none"> • 185,000 acres of montane forest and meadows on a 100-year rotation (1,850 acres annually) • 25 percent of 1850 (462 acres) would be excluded from treatment due to various environmental factors (slope, riparian areas, special designations, access)
375.	<p>Action: Public land within set aside areas would not be available for the harvest of forest products (5,400 acres*; Figure 2-63, Alternative A: Forest Products [Appendix A]).</p> <p><i>*1,200 acres are within montane forests and meadows and have commercial timber resources.</i></p>	<p>Action: Manage 211,700 acres* as closed to forest product sales and/or harvest. Additional areas may be found as unsuitable for harvest on a case-by-case basis to meet desired resource conditions (Figure 2-64, Alternative B: Forest Products [Appendix A]).</p>	<p>Action: Manage 2,700 acres* as closed to forest product sales. Additional areas may be found as unsuitable for harvest on a case-by-case basis to meet desired resource conditions (Figure 2-65, Alternative C: Forest Products [Appendix A]).</p>	<p>Action: Manage 119,600 acres* as closed to forest product sales and/or harvest. Additional areas may be found as unsuitable for harvest on a case-by-case basis to meet desired resource conditions (Figure 2-66, Alternative D: Forest Products [Appendix A]).</p>

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
		<i>*13,800 acres are within montane forests and meadows and have commercial timber resources.</i>	Exception: Provide opportunities for small sales of forest products to the public on a case-by-case basis (5450- permit). Small sales would only occur where sufficient physical access currently exists. No new permanent roads would be constructed to meet the demands of the small sale program. <i>*1,500 acres are within montane forests and meadows and have commercial timber resources.</i>	Exception: Provide opportunities for small sales of forest products to the public on a case-by-case basis (5450- permit). Small sales would only occur where sufficient physical access currently exists. No new permanent roads would be constructed to meet the demands of the small sale program. <i>*10,300 acres are within montane forests and meadows and have commercial timber resources.</i>
376.	Action: Roads would be constructed to the minimum standards necessary to remove the timber, unless the roads would be needed for other public purposes requiring a higher standard.	Action: Forest treatments would occur in areas already accessible by the current road system. Temporary roads would be decommissioned and reclaimed as soon as the project is completed.	Action: New roads would be authorized where multiple entries would be necessary to meet objectives. Temporary roads would be decommissioned, with reclamation initiated within 1 year of project completion.	
377.	Action: Firewood gathering by individuals for home use permitted on most accessible forestland that is available for the harvest of forest products. Permits would cost \$10 each and are good for a maximum of 10 cords. Occasional free use may be authorized to clean up specific concentrations of debris.	Action: No standing dead trees or downed wood would be allowed to be removed for firewood unless authorized in designated areas. Live trees could be removed for firewood in designated locations. The joint firewood permit system used by the BLM and Forest Service could not be used.	Action: Unless specifically reserved from cutting, standing dead or down wood may be taken as firewood. The BLM could designate specific areas for cutting of live trees for firewood to meet other resource objectives. The joint firewood permit system used by the BLM and Forest Service would continue to be used.	
378.	Action: Silvicultural prescriptions would be consistent with accepted methods related to site, species, habitat types, and the individual requirements of the forest stand.	Action: Conduct forest and woodland management activities using silvicultural prescriptions based upon the best available science. At a minimum, prescriptions would require a description of the current stand condition and DFCs. In addition, all forest management activities would follow the Best Management Practices for Forestry in Montana (DNRC 2006).		
379.	Action: No similar action. Salvage treatments are dealt with on a case-by-case basis.	Action: When salvage is proposed in dead and dying forests, contiguous acres of undisturbed standing and down woody material would be retained on a site-specific basis, consistent with wildlife species, forest health restoration, and other resource requirements (e.g., soils, riparian, and visual resources).		
380.	Action: No similar action. Pre-commercial thinning is dealt with on a case-by-case basis.	Action: Do not utilize pre-commercial thinning or other non-harvest silvicultural operations.	Action: Utilize pre-commercial thinning and other silvicultural practices to create healthy and economically sustainable forest stands consistent with other resource values.	

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
381.	Action: No similar action. Aspen management is dealt with on a case-by-case basis.	Action: Manage aspen communities as early seral stages and natural components of the forest. Allow decadent and non-reproductive stands to be naturally replaced in the ecosystem by climax forest. No forest products would be sold under this alternative.	Action: Manage aspen communities to maintain and expand aspen stands and strive for the DFC of all aspen forests. Forest products would be sold in conjunction with aspen treatments and stewardship contracting opportunities would be considered on a case-by-case basis.	
382.	Action: No similar action. Conifer encroachment is dealt with on a case-by-case basis.	Action: Allow natural disturbance to control conifer expansion into other communities.	Action: Actively manage woodlands to prevent expansion into other communities. Forest products would be sold in conjunction with conifer encroachment treatments.	
383.	Special Designations			
384.	Areas of Critical Environmental Concern (ACECs; see Appendix T, Areas of Critical Environmental Concern (ACEC): Report on the Application of the Relevance and Importance Criteria)			
385.	Goal: Manage ACECs to protect significant resource values and prevent damage to important natural, biological, cultural, recreational, or scenic resources and values, or to protect life and safety from natural hazards.			
386.	Objective: Designate eight ACECs/Outstanding Natural Areas (ONAs) or research natural areas (22,900 acres; Figure 2-67 , Alternative A: Special Designations [Appendix A]).	Objective: Designate 10 ACECs (32,000 acres; Figure 2-68 , Alternative B: Special Designations [Appendix A]).	Objective: No similar objective (no ACECs would be designated under this alternative).	Objective: Designate eight ACECs (26,000 acres; Figure 2-70 , Alternative D: Special Designations [Appendix A]).
387.	Action: Manage the following areas (22,900 acres) as ACECs/ONAs or research natural areas according to management actions in Appendix U , ACEC Management Actions (Figure 2-67 , Alternative A: Special Designations [Appendix A]): <ul style="list-style-type: none"> • Acid Shale-Pine Forest ACEC/Research Natural Area (JVP; 2,700 acres) • Blind Horse ONA (HRMP; 4,900 acres) • Chute Mountain ONA (HRMP; 3,200 acres) • Collar Gulch ACEC (JVP; 1,500 acres) 	Action: Manage the following areas (32,000 acres) as ACECs according to management actions in Appendix U (Figure 2-68 , Alternative B: Special Designations [Appendix A]): <ul style="list-style-type: none"> • Acid Shale-Pine Forest (2,700 acres) • Blacktail Creek (1,200 acres) • Blind Horse (4,900 acres) • Chute Mountain (3,200 acres) • Collar Gulch (2,700 acres) • Deep Creek/Battle Creek (3,100 acres) • Ear Mountain (1,800 acres) • Judith Mountains Scenic (4,800 acres) 	Action: No similar action (no ACECs would be designated under this alternative).	Action: Manage the following areas (26,000 acres) as ACECs according to management actions in Appendix U (Figure 2-70 , Alternative D: Special Designations [Appendix A]): <ul style="list-style-type: none"> • Acid Shale-Pine Forest (2,700 acres) • Blind Horse (4,900 acres) • Chute Mountain (3,200 acres) • Collar Gulch (2,700 acres) • Deep Creek/Battle Creek (3,100 acres) • Ear Mountain (1,800 acres) • Square Butte (2,700 acres) • Sun River (4,900 acres)

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	<ul style="list-style-type: none"> • Deep Creek/Battle Creek ONA (HRMP; 3,100 acres) • Ear Mountain ONA (HRMP; 1,800 acres) • Judith Mountains Scenic ACEC (JVP; 3,800 acres) • Square Butte ACEC/ONA (JVP; 1,900 acres) 	<ul style="list-style-type: none"> • Square Butte (2,700 acres) • Sun River (4,900 acres) 		
388.	Action: Designate eight ACECs/ONAs or research natural areas (22,900 acres) (Figure 2-67 , Alternative A: Special Designations [Appendix A]).	Action: Designate 10 ACECs (32,000 acres) (Figure 2-68 , Alternative B: Special Designations [Appendix A]).	Action: No similar objective (no ACECs would be designated under this alternative).	Action: Designate eight ACECs (23,300 acres) (Figure 2-70 , Alternative D: Special Designations [Appendix A]).
389.	Action: No similar action (activity plans have been completed for the ONAs).	Action: Existing activity plans would be reviewed and updated as needed. New activity plans would be created, if needed, to protect relevant important values.	Action: No similar action (no ACECs would be designated under this alternative).	Action: Same as Alternative B.
390.	Action: ACECs identified as retention parcels.			
391.	Back Country Byways			
392.	Goal: Enhance, promote, and protect the scenic, natural, and cultural resource values associated with current and future designated back country byways in partnership with communities, interest groups, and state and federal agencies.			
393.	Objective: Enhance opportunities for the public to see and enjoy the unique scenic and historical opportunities on public lands by communicating the multiuse management message through effective interpretive programs.			
394.	Action: Continue to manage the Missouri Breaks Back Country Byway to enhance visitor experiences while evaluating future routes for potential inclusion as back country byways.			
395.	National Trails			
396.	Goal: Safeguard the nature and purposes; and conserve, protect, and restore the national trail resources, qualities, values, and associated settings and the primary use or uses. Manage the following national trails (Figures 2-67 [Alternative A], 2-68 [Alternative B], 2-69 [Alternative C], and 2-70 [Alternative D]; Appendix A): Lewis and Clark NHT; Nez Perce NHT; Continental Divide NST			
397.	<p>Objective: For all national trails: provide premier trail visitor experiences for public benefit; maximize opportunities for shared national trail stewardship; reduce the potential for uses that substantially interfere with the nature and purposes of the national trail; avoid activities that are incompatible with the purposes for which the national trail was established.</p> <p>For NSTs: provide for maximum compatible outdoor recreation potential; maintain the continuous nature of the trail; maintain the special environments and landforms that support trail visitor experiences.</p> <p>For NHTs: identify and manage the historical route and historical remnants and artifacts for public use, enjoyment, and vicarious trail experiences; identify and manage high-potential historical sites or high-potential route segments, including the recommendation of additional Federal Protection Components.</p>			

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
398.	Action: Designate a 0.5-mile area from centerline as the trail management corridor for NSTs and NHTs.	Action: Designate a trail management corridor encompassing the visual resource inventory (VRI) Class 1 and 2 areas along the NSTs and NHTs. Minimum corridor width would be 1 mile from centerline and up to 10 miles from centerline based on the National Trails Visibility Analysis (BLM 2014b).	Action: Same as Alternative A.	Action: Designate a 1-mile area from centerline as the trail management corridor for NSTs and NHTs.
399.	Allowable Use: No similar allowable use.	Allowable Use: NO LEASING NL High-Potential Route Segments STIPULATION NSO National Scenic and Historic Trails	Allowable Use: STIPULATION NSO National Scenic and Historic Trails	Allowable Use: STIPULATION NSO National Scenic Trails STIPULATION NSO National Historic Trails
400.	Action: No similar action.	Action: For trail corridors containing High-Potential Route Segments and Sites: propose for withdrawal from locatable mineral entry; closed to nonenergy solid mineral leasing; closed to mineral material disposal.		
401.	Action: No similar action. (Comply with the National Trails System Act, comprehensive plans, and National Landscape Conservation System manuals for inventory standards and requirements.)	Action: Inventory and map the NHTs, assigning site numbers so that the trails are recorded on state cultural resource databases.	Action: Same as Alternative A.	Action: As undertakings are proposed along the NHTs, inventory and map the NHTs, assigning site numbers so that the trails are recorded on state databases.
402.	Action: No similar action.	Action: Manage the Lewis and Clark NHT and Continental Divide NST corridors as VRM Class II unless the adjacent landscape is VRM I. Manage the Nez Perce NHT corridor as VRM Class III unless the adjacent landscape is VRM Class I or II.	Action: Manage NHT and NST corridors as VRM Class III unless the adjacent landscape is VRM Class I or II.	Action: Manage NHT and NST corridors as VRM Class III unless the adjacent landscape is VRM Class I or II.
403.	Action: Manage NST and NHT corridors as exclusion areas for wind energy (BLM 2005).	Action: Same as Alternative A. In addition, manage NHT and NST corridors as ROW avoidance areas for other types of land use authorizations.	Action: Same as Alternative A.	
404.	Wild and Scenic Rivers (WSRs; see Appendix V, Draft Wild and Scenic River Report)			
405.	Goal: Protect National Wild and Scenic Rivers System-eligible segments in accordance with the	Goal: Evaluate eligible river segments to determine suitability for inclusion in the National Wild and Scenic Rivers System, providing interim protection in accordance with the Wild and Scenic Rivers Act and BLM guidance (currently BLM Manual 6400; BLM 2012e).		

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	Wild and Scenic Rivers Act and BLM guidance (currently BLM Manual 6400, BLM 2012e).			
406.	Objective: Preserve the preliminary classification of each eligible segment by protecting its free-flowing nature, water quality, and outstandingly remarkable values (ORV), pending congressional action.	Objective: Preserve the recommended classification of each suitable segment by maintaining the level of development allowed under the recommended classification. In addition, maintain the free-flowing condition, water quality, and ORVs associated with suitable segments.	Objective: No similar objective.	
407.	Action: Twenty-seven stream segments are eligible for inclusion in the National Wild and Scenic Rivers System (Figure 67; Appendix A).	Action: Determine that the 27 stream segments are suitable for inclusion in the National Wild and Scenic Rivers System (Figure 2-68; Appendix A): <ul style="list-style-type: none"> • Segments classified as Wild: Same as Alternative A. 	Action: Determine that all 27 eligible stream segments are not suitable for inclusion in the National Wild and Scenic Rivers System and release them from interim management protections afforded eligible segments. (See <i>Alternative A</i> for list of 27 stream segments.)	
408.	Action: Establish the following interim protective management guidelines for all eligible segments pending congressional action (all interim protective management is subject to valid existing rights): <ul style="list-style-type: none"> • Approve no actions altering the free-flowing nature of eligible segments through impoundments, diversions that have the effect of impounding water, channeling, or riprapping. • Approve no action that would have an adverse effect on an eligible segment's identified ORV(s). Enhance identified ORV(s) to the extent practicable. • Approve no action that would modify an eligible segment or its corridor to the degree that its 	Action: Establish the following interim protective management guidelines for all suitable segments pending congressional action (all interim protective management is subject to valid existing rights): <ul style="list-style-type: none"> • The same management of eligible segments as described under Alternative A would be carried forward for suitable segments under Alternative B, plus: <ul style="list-style-type: none"> ○ Manage Wild segments as VRM Class I ○ Manage Scenic segments as VRM Class II ○ Manage Recreational segments as VRM Class III ○ Manage Wild segments as ROW exclusion ○ Manage Scenic and Recreational 	Action: No similar action (there are not any suitable segments under this alternative).	

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
	<p>eligibility or tentative classification would be affected.</p> <ul style="list-style-type: none"> • Approve no action that would diminish water quality to the point that the water quality would no longer support the ORV(s). 	<p>segments as ROW avoidance (except for Middle Fork Dearborn and Missouri River)</p> <ul style="list-style-type: none"> ○ Allowable Use: NSO for wild segments ○ Allowable Use: CSU for Scenic and recreational segments ○ Allowable use: Close Wild segments to mineral material disposal ○ Allowable use: Close Wild segments to nonenergy solid mineral leasing ○ Recommend to the Secretary of the Interior to withdraw Wild segments from locatable mineral entry ○ Close suitable segments classified as “Wild” to forest product sales and/or harvest 		
409.	Wilderness Study Areas (WSAs)			
410.	Goal: Preserve the wilderness characteristics of WSAs.			
411.	Action: No similar action.	Action: The Montana Statewide Wilderness Study Report Volume I (September 1991) required two units in the planning area to be examined (Beaver Meadows and North Fork Sun River) for wilderness suitability in future land use plan revisions. In response to the Montana Statewide Wilderness Study Report Volume I (September 1991) direction, Beaver Meadows and North Fork Sun River WSAs were evaluated in this land use plan revision. Both WSAs met the criteria when combined with National Forest System Lands located along the eastern portions of the Rocky Mountain Front at the time of the 1991 report. Management of adjacent National Forest System lands was resolved in Section 3065 of the National Defense Authorization Act (2015), which removed the National Forest System lands from wilderness consideration. On their own, without contiguous National Forest System lands, Beaver Meadows and North Fork Sun River WSAs are unsuitable for wilderness consideration, due to their small size.		
412.	<p>Objective: Preserve wilderness characteristics in the Beaver Meadows, North Fork of Sun River, and Square Butte WSAs (2,700 acres; Figures 2-67 [Alternative A], 2-68 [Alternative B], 2-69 [Alternative C], and 2-70 [Alternative D]; Appendix A) in accordance with nonimpairment standards, as defined in BLM Manual 6330, Management of Wilderness Study Areas (BLM 2012b), until Congress either designates it as wilderness or releases it for other purposes.</p> <p><i>Note: Acreage differs from the Montana Statewide Wilderness Study Report due to the use of GIS-generated acres and rounding for consistency in this document. The use of GIS-generated acres does not change the 595 acres for Beaver Meadows, 196 acres for North Fork Sun River, or 1,947 acres for Square Butte identified in the Montana Statewide Wilderness Study Report.</i></p>			

	Alternative A (No Action)	Alternative B	Alternative C (Preferred)	Alternative D
413.	Action: Apply management prescriptions to the WSAs to meet the non-impairment standard (BLM Manual 6330, BLM 2012b): <ul style="list-style-type: none"> • Manage as VRM Class I • Manage as ROW exclusion, including wind • Closed to nonenergy solid mineral leasing • Closed to fluid mineral leasing • Closed to mineral material disposal (Exception: free collection of small amounts of mineral materials for personal use may be permitted if it satisfies the nonimpairment criteria. (See Section 1.6.C.5.b of BLM Manual 6330 [BLM 2012b, p. 1-22].) 			
414.	Action: Limit motorized and mechanized travel to existing ways.	Action: Close the WSAs to motorized and mechanized travel except for access to grandfathered uses.		
415.	Action: Manage wildfire in accordance with BLM policy for WSAs (BLM Manual 6330; BLM 2012b).			
416.	Action: No similar action.	Action: Manage the Square Butte WSA as an avoidance area for fire retardant use to protect visual resources.		
417.	Goal: No similar goal.	Goal: Implement management strategies for lands within WSAs, should Congress release the WSAs from wilderness consideration.		
418.	Objective: No similar objective.	Objective: If Congress releases the WSAs from wilderness consideration, manage those lands consistent with underlying land use designations.		
419.	Action: In those WSAs Congress designates as wilderness, off-road vehicle use would be restricted yearlong to cherry-stemmed and boundary roads. All internal trails and ways would be closed to off-road vehicle use. In those WSAs that Congress releases from further wilderness consideration, off-road vehicle use would be restricted seasonally to designated roads and trails. (JVP)	Action: If Congress releases Square Butte WSA from wilderness consideration manage as the Square Butte ACEC (see ACECs alternatives section in this table).	Action: No similar action.	Action: Same as Alternative B.
420.	Action: No similar action.	Action: If Congress releases the Beaver Meadows or North Fork Sun River WSAs from wilderness consideration, manage those lands consistent with underlying land use designations.		
421.	Social and Economic – Tribal Interests			
422.	Goal: Recognize tribal interests on public domain lands within the planning area.			
423.	Objective: Accommodate the exercise of rights provided by treaties or law that are applicable to the planning area. Coordinate with appropriate entities within tribal government on issues under its jurisdiction to determine appropriate protocols that provide for treaty uses of public lands.			
424.	Action: No similar action.	Action: Initiate government-to-government consultation to consider fee waivers to enrolled tribal members if fee areas/campgrounds are proposed within the planning area.		
425.	Objective: No similar objective.	Objective: Demonstrate a legally adequate good faith effort to consult and identify resource types or places of cultural significance with federally recognized tribes.		

	Alternative A (<i>No Action</i>)	Alternative B	Alternative C (<i>Preferred</i>)	Alternative D
426.	Action: No similar action.	Action: Coordinate with federally recognized tribes on an ongoing basis relating to any resource values or issues of tribal concern and invite tribes to engage in periodic meetings to express issues and concerns. Conduct consultation on a formal government-to-government basis. Call and/or email tribal representatives in emergencies or where the need for notification is urgent.		

Chapter 3. Affected Environment

3.1 INTRODUCTION

This chapter describes the existing biological, physical, and socioeconomic characteristics of the planning area, including human uses that could be affected by implementing the alternatives. In 2014, as part of the planning process, the BLM released the Analysis of Management Situation (AMS), which describes the conditions in the planning area. In 2018, the BLM released an updated AMS (BLM 2018), which is available at <https://go.usa.gov/xUPsP>. Because the AMS describes the planning area in detail, this chapter incorporates it by reference.

3.2 RESOURCES

3.2.1 Air Resources and Climate

Air quality is good throughout the planning area due primarily to the low population, few industrial sources, and favorable atmospheric conditions. The planning area is considered in attainment for all criteria air pollutants based on available monitoring data (MDEQ 2014). Depending on the topography, some areas, such as valleys or basins, may experience elevated levels of PM_{2.5} during wintertime inversions due primarily to residential wood stove smoke. The planning area has a semiarid continental climate marked by cold winters, warm to rarely hot summers, and abundant sunshine. The average temperature in central Montana over the last 30 years is between 40° and 50° F (Western Regional Climate Center 2013). Average annual precipitation ranges from 11 to 22 inches, with an average of 15 inches (Western Regional Climate Center 2012).

Montana last inventoried its GHG emissions in 2005 (Montana Climate Change Advisory Committee 2007). In 2005, activities in Montana accounted for approximately 37 million metric tons of CO_{2e} gross emissions. This is approximately 0.6 percent of the total US GHG emissions in that same year. Montana's gross emissions increased 11 percent from 1990 to 2004, while national emissions rose by 15 percent during this period. Additional information is available in Section 2.1, Air Resources and Climate, of the AMS (BLM 2018).

3.2.2 Geology

The planning area is within two physiographic provinces: the Northern Rocky Mountains and Great Plains. The Northern Rocky Mountain Province consists of the Little Belt Mountains and the Rocky Mountain Front. These are along the southwest and western boundary of the planning area. The remainder of the planning area to the east lies within the Great Plains Province. This consists of the glaciated and unglaciated sections of the Missouri Plateau. It is primarily underlain nearest the surface by the sedimentary formations.

The mountain ranges in Montana are commonly referred to as island mountain ranges due to their appearance as islands in an extensive sea of upland prairies. Ranges that fit into the mountain island description are the Sweet Grass Hills and Highwood, Judith, North and South Moccasin, Little Belt, Snowy, Little Rocky, and Bears Paw Mountains. Additional information is available in Section 2.2, Geology, of the AMS (BLM 2018). Because the alternatives are not anticipated to affect geology at the planning scale, and geology is discussed as it pertains to other resource topics, it is not discussed further as an individual topic in this draft environmental impact statement (DEIS).

3.2.3 Soil Resources

Soils in the planning area are diverse, and great differences in soil properties can be observed within short distances. Detailed soils information is available from the Soil Survey Geographic database for the individual soil surveys in the planning area. Sensitive soils have been identified in the planning area; generally, these are soils especially susceptible to erosion. The planning area also includes biological soil crusts, badlands, and rock outcroppings. The majority of BLM-administered surface or mineral estate in the planning area has moderate or high potential for soil restoration. Small areas of prime farmland exist on BLM-administered lands; there is no unique farmland on BLM-administered lands. Additional information is available in Section 2.3, Soil Resources, of the AMS (BLM 2018).

3.2.4 Water Resources

The major sources of surface water in the planning area are the Marias River, Musselshell River, Fort Peck Lake, and Upper Missouri River, which are tributaries of the Missouri River. Smaller watercourses in the planning area involve streams that can be ephemeral, intermittent, or perennial. Permanent waters can be in the form of lakes, wells, springs, ponds, diversions, and reservoirs developed for human, wildlife, or livestock consumption. Groundwater, including aquifers, and surface water are used for public and private water supplies and for agriculture, irrigation, and industry. Additional information is available in Section 2.4, Water Resources, of the AMS (BLM 2018).

3.2.5 Vegetation Communities

The planning area lies within the Northwestern Plains and the Middle Rockies Rapid Ecoregional Assessment boundaries. Approximately 63 percent of the Northwestern Plains are terrestrial systems, approximately 6 percent are aquatic systems (riparian, wetlands, or open water), approximately 26 percent are under human land use, and approximately 5 percent are recently disturbed areas (BLM 2012a). The Middle Rockies is characterized by mountainous terrain, which supports forested alpine tundra and shrub/grassland ecosystems. Approximately 77 percent of the ecoregion are terrestrial systems, approximately 5 percent are aquatic systems (riparian, wetlands, or open water), approximately 8 percent are under human land use, and approximately 4 percent are recently disturbed areas (BLM 2012b).

The BLM has identified five priority vegetation types (ponderosa pine breaks/badlands, montane forest and meadows, sagebrush/grasslands, grasslands, and riparian/wetland communities) and associated priority biological species and communities to prioritize and focus future management strategies based on a comprehensive understanding of species and habitat and vegetation community relationships. Priority habitats occur in priority vegetation types and provide habitat for assemblages of native wildlife, including priority wildlife species. Additional information is available in Section 2.5, Vegetative Communities, of the AMS (BLM 2018).

3.2.6 Fish and Wildlife

The wide dispersal and scattered parcel distribution of BLM-administered lands in the planning area result in lotic aquatic habitat crossing multiple land jurisdictions. Aquatic habitats are diverse and consist of prairie rivers and streams, rocky mountain streams, island mountain streams, springs, seeps, and lakes or reservoirs. The presence and interspersed of many habitat types support a large number of wildlife species, including some special status species, in the planning area. The wildlife habitats that occur in the planning area are primarily characterized by the existing conditions of priority vegetation in **Section 3.2.5**. Additional information is available in Section 2.6, Fish and Wildlife, of the AMS (BLM 2018).

3.2.7 Wildfire Ecology and Management

Wildfire is naturally occurring in the planning area ecosystem. Fires are frequent in the planning area, particularly near the Missouri and Musselshell River Breaks areas. Intense lightning storms occur in the planning region between July and September, often resulting in wildfires (BLM 1992). Most of the planning area is classified as VCC 2 and VCC 3. The planning area is subdivided into five FMUs: the Big Open FMU, Front FMU, Island Ranges FMU, Breaks FMU, and Prairie Forests FMU. Additional information is available in Section 2.7, Wildfire Ecology, of the AMS (BLM 2018).

3.2.8 Cultural and Heritage Resources

The distribution of the prehistoric sites recorded in the planning area is one site per 134 acres or 4.8 sites per square mile of inventoried acreage. Lithic scatters are the most numerous prehistoric site type in the study area, making up 43.8 percent of all recorded sites. Tipi rings (circular patterns of stones left from an encampment of Post-Archaic, proto-historic, and historic Native Americans) are the next most commonly recorded. The historic sites recorded in the study area are distributed at one site per 106 acres inventoried, or six sites per square mile inventoried. The most common historic site types are homesteads/farmsteads and residences. Some include standing architecture, but many homestead/farmstead sites in rural settings include foundations and depressions, or they are entirely in ruins. Additional information is available in Section 2.8, Cultural and Heritage Resources, of the AMS (BLM 2018).

3.2.9 Paleontological Resources

The planning area covers a wide range of geology and includes rock units of all Potential Fossil Yield Classification (PFYC) ranks. Presently, 51 geologic formations or units are recognized as having a PFYC rank of 3 to 5 (moderate or unknown to high fossil potential). Of those, 8 are ranked 5, 10 are ranked 4, and the remainder are ranked 3. See Table 2-49 in the AMS (BLM 2018) for a complete listing of the formations and fossil resources with ranks of 3 to 5. There are 554 fossil localities in the planning area and UMRBNM (Hanna 2009). Additional information is available in Section 2.9, Paleontological Resources, of the AMS (BLM 2018).

3.2.10 Visual Resources

The BLM-administered lands in the planning area contain a wide variety of scenic landscapes. This geologically and topographically diverse area has mountain slopes, rolling hills, coulees, rugged hills, and river valleys. Particularly notable scenic areas are the Rocky Mountain Front; Square Butte; Judith Mountains; BLM-administered land adjacent to the Big and Little Snowy Mountains and the Little Belt Mountains; portions of the Chain Buttes and East Indian Butte BMAs; and portions of the Missouri, Sun, Smith, and Judith Rivers. Most of the BLM-administered lands in the planning area are currently managed as VRM Class III or Class IV. An updated visual resource inventory was completed in 2014. Additional information is available in Section 2.10, Visual Resources, of the AMS (BLM 2018).

3.2.11 Lands with Wilderness Characteristics

Wilderness characteristics were identified on BLM-administered lands in the planning area as part of this RMP. Forty-seven units, totaling 335,358 acres were identified from the initial and final wilderness inventories for the Lewistown and Butte Districts, including additional areas that were not considered in the 1980 wilderness inventory. A total of 202,400 acres were found to have wilderness characteristics. Additional information is available in Section 2.11, Lands with Wilderness Characteristics, of the AMS (BLM 2018).

3.2.12 Cave and Karst Resources

A preliminary cave inventory conducted in 2012 helped identify potential cave and karst resources in the planning area using publications, records, and caver knowledge. In the planning area, there are two caves that meet the criteria to be considered significant: Tate-Poetter Cave and Crystal Cave. The Tate-Poetter Cave is significant because it provides bat habitat, and the Crystal Cave is significant because of recreational activities, such as spelunking. Additional information is available in Section 2.12, Cave and Karst Resources, of the AMS (BLM 2018).

3.3 RESOURCE USES

3.3.1 Minerals and Energy Resources

There are no federal mineral leases or licenses for coal or oil shale in the planning area. Oil and gas are the only fluid minerals that exist in the planning area. Recent oil activity in the planning area has been concentrated in Petroleum, Pondera, and Teton Counties. Gas activity is confined to Chouteau, Fergus, and Pondera Counties, with minor gas production in northern Teton County. Top-producing oil fields in the planning area are the Cut Bank and Pondera fields.

The portions of the planning area with the highest potential for hard rock minerals are the Judith, North Moccasin, and South Moccasin Mountains. Gypsum occurs in Fergus County. Sapphires occur in Judith Basin County, and gold, silver, and precious metals were mined historically in Meagher County. One company is planning to develop a copper deposit on nonfederal minerals in Meagher County.

The BLM has issued 24 prospecting permits for nonenergy leasable minerals over the past 20 years. Generally, two to three prospecting permits are active at any time. The BLM has issued 21 mineral material permits or sales in the planning area over the past 20 years. Most mineral material activity involves free use permits issued to county or state governments for road construction or maintenance. Additional information is available in Section 3.1, Minerals and Energy Resources, of the AMS (BLM 2018).

3.3.2 Livestock Grazing

Approximately 14,600 acres (2 percent) of BLM-administered lands in the planning area are unavailable to grazing to protect other resources. The remainder of the decision area is open to grazing (approximately 636,600 acres, or 98 percent of BLM-administered lands in the planning area). There are 590 allotments in the planning area. In addition to BLM-administered land, these allotments may contain other lands (e.g., National Forest System, state, or private land). There are 590 permits or leases authorizing grazing on these allotments. Total permitted use is 125,411 AUMs, with 631 AUMs in suspension and 2,971 AUMs available but unused. Additional information is available in Section 2.14, Livestock Grazing, of the AMS (BLM 2018).

3.3.3 Recreation and Visitor Services

In general, BLM-administered lands in the planning area are widely distributed and are largely noncontiguous, resulting in dispersed and localized recreation opportunities. Annually, approximately 166,000 visitors recreate on BLM-administered lands in the LFO, with the most popular activity being big game hunting, which takes place predominately during autumn (BLM 2012c). Hunting and most other recreation on BLM-administered lands take place largely in the northeastern portion of the planning area.

Based on the JVP RMP, all SRMAs and ERMAs are in Fergus and Petroleum Counties. BLM-administered lands west of the Judith River are smaller and more isolated than those east of the river. Recreation

opportunities west of the Judith River take place mostly in a few small, but contiguous, land holdings in Chouteau and Teton Counties. There are three SRMAs in the planning area and eleven ERMAs. Additional information is available in Section 2.15, Recreation and Visitor Services, of the AMS (BLM 2018).

3.3.4 Travel, Transportation Management, and Access

The broad distribution and limited number of paved routes in the planning area reflect the region's remoteness and varied topography. US interstates and state routes provide arterial connections to population centers in and beyond the planning area. A network of local paved and unpaved routes account for the remainder of the transportation network in the planning area. OHV use is limited to designated routes across most of the planning area with limited areas of closures. The BLM holds several easements for public access. Additional information is available in Section 2.16, Travel, Transportation Management, and Visitor Services, of the AMS (BLM 2018).

3.3.5 Lands and Realty

There are 40,900 acres available for disposal in the planning area; however, there are no pending land sales, acquisitions, exchanges, or purchase actions there. As of July 2013, according to its LR2000 database, the BLM administers 315 ROW grants on approximately 32,683 acres in the planning area. Communication site use requests are processed through a realty lease authorization and are restricted to the two existing communication sites. Additional information is available in Section 2.17, Lands and Realty, of the AMS (BLM 2018).

3.3.6 Renewable Energy

There are 15,700 acres managed as ROW exclusion areas and 378,700 acres managed as ROW avoidance areas. In addition to these general ROW allocations, there are 236,300 acres that have been excluded from wind energy development specifically, and 117,500 acres that are specifically wind energy avoidance areas. Generally, production of biomass resources in the planning area would result from management of forests and woodlands, as guided by the BLM's forestry program. Given the lack of major flowing water resources under BLM jurisdiction, the potential for major hydroelectric facilities in the planning area is limited. Additional information is available in Section 2.18, Renewable Energy, of the AMS (BLM 2018).

3.3.7 Withdrawals

There are currently 147,100 acres of withdrawals across several different withdrawal types. Additional information is available in Section 2.19, Withdrawals, of the AMS (BLM 2018).

3.3.8 Forest, Woodland, and Special Products

Commercial timber is harvested in the planning area. The annual allowable harvest level for the Judith Resource Area (including the southern portion of the UMRBNM) is 650 thousand board feet (MBF) per year and 26.45 million board feet (MMBF) per decade for the Headwaters Resource Area (including Broadwater, Gallatin, and Park Counties and the southern portion of Lewis and Clark County). Historic harvest levels over the past 5 years have increased, as a result of salvage operations in response to insect and disease outbreaks and other natural disturbances. Harvest volume for salvage operations has averaged 1.5 MMBF over the past 5 years, and fuel wood sales have average 400 cords per year. Additional information is available in Section 2.20, Forests, Woodland, and Special Products, of the AMS (BLM 2018).

3.4 SPECIAL DESIGNATIONS

3.4.1 Areas of Critical Environmental Concern (ACECs) and Outstanding Natural Areas (ONAs)

The BLM currently manages eight ACECs or ONAs in the planning area, which contain 22,900 acres collectively. These are the Acid Shale-Pine Forest ACEC, Collar Gulch ACEC, Judith Mountain Scenic Area ACEC, Square Butte ONA/ACEC, Blind Horse ONA, Ear Mountain ONA, Chute Mountain ONA, and Deep Creek/Battle Creek ONA. These lands are provided special management to protect the identified relevant and important values for which the areas were designated. Additional information is available in Section 2.22, Areas of Critical Environmental Concern, and Section 2.226, Outstanding Natural Areas, of the AMS (BLM 2018).

3.4.2 Back Country Byways

The Missouri Breaks National Back Country Byway is the only back country byway in the planning area (see **Figure 2-67**). It runs through central Montana, encompassing an area of varied geography and historical significance. The portion of the Missouri Breaks National Back Country Byway corridor (0.5-mile wide) located on BLM-administered lands consists of approximately 900 acres of VRI Class III and 300 acres of VRI Class IV. Additional information is available in Section 2.22, Back Country Byways, of the AMS (BLM 2018).

3.4.3 National Trails

Approximately 300 miles of the Lewis and Clark NHT are in the planning area, including approximately 1 mile on BLM-administered lands. There are no high potential route segments or historic sites on BLM-administered lands within the planning area.

Approximately 85 miles of the Nez Perce NHT are in the planning area, most of which are on private, primarily agricultural, land. A portion of the trail corridor in the planning area includes state highways, allowing visitors traveling by automobile to stop at select points along the trail. Approximately 1 mile of the Nez Perce NHT is on BLM-administered lands. There are no high potential route segments or historic sites on BLM-administered lands within the planning area.

Approximately 157 miles of the Continental Divide NST are in the planning area, including approximately 1 mile on BLM-administered lands north of Rogers Pass in northern Lewis and Clark County.

Additional information is available in Section 2.23, National Trails, of the AMS (BLM 2018).

3.4.4 Wild and Scenic Rivers

There are no designated WSRs in the planning area. As part of the land use planning process, the BLM evaluated 27 river segments for suitability based on interagency-developed criteria and completed a draft suitability report (see Appendix V). The report's preliminary findings are that none of the eligible rivers are suitable for potential inclusion into the National Wild and Scenic Rivers System; in many instances, this is due to patterns of landownership that would make management difficult. The next step in the planning process is to analyze a range of suitable and non-suitable action alternatives, along with the eligible river no-action alternative, as documented in this RMP/EIS.

3.4.5 Wilderness Study Areas

There are three WSAs in the planning area: Beaver Meadows (595 acres), North Fork Sun River (196 acres), and Square Butte (1,947 acres). Until Congress acts on the recommendations and either designates

them as wilderness or releases them for other uses, WSAs are managed so as not to impair the suitability of such areas for preservation as wilderness. Additional information is available in Section 2.25, Wilderness Study Areas, of the AMS (BLM 2018).

3.5 SOCIAL AND ECONOMIC

3.5.1 Social and Economic Conditions (including Environmental Justice)

BLM-administered lands in the planning area contribute to the livelihoods of area residents through subsistence uses and market-based transactions. Public lands provide products of value to households at no or low cost, such as fuel wood, wood posts, and livestock grazing. Additional products with subsistence value may include fish, game, plants, berries, and seeds. Use of these products is often part of traditions that sustain the local culture. Numerous nonmarket social and economic values are associated with the LFO. The value of ecosystem services, such as clean air and water, are not captured in the economic contribution analysis.

In general, the populations of the eight-county planning area and state are more racially and ethnically homogeneous than the nation; however, there are several notable exceptions for individual counties. Chouteau and Pondera Counties have higher concentrations of non-Hispanic racial minorities than the state, and Cascade County has a higher percentage of Hispanic residents than the state. Given the high rates of poverty and presence of minority populations that are “meaningfully greater” than populations in the wider area, the environmental consequences analysis addresses the potential for management actions to disproportionately and adversely affect minority and low-income individuals.

Additional information is available in Section 2.27, Social and Economic Conditions, and Section 2.30, Environmental Justice, of the AMS (BLM 2018).

3.5.2 Tribal Interests

The following American Indian tribes have an interest in the planning area: Crow Nation, Fort Belknap Assiniboine and Gros Ventre, Fort Peck Assiniboine and Sioux, Northern Cheyenne, Rocky Boy Chippewa Cree, Blackfeet Nation, Salish-Kootenai, Shoshone-Bannock, and Nez Perce. The Little Shell Tribe of Chippewa, based in Montana, is not federally recognized but is within the boundaries of the LFO. Historically, these tribes used numerous places in the planning area for natural resources, foraging, hunting subsistence, habitation, and spiritual and religious ceremonies. Practices that continue today, particularly along the Rocky Mountain Front, include visiting these areas for plant and mineral gathering, as traditional camps and ceremonies, and as burial areas. These tribes have at least one treaty with the United States, and several tribes have multiple treaties that describe continuing obligations and rights the tribes retain on the landscape. Additional information is available in Section 2.29, Treaty Rights and Tribal Interests, of the AMS (BLM 2018).

3.5.3 Public Safety

The BLM is required to address abandoned mines, target shooting, unexploded ordnance, mass movement, hazardous waste, and other public hazards. Typical hazardous materials issues in the planning area are associated with past mining activities, illegal dumping, and accidental material releases from transport vehicles. The primary concern for public safety in the planning area is identification of abandoned mine lands (AMLs). Additional information is available in Section 2.31, Public Safety, of the AMS (BLM 2018). The BLM will continue to address public safety concerns on BLM-administered lands as they are identified regardless of the alternative selected; therefore, public safety is not discussed further in this DEIS.

This page intentionally left blank.

Chapter 4. Environmental Consequences

4.1 INTRODUCTION

The analysis presented in this chapter is commensurate with the level of detail of the actions presented in **Chapter 2** and the availability or quality of data necessary to assess effects. Current conditions in the planning area (see the AMS (BLM 2018)) serve as the baseline for characterizing effects from the alternatives. For each topic area, the analysis of effects provides a qualitative discussion of management decisions and their effects on the resource, along with a quantitative comparison of effects under each alternative to the extent possible. See **Appendix W**, Analysis Assumptions and Cumulative Effect Scenario, for analysis assumptions, downstream climate analysis, and other supporting information.

4.2 RESOURCES

4.2.1 Air Resources and Climate

Alternative A

Alternative A would allow the highest levels of fluid mineral and livestock grazing activity but would have the lowest forest management emissions. Due to the inability to predict wildfire occurrence, which exceeds alternative-specific prescribed burning, fire emissions are considered to be consistent across all alternatives. **Table 4-1**, BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative A, provides estimated criteria and hazardous air pollutant emissions for BLM-authorized activities throughout the planning area. Alternative A would have slightly greater emissions of most pollutants and GHGs, with the exception of slightly lower emissions of nitrogen oxides (NO_x), particulate matter with a diameter less than 10 microns (PM₁₀), particulate matter with a diameter less than 2.5 microns (PM_{2.5}) and carbon dioxide (CO₂) when compared to Alternatives C and D. Given the good air quality described in the AMS (BLM 2018) and the small increase in criteria pollutants and hazardous air pollutants (HAPs), planning area air quality would continue to be very good except in areas affected by wildfire. Short-term air quality effects may also occur in localized areas due to prescribed burning; effects would be mitigated by prescribed burning approvals and procedures.

**Table 4-1
BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative A**

Resource or Resource Use	Emissions (Tons per Year)						
	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	VOC	HAP
Fluid minerals	-	-	-	-	-	-	-
Oil	61	28	0	19	3	27	2
Natural gas	11	4	0	5	1	6	2
Coal bed natural gas	0	0	0	0	0	0	0
Wildfire management ¹	56	11	1	37	5	11	1
Forestry and woodland products	1	2	0	5	1	0	0
Livestock grazing	11	9	0	137	14	4	0
BLM Emission Total²	139	54	1	202	24	50	6

¹Excludes smoke emissions from wildfires, but includes smoke emissions from prescribed fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

²Emission total may not reflect the sum of resource-specific emissions due to rounding.

With the exception of wildfires, the small increases in estimated emissions of visibility impairing pollutants (PM_{2.5}, NO_x, and SO₂) from BLM-authorized activities would likely have little effect on regional visibility and visibility in Class I and sensitive Class II areas. Class I areas are afforded increased air resource protection by the Clean Air Act of 1970 (CAA). A portion of the Bob Marshall Wilderness Class I area is located with the planning area, while Glacier National Park, Gates of the Mountains Wilderness, and the UL Bend Wilderness are located adjacent to the planning area. Class II areas may be analyzed to assess AQRV effects if they are identified as sensitive Class II areas during the NEPA process.

The Benton Lake NWR is a sensitive Class II area located within the planning area, while the Blackfeet Indian Reservation, Rocky Boy Indian Reservation, Great Bear Wilderness, Bear Paw Battlefield, Charles M. Russell NWR, Lake Mason NWR, and War Hose NWR are located near the planning area. Small increases in acid-forming pollutants would be expected to have little effect on deposition and lake acidification in Class I and sensitive Class II areas. Results from the BLM photochemical grid modeling study will provide additional information to estimate effects from criteria pollutant emissions on air quality, visibility, and deposition.

Table 4-2, BLM Source Greenhouse Gas Emissions Under Alternative A, summarizes Alternative A GHG emission estimates. When wildfire emissions are excluded, based on the EPA national emissions inventory, GHG emissions associated with Alternative A are estimated to represent approximately 1.6 percent of Montana's 2011 CO_{2e} emissions, 0.004 percent of national 2013 emissions, and 0.001 percent of global 2010 emissions (EPA 2015a). Although EPA provides methods to estimate nitrous oxide (N₂O) emissions, the National Emissions Inventory for Montana does not include N₂O emissions, which explains the high percentage of N₂O emissions shown in **Table W-9 (Appendix W)** when Alternative A wildfire emissions are included. Wildfire emissions vary greatly from one year to another, depend on many site-specific factors, and are largely determined by ignition sources and weather conditions beyond the BLM's control. GHG emission comparisons that include wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

Climate variability is occurring and would continue to occur for many years due to the longevity of GHGs that are already in the atmosphere.

Table 4-2
BLM Source Greenhouse Gas Emissions Under Alternative A

Resource or Resource Use	Emission (Tons per Year)				CO _{2e} (mtpy)
	CO ₂	CH ₄	N ₂ O	CO _{2e}	
Fluid minerals	-	-	-	-	-
Oil	5,935	8	0	6,146	5,576
Natural gas	1,235	4	0	1,336	1,217
Coal bed natural gas	0	0	0	0	0
Wildfire management ¹	289,034	32	11	293,046	265,845
Forestry and woodland products	201	0	0	204	185
Livestock grazing	1,382	635	0	14,744	13,379
BLM Emission Total²	297,787	680	11	315,476	286,202

¹Excludes smoke emissions from fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

² Emission total may not reflect the sum of resource-specific emissions due to rounding.

Alternative B

Alternative B would allow the lowest levels of fluid mineral and livestock grazing activity and would have relatively low forest management emissions. Fire emissions would be consistent with Alternative A. **Table 4-3**, BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative B, provides estimated criteria and HAP emissions for BLM-authorized activities throughout the planning area. Alternative B would have the lowest emissions of all pollutants and GHGs, with the exception of the second lowest emissions of PM₁₀ and PM_{2.5}. Planning area air quality, visibility, deposition, and lake acidification would be slightly better than Alternative A.

Table 4-3
BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative B

Resource or Resource Use	Emissions (Tons per Year)						
	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	VOC	HAP
Fluid minerals	-	-	-	-	-	-	-
Oil	42	19	0	13	2	19	2
Natural gas	8	3	0	5	1	5	1
Coal bed natural gas	0	0	0	0	0	0	0
Wildfire management ¹	56	11	1	37	5	11	1
Forestry and woodland products	5	7	0	19	2	1	0
Livestock grazing	11	9	0	137	14	4	0
BLM Emission Total²	122	49	1	210	25	40	4

¹Excludes smoke emissions from wildfires, but includes smoke emissions from prescribed fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

²Emission total may not reflect the sum of resource-specific emissions due to rounding.

Table 4-4, BLM Source Greenhouse Gas Emissions Under Alternative B, summarizes GHG emission estimates, which would be slightly less than GHG emissions for any other alternative. However, GHG emission effects would be negligible when considered in the context of state, national, and global scales.

Table 4-4
BLM Source Greenhouse Gas Emissions Under Alternative B

Resource or Resource Use	Emissions (Tons per Year)				CO ₂ e (mtpy)
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Fluid minerals	-	-	-	-	-
Oil	4,063	0	0	4,209	3,818
Natural gas	1,036	0	0	1,109	1,009
Coal bed natural gas	0	0	0	0	0
Wildfire management ¹	289,034	32	11	293,046	265,845
Forestry and woodland products	833	0	0	837	759
Livestock grazing	1,382	318	0	8,073	8,476
BLM Emission Total²	296,349	350	11	307,273	279,908

¹Excludes smoke emissions from wildfires, but includes smoke emissions from prescribed fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

²Emission total may not reflect the sum of resource-specific emissions due to rounding.

Alternative C

Alternative C would allow the highest level of timber harvesting, high livestock grazing activity, and the second-highest fluid mineral activity. Fire emissions would be consistent with Alternative A.

Table 4-5, BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative C, provides estimated criteria and HAP emissions for BLM-authorized activities throughout the planning area. Alternative C would have the highest emissions of CO, NO_x, PM₁₀, PM_{2.5}, and CO₂ with levels of volatile organic compounds (VOC), HAPs, and CH₄ that are slightly less than Alternative A. Planning area air quality, visibility, deposition, and lake acidification would be slightly less than Alternative A.

Table 4-6, BLM Source Greenhouse Gas Emissions Under Alternative C, summarizes GHG emission estimates, which would be slightly greater than GHG emissions for any other alternative. However, GHG emission effects would be negligible when considered in the context of state, national, and global scales.

Table 4-5
BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative C

Resource or Resource Use	Emissions (Tons per Year)						
	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	VOC	HAP
Fluid minerals	-	-	-	-	-	-	-
Oil	52	23	0	18	3	23	2
Natural gas	9	3	0	5	1	5	1
Coal bed natural gas	0	0	0	0	0	0	0
Wildfire management ¹	56	11	1	37	5	11	1
Forestry and woodland products	8	12	0	34	4	1	0
Livestock grazing	11	9	0	137	14	4	0
BLM Emission Total²	136	59	1	230	27	45	5

¹Excludes smoke emissions from wildfires, but includes smoke emissions from prescribed fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

²Emission total may not reflect the sum of resource-specific emissions due to rounding.

Table 4-6
BLM Source Greenhouse Gas Emissions Under Alternative C

Resource or Resource Use	Emissions (Tons per Year)				CO ₂ e (mtpy)
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Fluid minerals	-	-	-	-	-
Oil	5,219	0	0	5,397	4,896
Natural gas	1,116	0	0	1,200	1,093
Coal bed natural gas	0	0	0	0	0
Wildfire management ¹	289,034	32	11	293,046	265,845
Forestry and woodland products	1,520	0	0	1,526	1,385
Livestock grazing	1,382	635	0	14,744	13,379
BLM Emission Total²	298,272	668	11	315,913	286,598

¹Excludes smoke emissions from wildfires, but includes smoke emissions from prescribed fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

²Emission total may not reflect the sum of resource-specific emissions due to rounding.

Alternative D

Alternative D would allow a high level of livestock grazing activity coupled with relatively high timber harvesting and relatively low fluid mineral activity. Fire emissions would be consistent with Alternative A. **Table 4-7**, BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative D, provides estimated criteria and HAP emissions for BLM-authorized activities throughout the planning area. Alternative D would generally have lower emissions of criteria and HAPs than Alternatives A or C. Planning area air quality, visibility, deposition, and lake acidification would be slightly better in some respects than Alternative A or Alternative C.

Table 4-8, BLM Source Greenhouse Gas Emissions Under Alternative D summarizes GHG emission estimates. Alternative D CO₂ emissions would be nearly equal to Alternative A while CH₄ emissions would be slightly greater and N₂O emissions would be the same. However, GHG emission effects would be negligible when considered in the context of state, national, and global scales.

Table 4-7
BLM Source Criteria and Hazardous Air Pollutant Emissions Under Alternative D

Resource or Resource Use	Emissions (Tons per Year)						
	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	VOC	HAP
Fluid minerals	-	-	-	-	-	-	-
Oil	49	22	0	17	3	21	2
Natural gas	9	3	0	5	1	5	1
Coal bed natural gas	0	0	0	0	0	0	0
Wildfire management ¹	56	11	1	37	5	11	1
Forestry and woodland products	7	10	0	28	3	1	0
Livestock grazing	11	9	0	137	14	4	0
BLM Emission Total²	132	56	1	224	27	43	5

¹Excludes smoke emissions from wildfires, but includes smoke emissions from prescribed fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

²Emission total may not reflect the sum of resource-specific emissions due to rounding.

Table 4-8
BLM Source Greenhouse Gas Emissions Under Alternative D

Resource or Resource Use	Emissions (Tons per Year)				CO ₂ e (mtpy)
	CO ₂	CH ₄	N ₂ O	CO ₂ e	
Fluid minerals	-	-	-	-	-
Oil	4,981	0	0	5,147	4,670
Natural gas	1,116	0	0	1,200	1,093
Coal bed natural gas	0	0	0	0	0
Wildfire management ¹	289,034	32	11	293,046	265,845
Forestry and woodland products	1,273	0	0	1,278	1,160
Livestock grazing	1,382	635	0	14,744	13,379
BLM Emission Total²	297,786	668	11	315,415	286,146

¹Excludes smoke emissions from wildfires, but includes smoke emissions from prescribed fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

²Emission total may not reflect the sum of resource-specific emissions due to rounding.

Cumulative Effects

Cumulative emissions, including BLM-authorized and nonfederal fluid minerals emissions, are summarized in **Table 4-9**, Maximum Cumulative Emissions. Differences in cumulative GHG emission effects among the alternatives would be negligible when considered in the context of state, national, and global scales. GHG emissions under the highest-emitting alternative would be a small percentage of Montana, United States, and global emissions. Based on emission inventory data included in **Table W-9 (Appendix W)**, cumulative CO₂e emissions would be less than 1.9 percent of Montana's year 2011 CO₂e emissions of 18.4 million mtpy (EPA 2015a), 0.005 percent of US 2013 CO₂e emissions of 6,673 million mtpy (EPA 2015b), and 0.001 percent of global 2010 CO₂e emissions of 49,000 million mtpy (IPCC 2014).

Table 4-9
Maximum Cumulative Emissions

Resource or Resource Use	Emissions (Tons per Year)								
	CO	NO _x	SO ₂	PM ₁₀	PM _{2.5}	VOC	CO ₂	CH ₄	N ₂ O
BLM ¹	139	59	1	230	27	50	198,272	680	11
Nonfederal fluid minerals	530	432	4	199	39	287	54,788	100	0
Cumulative Emissions²	669	491	5	429	67	337	253,060	779	11

¹Excludes smoke emissions from wildfires, but includes smoke emissions from prescribed fires. Estimates of wildfire emissions are included in the *Air Resources Technical Support Document* (BLM 2016).

²Emission total may not reflect the sum of resource-specific emissions due to rounding.

Effects from GHG emissions would be long-term effects that would contribute to climate variability for beyond the life of the plan. The lack of models with sufficient spatial and temporal resolution to forecast climate variability at local scales limits the ability to quantify future effects to climate within the planning area, although past trends can be used to project potential future effects. The ability to accurately predict future effects is limited by scientific understanding of carbon exchanges between air, vegetation, soil, and water, particularly as atmospheric GHG concentrations continue to increase.

Climate trends based on available data from the National Oceanic and Atmospheric Administration may provide insight into near-term climate variability through the life of the plan. Montana’s Central Climate Division covers a geographic area similar to the planning area. **Table 4-10**, Climate Trends, summarizes past trends in maximum temperatures, minimum temperatures, and precipitation based on available data for three-month time periods from 1895-2015 for Montana’s Central Climate Division and for the 48 contiguous United States. If the trends continue into the future, average maximum temperatures for the planning area would increase throughout all seasons by at least 0.2°F/decade (0.4°F or more for the life of the plan), while minimum temperatures would increase at a slower rate during the December-May time periods and remain relatively stable from June through November. Average precipitation would decrease throughout most of the year in the planning area, but would increase during March through May. With the exception of minimum temperatures, Montana’s Central Division would generally experience more pronounced climate variability than the average changes experienced in the 48 contiguous United States.

**Table 4-10
Climate Trends**

Change per Decade	Montana Central Climate Division				48 Contiguous United States			
	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov	Dec-Feb	Mar-May	Jun-Aug	Sep-Nov
Maximum temperature (°F/decade)	+0.4	+0.2	+0.2	+0.2	+0.19	+0.15	+0.07	+0.07
Minimum temperature (°F/decade)	+0.2	+0.1	0.0	0.0	+0.2	+0.13	+0.13	+0.13
Precipitation (inches/decade)	-0.06	+0.04	-0.01	-0.4	0.0	+0.05	+0.02	+0.09

The following paragraphs describe effects to climate that are occurring and that are expected to occur more frequently as atmospheric GHG concentrations increase. The magnitude of effects to climate are expected to vary by location, season, and time of day. Computer model forecasts indicate that increases in temperature would not be evenly or equally distributed but are likely to be greater at higher latitudes and may be more pronounced at higher elevations.

In mountain areas of the planning area, warming is projected to cause decreased snowpack and reduced summer river and stream flows, which would exacerbate competition for water resources and could cause declining water quality. The warming of lakes and rivers would adversely affect the thermal structure and water quality of hydrological systems, which would add additional stress to water resources in the region (USGCRP 2014). The region depends on springtime snowpack to meet demand for water from municipal, industrial, agricultural, and recreational uses, and BLM-authorized activities. Mountain ecosystems in the western United States are particularly sensitive to climate variability, particularly in the higher elevations, where much of the snowpack occurs. Higher temperatures are also causing more winter precipitation to fall as rain rather than snow, which would contribute to earlier snowmelt. Additional declines in snowmelt associated with climate variability are projected, which would reduce the amount of water available during summer (USGCRP 2014). Rapid spring snowmelt resulting from sudden and unseasonal temperature increases could also lead to greater erosive events and unstable soil conditions.

Increasing temperatures could also increase the amount of water vapor in the atmosphere, the timing and amount of precipitation, and the intensity of storm systems. Climate models predict continued increases in the heaviest rainfall events, while the lightest precipitation is predicted to decrease. Heavy downpours that are now 1-in-20-

year occurrences are predicted to occur approximately every 4 to 15 years by the end of this century, depending on location, and the intensity of heavy downpours is also expected to increase.

Recent warming is affecting aquatic biological systems (USGCRP 2014). Increases in algal abundance in lakes have been linked to warmer temperatures, while range changes and earlier fish migrations in rivers have also been observed (USGCRP 2014). Increased air temperatures raise water temperatures in lakes, reservoirs, rivers, and streams. Cold water fish populations are expected to decline in warmer waters.

Climate variability is likely to combine with other human-induced stress to further increase the vulnerability of ecosystems to pests, invasive species, and loss of native species. Warming temperatures are leading to earlier timing of spring events such as leaf unfolding, bird migration, and egg laying (USGCRP 2014). The range of many plant and animal species is shifting north and to higher elevations, as the climate of these species' traditional habitat changes. Warming temperatures are also linked to longer thermal growing seasons. Climate variability is likely to affect wildlife breeding patterns, water and food supply, and habitat availability to some degree. Sensitive species in the planning area, such as greater sage-grouse, which are already stressed by declining habitat, increased development, and other factors, could experience additional pressures due to climate variability.

Increases in average summer temperatures and earlier spring snowmelt in the region are expected to increase the risk of wildfires by increasing summer moisture deficits (USGCRP 2014). Studies have shown that earlier snowmelts can lead to a longer dry season, which increases the incidence of landscape-level wildfire. Together with historical changes in land use, climate variability is anticipated to affect the variability in the occurrence of wildfire throughout the planning area. Although the effect of climatic factors varies by ecosystem type and from year to year, drought, low winter precipitation, wind conditions, and high summer temperatures are positively associated with wildfire occurrence. During the last 20 years, research has shown that these factors have led to an increase in the frequency of very large wildfires and total acres burned throughout the region.

Climate variability also poses challenges for many resource uses on BLM-administered land. Increased temperatures, drought, and evaporation may reduce seasonal water supplies for livestock and could affect forage availability. However, in non-drought years, longer growing seasons resulting from thermal increases may increase crop yield and forage availability throughout the year. Major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilized water resources. Shifts in wildlife habitat due to climate variability may influence hunting and fishing activities, and early snowmelt may affect winter- and water-based recreational activities. Drought and resulting stress on vegetation could increase the frequency and intensity of mountain pine beetle and other insect infestations.

Given the broad spatial influence of climate variability that requires response at the landscape level, the DOI also established landscape conservation cooperatives, which are management-science partnerships that help to inform management actions addressing climate change across landscapes. These cooperatives are formed and directed by land, water, wildlife, and cultural resource managers, and interested public and private organizations, to increase the scope of climate change response beyond federal lands.

4.2.2 Soil Resources

Comparative Effect Summary Tables

Table 4-11 through Table 4-16 provide a summary of quantitative effects on soil resources by alternative.

**Table 4-11
Alternatives Comparison of Livestock Grazing on Sensitive Soils**

Allowable Use	Alternatives (Acres)			
	Alternative A	Alternative B	Alternative C	Alternative D
Available for livestock grazing	636,600	621,200	636,600	636,600
Unavailable for livestock grazing	14,600	30,000	14,600	14,600

Allowable Use	Overlapping Sensitive Soils (Acres, with a Total of 302,700 Acres of Sensitive Soils on BLM-Administered Land)			
	Alternative A	Alternative B	Alternative C	Alternative D
Available for livestock grazing	288,900	279,000	288,900	288,900
Unavailable for livestock grazing	13,800	23,700	13,800	13,800

Source: BLM GIS 2015a

Table 4-12
Alternatives Comparison of Timber Management on Sensitive Soils

Allowable Use	Alternatives (Acres)			
	Alternative A	Alternative B	Alternative C	Alternative D
Closed to timber management	5,400	211,700	2,700	119,600

Allowable Use	Overlapping Sensitive Soils (Acres, with a Total of 302,700 Acres of Sensitive Soils on BLM-Administered Land)			
	Alternative A	Alternative B	Alternative C	Alternative D
Closed to timber management	2,800	89,500	2,600	104,200

Source: BLM GIS 2015a

Table 4-13
Alternatives Comparison of Travel Management on Sensitive Soils

Allowable Use	Alternatives (Acres)			
	Alternative A	Alternative B	Alternative C	Alternative D
Limited to designated routes for OHV travel	487,700	413,500	500,600	487,700
Seasonal restrictions for OHV travel	147,800	28,700	147,800	147,800
Closed to OHV travel	13,000	0	0	0
Closed to motorized travel*	2,700	209,000	2,700	2,700

Allowable Use	Overlapping Sensitive Soils (Acres, with a Total of 302,700 Acres of Sensitive Soils on BLM-Administered Land)			
	Alternative A	Alternative B	Alternative C	Alternative D
Limited to designated routes for OHV travel	236,300	202,600	245,900	236,300
Seasonal restrictions for OHV travel	54,300	11,100	54,300	54,300
Closed to OHV travel	9,500	0	0	9,500
Closed to motorized travel*	2,600	89,100	2,600	2,600

Source: BLM GIS 2015a

*Prohibits all motorized travel, including administrative and permitted uses.

Table 4-14
Alternatives Comparison of Land Use Authorizations on Sensitive Soils

Allowable Use	Alternatives (Acres)			
	Alternative A	Alternative B	Alternative C	Alternative D
ROW exclusion	15,700	278,800	2,700	18,000
ROW avoidance	378,700	341,500	345,500	446,600
Open to ROWs	256,800	30,900	302,900	186,600

Allowable Use	Overlapping Sensitive Soils (Acres, with a Total of 302,700 Acres of Sensitive Soils on BLM-Administered Land)			
	Alternative A	Alternative B	Alternative C	Alternative D
ROW exclusion	12,100	131,200	2,600	13,100
ROW avoidance	157,800	169,700	137,100	175,500
Open to ROWs	142,900	1,800	163,000	114,000

Source: BLM GIS 2015a

Table 4-15
Alternatives Comparison of Fluid Minerals Development Stipulations on Sensitive Soils

Allowable Use	Alternatives (Acres)			
	Alternative A	Alternative B	Alternative C	Alternative D
Closed to fluid mineral leasing	110,400	311,000	110,400	116,800
Open to fluid mineral leasing*	1,086,300	885,700	1,085,900	1,080,000
Open to leasing, subject to NSO	58,300	744,000	411,700	472,000
Open to leasing, subject to CSU	281,700	241,400	113,200	632,900

Allowable Use	Overlapping Sensitive Soils (Acres, with a Total of 516,400 Acres of Sensitive Soils on BLM-Administered Federal Mineral Estate)			
	Alternative A	Alternative B	Alternative C	Alternative D
Closed to fluid mineral leasing	1,900	83,500	1,900	3,800
Open to fluid mineral leasing*	472,800	391,200	472,800	470,900
Open to leasing, subject to NSO	31,800	391,200	159,600	182,500
Open to leasing, subject to CSU	281,700	155,200	58,800	470,900

Source: BLM GIS 2015a

*Acres open to fluid mineral leasing overlap with acres managed as NSO or CSU.

Table 4-16
Alternatives Comparison of Mineral Development on Sensitive Soils

Allowable Use	Alternatives (Acres)			
	Alternative A	Alternative B	Alternative C	Alternative D
Proposed for withdrawal from locatable mineral entry	0	198,400	0	5,400
Open for locatable mineral entry	628,000	628,000	628,000	628,000
Withdrawn from locatable mineral entry	23,200	23,200	23,200	23,200
Closed to mineral material disposal	299,600	463,100	4,200	399,200
Open to mineral material disposal	897,200	733,700	1,192,600	797,600
Closed to nonenergy mineral leasables	394,100	555,800	394,100	492,200
Open to nonenergy mineral leasables	802,600	641,000	802,600	704,500

Allowable Use	Overlapping Sensitive Soils (Acres, with a Total of 302,700 Acres on BLM-Administered Land and 516,400 Acres of sensitive Soils on BLM-Administered Federal Mineral Estate)			
	Alternative A	Alternative B	Alternative C	Alternative D
Proposed for withdrawal from locatable mineral entry	18,900	89,400	21,000	23,700
Open for locatable mineral entry	280,100	280,100	280,100	280,100
Withdrawn from locatable mineral entry	0	76,000	0	4,800
Closed to mineral material disposal	102,500	174,000	3,200	143,400
Open to mineral material disposal	413,900	342,400	513,200	373,000
Closed to nonenergy mineral leasables	134,000	204,600	134,000	174,300
Open to nonenergy mineral leasables	382,400	311,800	382,400	342,000

Source: BLM GIS 2015a

Effects Common to All Alternatives

Managing to protect major paleontological resources of scientific interest and cave and karst resources may provide incidental protection of soil resources and sensitive soils; however, this effect would occur only in specific areas.

The BLM could, as needed, change grazing permit terms, adjust AUMs for livestock, implement grazing systems, require rotation or deferment, and impose utilization limits. Intensive livestock management can reduce the magnitude of the effects listed above by allowing vegetation to adequately rest and recover between periods of domestic grazing. However, vegetation and soil resources may be damaged until it is detected and management is changed.

Recreation in the planning area is expected to continue and may affect soil resources through vegetation trampling, fragmentation, soil compaction, and increased likelihood of invasive or noxious weed spread. Recreation is dispersed throughout the planning area, thus minimizing effects in any one location. However, more intensive effects would occur in areas that are heavily used.

Current management provides opportunities for coal exploration and development; however, because there is limited resource potential and no coal leasing has occurred in the last 20 years, no development of federal coal or oil shale resources is anticipated. Therefore, no effects on soil resources are expected from coal or oil shale management. Similarly, locatable mineral development in the planning area would likely remain uneconomical for the life of the RMP; therefore, no effects on soil resources are expected. The effects of salable mineral developments on soil resources would occur in specific areas, typically next to roads.

Effects from fluid mineral development would result from exploration and development, requiring the construction of roads, pipelines, pads, and facilities. This would involve vegetation clearing, which could increase soil erosion and compaction. Additionally, fluid mineral leasing stipulations would not preclude developing areas already leased. In these areas, surface-disturbing activities that could affect soils would occur if leases were developed.

Stipulations for fluid minerals leasing (**Appendix L**), and BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would likely reduce effects on soil resources associated with activities such as road, pipeline, or power line construction; mineral development; range improvements; and recreational activities. Stipulations, BMPs and mitigation measures would reduce the likelihood of loss of ground cover or soil mixing, compaction, or removal; exposure of the soil resource to accelerated wind and water erosion; and the irretrievable loss of topsoil and nutrients and soil productivity. Requiring a reclamation plan (**Appendix G**) for

all surface-disturbing activities across all alternatives would stabilize disturbed areas in the short term and landscapes in the long term, reducing potential effects from loss of vegetation cover, erosion, and sedimentation and the proliferation of noxious or invasive weeds.

Alternative A

Alternative A focuses on maintaining or improving existing soil conditions which would continue to protect soil resources by reducing and preventing erosion. Before authorizing any surface-disturbing activity, the BLM would continue to apply mitigation measures (**Appendix F**) for soils with high erosion susceptibility, areas susceptible to mass failure, steep slopes, sparse vegetation, and shallow soil depth. However, current management does not specify actions for maintaining sensitive soils or restoring areas with soil degradation. These areas would continue to be at higher risk for erosion from authorized activities or resource uses and natural disturbances.

ACECs would continue to be designated across 22,900 acres with limitations on OHV use, ROW authorizations, and use of forest products. ACEC designations would overlap with 5,500 acres of sensitive soils. This would reduce potential effects on soils such as reduced soil productivity, increased soil erosion, or soil compaction.

Stipulations for fluid minerals leasing (**Appendix L**), and BMPs (**Appendix F**) for authorized land uses or activities would restrict effects from surface-disturbing activities, such as mineral and ROW developments, which would reduce the likelihood of vegetation removal, soil productivity reduction, increased soil erosion, or cases of soil compaction. Applying fluid mineral NSO stipulations to fishing reservoirs would have a negligible effect on soil resources because most fluid mineral leasing is deferred under current management.

Alternative A would manage 5,400 acres as closed to the commercial timber harvest corresponding with ACECs and the WSAs. This would protect these acres from surface-disturbing activities that result from timber management, as discussed in **Appendix W**. This includes road building and vegetation clearing, which can cause soil compaction and instability and can increase erosion rates. This could result in a decline in soil health and productivity through the loss of vegetation and soil organic matter. Additional limitations Forestry BMPs would reduce effects on soils; by requiring ground-based logging to be done on dry or frozen ground and slopes less than 45%.

Alternative A would manage 2,700 acres as closed to motorized travel, 13,000 acres as closed to OHV travel, 487,700 acres as limited to designated routes year-round, and 147,800 acres limited to designated routes seasonally. Areas closed or managed with restrictions on motorized or OHV travel would reduce the magnitude of surface disturbance to soils and would protect sensitive soils from motorized vehicle use. This includes the loss of vegetation cover and increased erosion rates. Areas available for motorized vehicle and OHV travel would result in surface disturbance, which may damage vegetation and cause soil rutting, runoff concentration, and soil erosion increases. This could result in a decline in soil health and productivity through vegetation and soil organic matter loss and nutrient depletion.

Livestock grazing under Alternative A would be managed so that 40 percent of forage would continue to be allotted to livestock grazing on 636,600 acres. This may result in declining soil surface health due to consistent AUM use during unpredicted consequences of climate variability. This would be the case especially during unforeseen droughts, which are predicted to increase in intensity and duration. However, the BLM would mitigate adverse effects on soils from livestock grazing by managing all allotments to meet the Standards for Rangeland Health (BLM 1997) through actions that modify the time, duration, intensity, and frequency of grazing, including herd reductions and livestock removal.

Alternative A would continue to manage 14,600 acres as closed to livestock grazing, which includes 13,800 acres of sensitive soils. As a result, the soils in these areas would be protected from vegetation trampling, soil compaction, and soil erosion, which would reduce the potential for declining soil health and productivity.

Additionally, to reestablish vegetation communities in areas that have been highly disturbed by wildfire, Alternative A would implement rest periods from livestock grazing for a minimum of two growing seasons. Additional time may be required on a case-by-case basis. Managing livestock allotments and restricting grazing after a major disturbance would reduce the potential for effects on soils from livestock grazing—vegetation trampling, soil

compaction, and soil erosion—by preventing a decline in soil surface health and maintaining the ability to meet the Standards for Rangeland Health (BLM 1997).

Managing for recreation and visitor services under Alternative A would restrict other resource uses that might otherwise affect soil resources. However, effects on soil resources from surface-disturbing activities described in **Appendix W** are likely to continue because of increased demand for recreation opportunities. Because access is a limiting factor for recreation, the effects would likely be concentrated in existing SRMAs and extensive recreation management area (ERMAs).

Alternative A would manage 15,700 acres as VRM Class I, 105,000 acres as VRM Class II, 193,300 acres as VRM Class III, and 280,500 acres as VRM Class IV. As most of the planning area is managed as VRM Class III or Class IV, surface-disturbing activities would occur. This would result in vegetation clearing, soil destabilization, soil compaction, and increased erosion. Without proper case-by-case project and soil management, these activities, in turn, may result in declining soil health and productivity.

Nonenergy leasable mineral management under Alternative A would close 394,100 acres to nonenergy solid leasables. This includes 134,000 acres of sensitive soils. Alternative A would withdraw acres from locatable mineral development and would manage 299,600 acres as closed to mineral material disposal. This includes 102,500 acres of sensitive soils. Acres closed to mineral entry or withdrawn from locatable development would reduce disturbance levels on soils and prevent effects on soil resources from mineral development. This includes temporary and permanent disturbance involving vegetation clearing and soil compaction, which may result in a decline in soil health and productivity.

Alternative A would not manage any additional acres as closed to fluid mineral leasing but would manage 58,300 acres as NSO and 281,700 acres as CSU, including 31,800 acres NSO and 281,700 acres CSU of sensitive soils. Areas managed as CSU and NSO would restrict surface-disturbing activities related to fluid mineral development. This may reduce the effects from fluid mineral development, including vegetation clearing and soil disturbance and compaction. These activities may result in a decline in soil health and productivity. However, the LFO would continue to defer fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. (Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO). Oil and gas development in the decision area would continue to be limited to leases not requiring special wildlife stipulations. Because of this, effects on soils from fluid mineral development would continue to be low. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 456 acres; long-term disturbance could affect approximately 88 acres (**Table W-1, Appendix W**).

Alternative A would also manage 15,700 acres as ROW exclusion areas and 378,700 acres as ROW avoidance areas. ROW exclusion would overlap with 12,100 acres with sensitive soils, and ROW avoidance would overlap with 157,800 acres. Areas managed as ROW avoidance would reduce the occurrence and concentration of ROW development which can reduce soil health and productivity by compacting soils and removing vegetation cover, destabilizing soils, and potentially increasing erosion. Areas managed as ROW exclusion would eliminate the potential for effects on soils from ROW development. This would prevent soil health and productivity decline by preventing soil compaction, vegetation clearing, and soil erosion associated with ROW development.

Alternative B

In general, Alternative B would prioritize designated areas for resource protection, would minimize overall ground disturbance, and would prioritize previously degraded areas for soil restoration. Biological soil crusts would be avoided and disturbances would be mitigated. Soils susceptible to mass failure and sensitive soils would be managed as NSO for fluid minerals leasing. Implementing fluid minerals NSO stipulations for soils would provide for long-term protection of soil resources and sensitive soil resources where they occur in this designation. NSO stipulations for soils are greater under Alternative B than Alternative A; however, effects from fluid mineral development would be similar to Alternative A. This is because the deferral of fluid mineral leasing under Alternative A precludes disturbance in important wildlife habitat areas (similar to an NSO stipulation).

Soil erosion and sedimentation is likely to continue in the planning area due to natural processes. Alternative B would also manage all sensitive soils as ROW avoidance areas, and proponents of any proposed activities on sensitive soils would be required to incorporate BMPs and mitigation measures (**Appendix F**) to minimize soil erosion and maintain soil stability. Authorized disturbances would include plans for reclamation, and site-specific reclamation actions would reflect the environmental concerns and reclamation potential of the site. This would decrease the potential and magnitude of localized declines in soil health and productivity.

Alternative B would implement additional adaptive management strategies to identify specific climate vulnerabilities, which would allow for more vegetation management flexibility and, therefore, soil management, compared with Alternative A. This may protect soils from the effects of drought and climate variability, as described in **Appendix W**. Considering variability in climate when proposing restoration seeding of native plants would support resilient vegetation in areas undergoing restoration, which would better stabilize soils, increase soil productivity, and decrease erosion. The effects from climate variability would be applicable to soils, sensitive soils, and biological soil crusts.

Under Alternative B, the Breaks FMU (197,300 acres) would be managed as Category D, where fire is desired and there are no constraints on its use. This emphasis increases the potential for a modified landscape and increased ground disturbance in this area.

Alternative B would manage 202,400 acres for the protection of their wilderness characteristics, whereas Alternative A would not identify any management actions specific for the protection wilderness characteristics. Restrictions on surface-disturbing activities on lands with wilderness characteristics would indirectly protect soil resources in these areas from surface-disturbing activities and would prevent a decline in soil health and productivity. Management would include ROW exclusions and restrictions on travel, energy development, and other surface-disturbing activities. Additionally, considering adjacent lands to identify new qualifying areas for lands with wilderness characteristics could reduce effects on soil resources in other areas in the future.

Alternative B would manage 32,000 acres as ACECs which would result in restrictions on surface-disturbing activities from OHV use, ROW authorizations, forest products use, and mineral development. Due to the larger acreage of ACEC management under Alternative B than under Alternative A, more soil resources in the ACECs would be protected from surface-disturbing activities. This may result in a decline in soil productivity, increase in soil erosion, and additional potential for soil compaction.

Alternative B would manage 211,700 acres as closed to commercial timber harvest, compared with 5,400 acres under Alternative A. As a result, more acres would be protected from the disturbing activities that result from timber management. This includes road building and vegetation clearing, which can cause soil compaction and instability and increase erosion rates. This could result in a decline in soil health and productivity through the loss of vegetation cover and soil organic matter.

Alternative B would manage 0 acres as closed to OHV travel, compared with 13,000 acres under Alternative A. However, there would be 209,000 acres closed to motorized travel (including for administrative and permitted use). Alternative B would manage the largest acreage as closed to motorized or OHV use. This would reduce the surface disturbance potential of soils in closed areas and would reduce the likelihood of effects on soils from motorized and OHV use, as described in **Appendix W**. This includes protection from damage to vegetation, soil rutting, runoff concentration, and increased soil erosion, which may result in a decline in soil health and productivity through loss of vegetation and soil organic matter and nutrient depletion.

Alternative B would manage 621,200 acres as open to livestock grazing and 30,000 acres as closed to livestock grazing, including 23,700 acres of sensitive soils. As under Alternative A, following a major disturbance, a rest period of 2 years from livestock grazing would be required. Managing livestock allotments to meet the Standards for Rangeland Health (BLM 1997) and restricting grazing after a major disturbance would reduce the potential for effects on soils from livestock grazing, as discussed in **Appendix W**. It would do this by preventing a decline in soil surface health and maintaining the ability to meet the Standards for Rangeland Health (BLM 1997).

Under Alternative B, allotment stocking rates would be managed to achieve an adequate residual forage standard to be made available for watershed function, vegetation, and nutrient cycling, corresponding with a light (21 to 40

percent) utilization level. This would result in healthier soils due to accumulation of soil nutrients and organic matter. Alternative B would allocate 252,084 AUMs for watershed function, vegetation, and nutrient cycling and would allocate 63,021 AUMs to livestock. Light utilization levels, often recommended for degraded or drought experiencing ranges (more likely with climate variability), may help to maintain deep-rooted bunch grasses, which may help with range resiliency. This would protect soils from vegetation die-off and subsequent soil susceptibility to wind and water erosion.

Surface use BMPs and mitigation measures (**Appendix F**) for recreation and visitor services would restrict other resource uses that might otherwise affect soil resources and sensitive soils. Recreation areas are widespread and would likely effect soils, sensitive soils, and biological soil crusts. Because recreation BMPs are more extensive than Alternative A, there would be increased protection of soil resources and biological soil crusts.

Alternative B would manage 16,900 acres as VRM Class I, 329,500 acres as VRM Class II, 92,400 acres as VRM Class III, and 212,400 acres as VRM Class IV. Surface disturbance would be minimized in VRM Class I areas and reduced in VRM Class II areas. Under this alternative, 304,800 acres would be managed as VRM Class III or Class IV, compared with 473,800 acres under Alternative A. Fewer acres of the planning area would be managed as VRM Class III or Class IV under Alternative B. This would result in fewer acres of surface-disturbing activities, which, as described in **Appendix W**, result in vegetation clearing, soil destabilization, soil compaction, and increased erosion. These conditions could result in declining soil health and productivity.

Alternative B would close the most acres, 555,800, to nonenergy leasables, a 161,700 acre increase over Alternative A. Alternative B would also propose to withdraw 198,400 acres from locatable mineral development, which is an 198,400 acre increase over Alternative A. Finally, 463,100 acres would be closed to mineral material disposal, which is a 163,700 acre increase over Alternative A. These closures and withdrawals include 204,600 acres of sensitive soils closed to nonenergy leasables, 89,400 acres proposed for withdrawal from locatable mineral entry, and 174,000 acres closed to mineral material disposal. Additional acres closed to mineral entry and withdrawn from locatable development would reduce disturbance levels on soils from mineral development. These disturbances would be from vegetation clearing, soil compaction, and soil erosion, which would reduce the potential for soil health and productivity decline.

Alternative B would also close 200,600 more acres to fluid mineral leasing over Alternative A. Additionally, 744,000 acres would be managed as NSO and 241,400 acres would be managed as CSU. Acres closed to fluid mineral leasing would overlap with 125,200 acres of sensitive soils, and acres managed as CSU and NSO would overlap with 155,200 and 391,200 acres of sensitive soils, respectively.

Areas closed or restricted to fluid mineral development would be protected from surface-disturbing activities, including vegetation clearing, soil compaction, and increased erosion rates, which could cause a decrease in soil health and productivity. However, unlike Alternative A, fluid mineral leasing would not be deferred under Alternative B. Therefore, new fluid mineral leasing would be more likely to occur, which may affect soil resources, as described in **Appendix W**. However, overall short- and long-term surface disturbance effects would be similar to Alternative A, due to reasonable foreseeable developments (RFDs) for oil and gas production. On BLM-administered lands, the RFD scenario short-term disturbance associated with access roads, flow lines, and well pads (existing and RFD scenario) could affect approximately a total of 330 acres; long-term disturbance could affect approximately 72 acres (**Table W-1, Appendix W**).

Alternative B would manage 278,800 acres, including 131,200 acres of sensitive soils, as ROW exclusion and 341,500 acres as ROW avoidance areas, including 169,700 acres of sensitive soils. Acres managed as ROW exclusion are increased by 263,100 acres over Alternative A, and acres managed as ROW avoidance are decreased by 37,200 acres. While Alternative B would manage fewer acres as ROW avoidance than Alternative A, the increased acreage of ROW exclusion would increase protection to soils and sensitive soils from surface-disturbing activities. The increase in acres managed as ROW exclusion would result in no surface disturbance to soils from ROW development in these areas, including vegetation clearing, soil compaction, and increased erosion. This would prevent soil health and productivity degradation because of ROW development.

Alternative C

In general, Alternative C would maximize land areas available for resource uses. Management of soil resources would improve soil productivity by increasing vegetation cover and reducing soil compaction and erosion. Alternative C would maximize land areas available for resource uses and would ensure that surface disturbance does not cause accelerated erosion. Alternative C would mitigate effects on sensitive soils and soils prone to slumping by implementing BMPs and mitigation measures for authorized activities (**Appendix F**).

Soil-disturbing activities could result in topsoil loss, reduced vegetation cover, inhibited vegetation regeneration and succession, and altered seed germination and plant establishment. Because soil-disturbing activities are widespread in the planning area, the effects would be applicable to soils, sensitive soils, and biological soil crusts. Alternative C does not avoid biological soil crusts as does Alternative B; instead it would require that authorized disturbance activities include plans for reclamation and site-specific reclamation actions that reflect the environmental concerns and reclamation potential of the site.

Effects on soils from adaptive management strategies related to climate vulnerabilities would be the same as under Alternative B.

Alternative C would identify lands with wilderness characteristics but would not manage them specifically for the protection of their wilderness characteristics. Effects would be similar to those described under Alternative A. No areas would be designated as ACECs; therefore, there would be no special management for the protection of the relevant and important values of the potential ACECs, such as management as VRM Class II, which could limit surface-disturbing activities and indirectly benefit soil resources.

Alternative C would manage 2,700 acres as closed to commercial timber harvest, which is 2,700 acres fewer than Alternative A. Closure to timber harvest would protect soils from surface-disturbing activities, including road building and vegetation clearing. This can cause soil compaction and instability and can increase erosion rates, which could result in a decline in soil health and productivity through the loss of vegetation cover and soil organic matter. However, the overall decrease in acres closed would result in less protection to soil resources compared with Alternative A. Alternative C may increase the decline in soil health and productivity and increase soil disturbance under timber management, compared with Alternative A.

As under Alternative A, Alternative C would manage 2,700 acres as closed to motorized travel, 0 acres as closed to OHV travel, 500,600 acres as limited to designated routes year-round, and 147,800 acres as limited to designated routes seasonally. Therefore, effects would be greater than under Alternative A.

Like Alternative A, Alternative C would continue to manage 14,600 acres as closed to livestock grazing, which includes 13,800 acres of sensitive soils unavailable for livestock grazing. As a result, the soils in these areas would be protected from vegetation trampling, soil compaction, and soil erosion, which would reduce the potential for declining soil health and productivity.

Alternative C would establish allotment stocking rates to maintain and maximize utilization of forage, corresponding to a moderate (41 to 60 percent) utilization level. This would increase the time livestock spend on the range, which may increase vegetation trampling and soil compaction. Increased utilization over Alternative A (limited to 40 percent) may decrease residual annual biomass and root mass, which may result in less drought-tolerant range. If climate variability increases droughts, then increased utilization rates may change the vegetation community, which reduces soil stability and increases soil erosion and soil compaction.

Developing staging and parking areas and other recreation facilities under Alternative C could remove or trample vegetation, resulting in soil compaction and increased soil erosion. Increased accessibility to recreation areas (e.g., Snowy Mountains ERMA) may result in the direct removal of vegetation and could indirectly increase the risk of noxious weed spread. Both are long-term effects that may result in destabilized soils, decreased soil productivity, and increased erosion rates.

Alternative C would manage 2,700 acres as VRM Class I, 14,100 acres as VRM Class II, 292,900 acres as VRM Class III, and 341,500 acres as VRM Class IV. Surface disturbance would be minimized in VRM Class I areas and reduced in VRM Class II areas. Alternative C would manage 634,400 acres as VRM Class III and VRM Class IV,

compared with 473,800 acres under Alternative A. This would increase acreage available for surface-disturbing activities, which may decrease soil health and productivity, in comparison to Alternative A.

Alternative C would close the same number of acres, 394,100, to nonenergy solid leasables as Alternative A. 0 acres would be proposed for withdrawal from locatable mineral entry, under both Alternative A and Alternative C. 4,200 acres would be managed as closed to mineral material disposal, compared with 299,600 acres under Alternative A, resulting in the largest area managed as open for mineral material disposal among the alternatives (1,192,600 acres). In areas with sensitive soils, 134,000 acres would be closed to nonenergy leasables, and 3,200 acres would be closed to mineral material disposal. Alternative C would be slightly more protective of soils from surface-disturbing activities and a decline in soil health and productivity from mineral development, as described in **Appendix W**, when compared with Alternative A, due to a slight increase in acres managed with mineral development restrictions.

Alternative C would not close any additional acres to fluid mineral leasing, similar to Alternative A, and the all of the closed acres (1,900) would coincide with areas with sensitive soils. Additionally, Alternative C would manage 411,700 acres as NSO and 113,200 acres as CSU. Fluid minerals NSO and CSU stipulations would overlap with 159,600 and 57,100 acres of sensitive soils, respectively. Areas managed with restrictions or as closed to fluid mineral entry would reduce the potential for disturbing soils or sensitive soils, which may preserve soil health and productivity. Areas closed or managed with restrictions to fluid mineral development would have fewer effects from fluid mineral development, including vegetation clearing, soil compaction, and soil erosion.

Like Alternative B, under Alternative C fluid mineral leasing would not be deferred due to wildlife habitat. Therefore, new fluid mineral leasing would be more likely to occur, which may affect soil resources, as described in **Appendix W**. However, overall short- and long-term surface disturbance effects would be similar to Alternative A due to the RFD scenario for oil and gas production. On BLM-administered lands, the RFD scenario short-term disturbance associated with access roads, flow lines, and well pads (existing and RFD scenario) could affect approximately a total of 384 acres; long-term disturbance could affect approximately 79 acres (**Table W-1, Appendix W**).

Alternative C would manage 2,700 acres as ROW exclusion areas and 345,500 acres as ROW avoidance areas. This includes 2,600 and 137,100 acres of sensitive soils, respectively. Alternative C would manage 13,000 fewer acres as ROW exclusion and 33,200 fewer acres as ROW avoidance compared to Alternative A. This would increase surface disturbance and the potential magnitude of effects on soil resources from ROW development, including vegetation clearing, soil compaction, and increased erosion.

Alternative D

Management of soil resources under Alternative D would be similar to, but less protective than Alternative B. Alternative D would mitigate effects on sensitive soils (**Appendix F**), rather than avoid sensitive soils, as Alternative B would. Management actions to prioritize sensitive areas for soil protection, including biological soil crusts and sensitive soils, would reduce the potential for effects on sensitive soils in these areas, in comparison to Alternative A. Requiring plans for mitigation and implementing BMPs for authorized activities (**Appendix F**) would also reduce the potential effects, in comparison to Alternative A.

Under Alternative D, any proposed activities on sensitive soils would require mitigation measures (**Appendix F**) to minimize soil erosion and maintain soil stability, and sensitive soils would be managed as CSU to fluid minerals. This would result in additional management of soil to protect soil health and productivity during and after surface-disturbing activities.

Effects on soils from adaptive management strategies related to climate vulnerabilities would be the same as under Alternative B.

Alternative D would also identify management actions specific to the protection of wilderness characteristics on 100,368 acres of lands with wilderness characteristics. These areas would be managed to maintain the natural quality and opportunities for solitude and primitive recreation. As a result, these areas would be managed as VRM Class II, ROW avoidance, and ROW exclusion for renewable energy. OHV and mechanized travel would be

limited to designated routes. These areas would be closed to wood product sales and harvest, mineral material disposal, and nonenergy solid mineral leasing, and they would be NSO for fluid mineral leasing. These restrictions would reduce the opportunity for surface disturbance in these areas, which may preserve soil health and productivity over Alternative A.

Alternative D would manage 23,300 acres of ACECs. Surface-disturbing activities that would be limited by designating areas as ACECs are ROW authorizations, travel and mineral development limitations, and disposal of forest products. Effects would be similar to Alternative B, but over a smaller area, as Alternative B would manage 32,000 acres as ACECs.

Alternative D would manage 119,600 acres as closed to commercial timber harvest, compared with 5,400 acres under Alternative A. This would protect these acres from surface-disturbing activities that result from timber management, as discussed in **Appendix W**. This includes road building and vegetation clearing, which can cause soil compaction, instability, and increased erosion rates. This could result in a decline in soil health and productivity through the loss of vegetation cover and soil organic matter.

Alternative D would manage 2,700 acres as closed to motorized travel, 0 acres as closed to OHV travel, 487,700 acres as limited to designated routes year-round (lands with wilderness characteristics would be managed as OHV limited area), and 147,700 acres as limited to designated routes seasonally. Effects on soil resources from OHV management would be similar to Alternative A, however less acreage would be closed to OHV travel.

Alternative D would manage 14,600 acres as closed to livestock grazing, which would overlap with 13,800 acres of sensitive soils unavailable for livestock grazing. This is the same as under Alternative A. Alternative D would establish stocking rates in areas preferred by livestock that allow for appropriate use levels adjusted for the anticipated intensity of use necessary to provide sufficient forage and cover to support and maintain healthy diverse vegetation communities and to maintain or achieve Standards for Rangeland Health (BLM 1997). Forage utilization levels may vary based on the implementation of comprehensive grazing strategies necessary to maintain or achieve vegetation objectives. Alternative D would allocate up to 126,042 AUMs to livestock and 189,063 acres to watershed function vegetation, nutrient cycling, and cover/forage for wildlife.

Alternative D would determine rest periods after a major disturbance through site-specific interdisciplinary team planning, monitoring, and environmental review. Livestock grazing on disturbed areas would be excluded until site-specific analysis or monitoring data indicated that vegetation, species composition, and litter accumulation are adequate to support watershed values, meet vegetation objectives, and sustain grazing use. This may meet Standards for Rangeland Health (BLM 1997) on more acres after a major disturbance and increased soil health and productivity than would a 2-year rest period under Alternative A.

Surface use stipulations for recreation and visitor services would restrict fluid mineral leasing that might otherwise result in vegetation removal, soil compaction, or soil erosion. Developing access opportunities (e.g., new trail opportunities in the Judith Mountains SRMA) would result in long-term removal of vegetation in specific areas. These effects could affect soils, sensitive soils, or biological soil crusts, depending on where access roads are developed.

Alternative D would manage 15,900 acres as VRM Class I, 125,300 acres as VRM Class II, 235,600 acres as VRM Class III, and 274,400 acres as VRM Class IV. Surface disturbance would be minimized in VRM Class I areas and reduced in VRM Class II areas. Alternative D would manage 200 more acres as VRM Class I and 20,300 more acres as VRM Class II, in comparison to Alternative A. The increase in VRM Class I and II acres would increase protection of soil resources from surface-disturbing activities, which may better preserve soil health and productivity than Alternative A.

Alternative D would close 492,200 acres to nonenergy solid leasables; 5,400 acres would be proposed for withdrawal from locatable mineral development, and 399,200 acres would be managed as closed to mineral material disposal. This includes 174,300 acres of sensitive soils closed to nonenergy leasables, 4,800 acres proposed for withdrawal from locatable minerals, and 143,400 acres closed to mineral material disposal. Compared with Alternative A, Alternative D would manage 98,100 more acres as closed to nonenergy solid leasables, 5,400 more acres as proposed for withdrawal from locatable mineral entry, and 99,600 more acres as

closed to mineral material disposal. As a result, Alternative D would be more protective of soil resources than Alternative A, due to the increase in acres closed to mineral development. Alternative D would result in fewer acres of surface disturbance from mineral entry. This would result in less vegetation clearing, soil compaction, and soil erosion, which may increase soil health and productivity in these areas, over Alternative A.

Alternative D would close 6,400 more acres to fluid mineral leasing over Alternative A, including 45,500 acres of sensitive soils. Additionally, 472,200 acres would be managed as NSO, and 632,900 acres would be managed as CSU. Fluid minerals NSO stipulations would overlap with 182,500 acres of sensitive soils and CSU stipulations would overlap with 470,900. This increase in acreage closed to fluid mineral entry or with restrictions on fluid mineral development would result in fewer acres disturbed by fluid mineral development. Disturbance related to fluid mineral development includes vegetation clearing, soil compaction, and increased soil erosion, as discussed in **Appendix W**. As a result, Alternative D would be more protective of soil health and productivity than Alternative A.

Like Alternative B, Alternative D would not defer fluid mineral leasing due to wildlife habitat. Therefore, new fluid mineral leasing would be more likely to occur, which may affect soil resources, as described in **Appendix W**. However, overall short- and long-term surface disturbance effects would be less than Alternative A. On BLM-administered lands, the RFD scenario short-term disturbance associated with access roads, flow lines, and well pads (existing and RFD scenario) could affect approximately a total of 366 acres; long-term disturbance could affect approximately 77 acres (**Table W-1, Appendix W**).

Alternative D would manage 18,000 acres as ROW exclusion areas and 446,600 acres as ROW avoidance areas. This includes 13,100 acres as ROW exclusion and 175,500 acres of sensitive soils as ROW avoidance. Alternative D would manage 2,300 more acres as ROW exclusion and 67,900 more acres as ROW avoidance than Alternative A. This would reduce surface disturbance and the potential magnitude of effects on soil resources from ROW development, including vegetation clearing, soil compaction, and increased erosion, in avoidance areas, compared with Alternative A.

Cumulative

The cumulative effect analysis for soils, sensitive soils, and biological soil crusts is restricted to the project planning area. Vegetation treatments to reduce hazardous fuels in the project planning area would continue through the life of the RMP, and would probably increase if drought conditions persist. Prescribed fire and wildfire temporarily removes vegetation and can increase soil erosion.

Wildfires would continue to bring the risk of burning hot enough to kill soil organisms and root systems, resulting in long-term effects of diminished plant recruitment and growth rates and may result in mass movement of soil if rain were to fall shortly after the fire. The use of vehicles and heavy equipment to suppress wildfires can disturb the soil surface, concentrate surface runoff, and increase soil erosion.

Additionally, forest management would continue, with harvest levels increasing regardless of which alternative were chosen. Salvage operations may increase in response to insects, disease outbreaks, and other natural outbreaks. This could affect soil resources from the construction of roads and trails and could remove vegetation, which protects the soil surface from erosion.

Vehicle-based recreation has grown and is expected to continue to grow over the life of the RMP. OHV use has the potential to damage vegetation, resulting in soil rutting, runoff concentration, and soil erosion increase. Traveling off designated or existing routes and creating administrative trails has occurred and would likely continue in the decision area. This would result in localized effects from trail blazing, which includes vegetation clearing, increased wind erosion from the new trail and overland water erosion rates during storms, and soil compaction and rutting after continued use.

Livestock grazing is expected to continue through the life of the RMP. Livestock grazing can result in a loss of vegetation, leading to increased soil erosion (Hubbard et al. 2004). Continued management to meet the Standards for Rangeland Health (BLM 1997) would continue to prevent undue degradation on soil resources from livestock

grazing. Grazing on private lands in the planning area is expected to remain stable or to slightly decrease, as residential and recreational development increases and continues to effect soils.

Continued fluid mineral development generally requires both permanent and temporary roads, drilled wells, and associated well pads. In addition, fluid mineral development may require associated pipelines and transmission lines and the necessary service roads for these facilities. In the planning area, projected total acres of short-term disturbance associated with all new drilled wells and existing active wells range from 4,700 under Alternatives B, C, and D, to 4,800 under Alternative A. The projected long-term surface disturbance could be less than 100 acres under all alternatives (**Table W-1, Appendix W**). Because the RFD scenario projects similar acreages for both short- and long-term surface disturbances associated with fluid mineral developments (access roads, flow lines, and well pads) under all alternatives, the cumulative effects would be similar across alternatives. However, the required stipulations to protect the important wildlife values would inadvertently protect soil resources and reduce the potential for disturbance, compaction, and erosion.

Small-scale prospecting permits for nonenergy solid leasables, locatable mineral mining claims, and mineral material permits are expected to be leased or granted through the life of the RMP. Local soil health, productivity, and characteristics in project footprints are typically negatively affected by excavation, compaction, erosion, and vegetation clearing. Once mineral extraction is complete, restoration and restoring vegetation may return a lower level of soil health and productivity over the long term. Currently, there are no active exploration or mining of locatable minerals in the planning area.

The BLM had an average of 17 ROW actions per year between 2006 and 2015, with a steadily increasing ROW action trend from 2006 through 2012. Total ROW surface disturbance for 2015 to date is 2,821 acres. Applications for ROW authorizations may increase to accommodate development, such as residential development and communication site use for public safety and homeland security. There is some potential for land use authorizations for renewable energy projects, although no requests have been submitted recently. ROW development includes several surface-disturbing activities, such as road building or trenching.

4.2.3 Water Resources

Comparative Effect Summary Tables

Table 4-17 through **Table 4-20** provide a summary of quantitative effects on water resources by alternative.

**Table 4-17
Alternatives Comparison of Fluid Minerals Development Stipulations on Water Resources**

Location	Allowable Use	Alternative			
		A	B	C	D
All Planning Area (Acres)	Closed to fluid mineral leasing	110,400	311,000	110,400	116,800
	Open to leasing, subject to CSU	281,700	241,400	113,200	632,900
	Open to leasing, subject to NSO	58,300	744,000	411,700	472,00
	Open to fluid mineral leasing	1,086,300	885,700	1,086,300	1,080,000
Streams of Particular Interest (Miles)	Closed to fluid mineral leasing	0	69	0	0
	Open to leasing, subject to CSU	8	26	10	115
	Open to leasing, subject to NSO	6	60	55	100
	Open to fluid mineral leasing	131	62	131	131
19 Major Reservoirs on BLM-Administered Lands (Acres)	Closed to fluid mineral leasing	0	0	0	0
	Open to leasing, subject to CSU	0	200	0	300
	Open to leasing, subject to NSO	100	300	300	300
	Open to fluid mineral leasing	400	300	400	400
Other Reservoirs on BLM-Administered Lands (Acres)	Closed to fluid mineral leasing	0	200	0	0
	Open to leasing, subject to CSU	0	200	0	2,000
	Open to leasing, subject to NSO	100	1,800	1,600	2,000
	Open to fluid mineral leasing	2000	1,800	2,000	2,000

Source: BLM GIS 2015a

Table 4-18
Alternatives Comparison of Livestock Grazing on Water Resources

Location	Allowable Use	Alternative			
		A	B	C	D
All Planning Area (Acres)	Available for livestock grazing	1,311,000	1,464,100	1,501,400	1,295,300
	Unavailable for livestock grazing	36,000	66,900	34,600	34,600
Streams of Particular Interest (Miles)	Available for livestock grazing	103	103	103	103
	Unavailable for livestock grazing	0	0	0	0
19 Major Reservoirs on BLM-administered Lands (Acres)	Available for livestock grazing	400	400	400	400
	Unavailable for livestock grazing	0	0	0	0
Other Reservoirs on BLM-Administered Lands (Acres)	Available for livestock grazing	3,600	2,000	3,600	3,600
	Unavailable for livestock grazing	0	1,600	0	0

Source: BLM GIS 2015a

Table 4-19
Alternatives Comparison of Travel Management on Water Resources

Location	Allowable Use	Alternative			
		A	B	C	D
All Planning Area (Acres)	Seasonal restrictions for OHV travel	147,800	28,700	147,800	147,800
	Limited to designated routes for OHV travel	487,700	413,500	500,600	487,700
	Closed to OHV travel	13,000	0	0	0
	Closed to Motorized travel*	2,700	209,000	2,700	2,700
Streams of Particular Interest (Miles)	Seasonal restrictions for OHV travel	70	6	70	70
	Limited to designated routes for OHV travel	34	23	34	34
	Closed to OHV travel	0	0	0	0
	Closed to Motorized travel*	0	74	0	0
19 Major Reservoirs on BLM-administered Lands (Acres)	Seasonal restrictions for OHV travel	100	100	100	100
	Limited to designated routes for OHV travel	300	300	300	300
	Closed to OHV travel	0	0	0	0
	Closed to Motorized travel*	0	0	0	0
Other Reservoirs on BLM-Administered Lands (Acres)	Seasonal restrictions for OHV travel	300	100	300	300
	Limited to designated routes for OHV travel	3,400	3,300	3,400	3,400
	Closed to OHV travel	0	0	0	0
	Closed to Motorized travel*	0	200	0	0

Source: BLM GIS 2015a

*Prohibits all motorized travel, including administrative and permitted uses.

Table 4-20
Alternatives Comparison of Land Use Authorizations on Water Resources

Location	Allowable Use	Alternative			
		A	B	C	D
All Planning Area (Acres)	ROW exclusion	15,700	278,800	2,700	18,000
	ROW avoidance	378,700	341,500	345,500	446,600
	Open to ROW	256,800	30,900	302,900	186,600

Location	Allowable Use	Alternative			
		A	B	C	D
Streams of Particular Interest (Miles)	ROW exclusion	0	88	0	0
	ROW avoidance	38	16	38	94
	Open to ROW	65	0	65	9
19 Major Reservoirs on BLM-administered Lands (Acres)	ROW exclusion	0	400	0	0
	ROW avoidance	400	2	400	400
	Open to ROW	0	0	0	0
Other Reservoirs on BLM-Administered Lands (Acres)	ROW exclusion	0	3,400	0	0
	ROW avoidance	3,400	200	1,800	1,900
	Open to ROW	200	0	1,900	1,700

Source: BLM GIS 2015a

Effects Common to All Alternatives

Current management provides opportunities for coal exploration and development; however, because there is limited resource potential and no coal leasing has occurred in the last 20 years, no development of federal coal or oil shale resources is anticipated. Therefore, no effects on water resources are expected from coal or oil shale management. Similarly, locatable mineral development in the planning area would likely remain uneconomical for the life of the RMP; therefore, no effects on water resources are expected. Effects of salable mineral developments on water resources would occur in specific areas, typically next to roads. Fluid mineral leasing stipulations would not preclude developing areas already leased. In these areas, surface-disturbing activities that could affect water quality and quantity would occur if leases were developed.

Effects from fluid mineral development would result from exploration and development, requiring the construction of roads, pipelines, pads, and facilities. This would involve vegetation clearing which can increase sediment runoff into waterways. Additionally, fluid mineral development may affect aquifers and groundwater resources, as described in **Appendix W**. The use of horizontal drilling technology and hydraulic fracturing for well stimulation is estimated to occur as part of 20-25 percent of the oil and gas development in the planning area.

Stipulations for fluid minerals leasing (**Appendix L**), and BMPs and mitigation measures (**Appendix F**) for surface-disturbing activities would likely reduce effects on water resources associated with authorized land uses or activities such as road, pipeline, or power line construction; mineral development; range improvements; and recreational activities. BMPs and mitigation would reduce the likelihood of removal of essential soil stabilizing agents, erosion and sedimentation, and contamination from spills and hazardous waste.

Requiring a reclamation plan (**Appendix F**) for all surface-disturbing activities across all alternatives would stabilize disturbed areas in the short term and stabilize landscapes in the long term, reducing potential effects from erosion and sedimentation.

Managing lands that the BLM administers to prevent contamination with hazardous substances would reduce the risk of spills and contamination into waterways associated with hazardous waste disposal or landfill facilities. Management of WSAs would contribute to localized protection of water resources.

Alternative A

All 19 hazard-class dams and fisheries with recreation facilities would be maintained. This would continue to effect watershed connectivity by decreasing the flowing water supply and flow rate downstream (Womack 2012). Effects would the physical characteristics of downstream rivers and streams would continue by maintaining flow patterns that are less variable and a higher percentage of dissolved solids than would naturally occur; this would decrease water quality.

Because impoundments are one of the primary contributors to impairment of streams in the planning area, effects from management for impoundments could have some of the greatest effects on water quality under this alternative. The number and volume of perennial and intermittent streams would likely remain higher than what

would naturally occur due to less variability in the flow of the watershed. The PFC ratings for assessed streams can be found in Section 2.4, Water Resources, of the AMS (BLM 2018).

Managing soil resources to maintain or improve soil conditions would continue to reduce effects on water quality by reducing and preventing erosion. The BLM would continue to apply mitigation measures for soils with high erosion susceptibility, steep slopes, sparse vegetation, and shallow soil depth before authorizing any surface-disturbing activity. Applying a fluid mineral CSU stipulation for extremely erodible and slumping soils on steep slopes and a TL stipulation for wet periods would continue to reduce the potential for effects on water quality in these sensitive areas. These measures may continue to reduce effects on water quality and quantity, and the physical characteristics of streams by mitigating the effects of soil erosion associated with surface-disturbing activities.

Current management does not specify actions for sensitive soils or the restoration of areas with soil degradation. Those areas not included in the stipulations or mitigation measures would continue to be at higher risk for erosion from authorized activities or resource uses and natural disturbances. They would continue to have greater opportunity to effect water quality and increase sediment levels in surface water.

In general, continuing to manage vegetation with the objective of enhancing its health and maintaining species diversity would reduce effects on water resources. Riparian/wetland vegetation communities would be managed to achieve or make significant and measurable progress toward Lewistown Standard 2: that riparian and wetland areas be in PFC. This would support actions that would reduce effects on plant vigor and water quality and quantity from erosion and sedimentation, as described in **Appendix W**. These actions would include designing management activities to maintain or improve riparian habitat conditions and to avoid riparian zones when establishing roads and utility corridors.

Because riparian conditions and water quality are directly related, and improvements to riparian/wetland conditions would tend to improve water quality, management to maintain or improve this vegetation could have some of the most significant effects on water quality under this alternative.

In general, fish and wildlife management would reduce effects on water resources by continuing to maintain and enhance suitable habitat for all wildlife species, with an emphasis on present and potential habitat for nesting waterfowl and fisheries. This management would maintain or improve the vegetation conditions necessary for preserving soil stability and preventing erosion, which would preserve water quality.

BLM-administered land would continue to be managed as Category B or C. Most riparian/wetland areas in the planning area are managed as Category B. At the watershed scale, unplanned fire could increase groundwater availability in the long term by reducing the demand on shallow water tables (Tucker and Marlow 2006). Short-term effects on water quality, such as sediment and nitrogen and phosphorus loading from prescribed burns and wildfires may also occur, as described in **Appendix W**.

Alternative A would manage 15,700 acres as VRM Class I, 105,000 acres as VRM Class II, 193,300 acres as VRM Class III, and 280,500 acres as VRM Class IV. In riparian/wetland areas, most lands are managed as VRM Class III and Class IV. To comply with these classifications, activities would be allowed that have a greater potential for surface-disturbing activities than those allowed under VRM Class I and Class II, increasing the potential for water quality effects from erosion and sedimentation, as described in **Appendix W**. VRM Class III and Class IV areas would also have greater potential for effects on the physical characteristics of water resources, compared with lands managed as VRM Class I and Class II.

Alternative A would not manage any additional acres as closed to fluid mineral leasing but would manage 58,300 acres as NSO and 281,700 acres as CSU. Managing buffers around floodplains, intermittent, ephemeral, and perennial streams, and undeveloped recreation areas as NSO and slopes over 30 percent as CSU can reduce the effects on water quality in these sensitive areas from potential spills and surface-disturbing activities associated with fluid mineral development. However, the LFO would continue to defer fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. (Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO).

Oil and gas development in the decision area would continue to be limited to leases not requiring special wildlife stipulations. Because of this, effects on water resources from fluid mineral development would continue to be low. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 456 acres; long-term disturbance could affect approximately 88 acres (**Table W-I, Appendix W**). On existing leases or new leases, water depletions could affect surface water and groundwater quantity.

Areas with fluid minerals NSO and CSU stipulations would have a decreased risk of impairment to water quality than those open to fluid mineral leasing. These effects are discussed in **Appendix W**. However, effects on water resources from fluid mineral development would continue to be low due to the deferral of fluid mineral leasing.

There would continue to be 14,600 acres closed to livestock grazing and 636,600 acres open to livestock grazing, with a forage allocation of 40 percent. Improper grazing has the potential to accelerate erosion rates and nutrient loads to surface water from trampled vegetation and soil compaction, as described in **Appendix W**. In lands closed to future livestock grazing, these types of water resource effects would not occur. The BLM would manage all allotments to meet the Standards for Rangeland Health (BLM 1997), which could reduce AUMs or remove livestock if necessary, thereby reducing potential effects.

Additionally, implementing mandatory rest periods of at least two growing seasons after major disturbances in areas open to grazing, would reduce effects on water resources by maintaining plant vigor and health and reducing overuse. Mechanical disturbance to riparian and wetland habitats associated with livestock trampling and surface-disturbing activities would also be minimized and managed to support PFCs.

Because livestock grazing is one of the primary causes of stream impairment in the planning area, management to reduce its effects would have some of the greatest effects on improving water quality under this alternative, and vice versa.

Managing for recreation and visitor services under Alternative A would restrict other resource uses that might otherwise affect water resources. However, effects on water resources from surface-disturbing activities described in **Appendix W** are likely to continue as a result of increased demand for recreation opportunities.

Because access is a limiting factor for recreation, the effects would likely be concentrated in existing SRMAs and ERMAs. Within the Judith ERMA, undeveloped recreation sites associated with fishing reservoirs could attract more concentrated use and associated effects.

Under Alternative A, 13,000 acres corresponding to the designated ACECs would continue to be managed as closed to OHV travel (and 2,700 acres would be closed to motorized travel), while the rest of the decision area would be designated as limited to designated routes (487,700 acres) and seasonal limitations (147,800 acres). Within areas where OHV travel is limited to designated routes, potential surface-disturbing effects on water resources would continue and could increase due to increased motorized vehicle use of existing routes.

In the acres closed to OHV travel, excessive erosion of uplands and stream channels and banks would be reduced. This would reduce effects on the natural stream conditions. Closed areas would experience less soil structure disturbance and disruption and removal of vegetation. This would limit erosion, sedimentation, and contamination of water bodies. Construction of new routes would cause surface disturbances that could lead to increased erosion or sedimentation, affecting water resources. **Table 4-20, Alternatives Comparison of Land Use Authorizations on Water Resources**, provides a quantitative summary of effects on water resources.

Under Alternative A, the BLM would continue to manage 15,700 acres of ROW exclusion areas and 378,700 acres of ROW avoidance areas in the planning area. ROW actions that could release pollutants capable of contaminating surface water during runoff or contaminating aquifers during groundwater recharge would not occur or would be limited in these areas. In addition, surface-disturbing activities, such as infrastructure development for wind energy, would be limited or prohibited in these areas.

Road and utility corridor development would be avoided in riparian zones if practicable, reducing the potential for effects from ROW development on these areas. On the remaining land not managed as exclusion or avoidance

areas, there would be fewer management actions implemented to prevent these effects from occurring. The severity of these direct and indirect effects would vary, depending on the different types of ROW activities, intensity of development, and site-specific conditions.

Managing 40,900 acres as available for disposal would allow for agricultural development on these lands, if purchased. Because agricultural and irrigated crop production are some of the primary contributors to impairment in the planning area, this management could allow for some of the greatest degradation to water quality under this alternative.

Alternative A would manage 5,400 acres as closed to harvesting timber, corresponding with ACECs and the WSAs. This would reduce the potential for surface-disturbing activities in these areas that result from timber management, as discussed in **Appendix W**. However, where timber harvest is allowed and where logging vehicles travel across or near water resources, increased sedimentation may occur, as described in **Appendix W**, effecting water quality. Following the water quality BMPs for Montana forests would reduce effects on water quality and would minimize the amount of sediment-laden overland flow that reaches stream channels.

The BLM would continue to manage 22,900 acres of ACECs/RNAs or research natural areas for purposes that directly or indirectly affect water resources. This includes 3 miles of streams listed under Section 303d of the Clean Water Act of 1972 (CWA). Limiting surface-disturbing activities (e.g., OHV travel, ROW authorizations, and disposal of forest products) in lands managed as ACECs would reduce effects on water resources by reducing sedimentation and erosion and the potential contamination or dewatering of groundwater sources.

Managing the Collar Gulch ACEC to restrict withdrawal of surface or groundwater when water supply is low and to enhance trout habitat would specifically help retain water quantity and quality, as well as the physical characteristics of the area. Management of these areas would continue to indirectly affect water resources by managing for other special resource values, such as vegetation. Under Alternative A, the BLM would not designate additional ACECs, and there would be no additional protection of water resources from ACEC management.

The 27 stream segments, covering approximately 89.9 miles of BLM-administered land, would continue to be identified as eligible for inclusion in the National Wild and Scenic River System ([NWSRS]; see **Appendix V**). The BLM would continue to manage the eligible segments according to interim protective management guidelines. The guidelines specify that BLM cannot take any actions that would degrade the ORV, degrade the free-flowing nature of the segment through impoundments, degrade water quality that is necessary to support the ORVs, or change the classification of the segment (level of development).

These guidelines would contribute to maintaining water conditions in these 27 segments only. Identifying streams as eligible for WSR designations, especially the six stream segments classified as recreational, could attract recreation; this could degrade water quality when river-based recreation removes streamside vegetation.

Alternative B

Management actions aimed at increasing watershed connectivity in the planning area would affect all indicators for surface water and groundwater. Decreasing the number of major surface water impoundments from 19 to 5 would increase the downstream flowing water supply, would increase the variability of stream flow, would create wider or narrower flow channels, and would reduce the percentage of dissolved solids, resulting in improved water quality, compared with Alternative A. Management of impoundments could result in some of the greatest improvements to water quality in the planning area under this alternative.

Under Alternative B, implementing adaptive climate management actions to target specific climate vulnerabilities could help reduce effects on water resources during drought and other climatic events. Considering climate variability when evaluating land use around streams and riparian and wetland areas would support water quantity, quality, and the physical characteristics of these areas in the long term. For example, the BLM could reduce conifer encroachment around a stream containing threatened and endangered fish in order to reduce evapotranspiration and runoff so that increased infiltration would augment base flows for the fish. The effects of climate variability on water resources are discussed in the context of other reasonably foreseeable future actions, under *Cumulative*.

Management actions to prioritize sensitive areas for soil protection, including biological soil crusts and sensitive soils, would reduce the potential for water quality effects in these areas, in comparison to Alternative A. By reducing soil compaction and supporting the health of soil-stabilizing vegetation, the potential for erosion and sedimentation into streams would be reduced. Requiring plans for mitigation would reduce the potential for continued water quality effects, in comparison to Alternative A. However, effects on water quality from erosion and sedimentation may still occur from natural processes in the planning area, especially during floods or periods of high precipitation, where sedimentation and nutrient deposit into streams would increase.

Under Alternative B, managing riparian and wetland vegetation communities with the objective of increasing the percentage of riparian wetland miles would improve or maintain the physical characteristics of riparian/wetland areas and promote properly functioning or sustainable conditions. In addition, restricting wetlands draining, burning, filling, or leveling would reduce direct effects on water quality from nutrient loading and sedimentation and would maintain water availability in these areas, in comparison to Alternative A. Management of riparian wetlands could result in some of the greatest improvements to water quality under this alternative.

Under Alternative B, management actions to restore priority habitat and to maintain and enhance habitat would generally indirectly reduce effects on water resources, in comparison to Alternative A. Specific actions to enhance fish and aquatic communities would further reduce effects on the physical characteristics of streams and those on water quality and quantity, in comparison to Alternative A.

Under Alternative B, the effects of fire on water resources would be similar to those described under Alternative A. Managing 5,800 more acres of riparian/wetlands as Category D would increase the potential for the use of prescribed fire in these sensitive areas, compared with Alternative A. This could increase groundwater availability in these areas, as described in **Appendix W**. At the watershed scale, unplanned fire and prescribed fires on acres managed as Category D could have greater short-term effects on water quality, as described in **Appendix W**, in comparison to those managed as Category B. However, emergency response actions under Alternative B to reduce effects of fire on water resources may limit or mitigate short-term effects from fire.

Under Alternative B, there would be 3.1 times more acres in the planning area managed as VRM Class II compared with Alternative A. In these areas there would be less potential for effects on the physical characteristics of water resources compared with lands managed as VRM Class III and Class IV. There would also be less potential for effects on water quality due to restrictions on surface-disturbing activities. In particular, the increase in acreage classified as VRM Class II in riparian and wetland communities would reduce the potential for direct effects on water resources in these areas.

Managing 202,400 more acres than under Alternative A for the protection of their wilderness characteristics would reduce the potential for effects on water resources in these areas from surface disturbance. Management would include ROW exclusions and restrictions on travel, energy development, and other surface-disturbing activities. Specifically managing riparian/wetland areas as ROW exclusion areas for new roads and utility corridors would reduce the potential for new effects on these areas from ROW development. Additionally, considering adjacent lands to identify new qualifying areas for lands with wilderness characteristics could reduce effects on water quality in other areas in the future. In particular, managing the 6,000 more acres in riparian and wetland vegetation communities for the protection of wilderness characteristics would reduce direct effects on water resources in these areas.

Under Alternative B, there would be 1.2 times fewer acres of federal mineral estate open to fluid mineral leasing than under Alternative A. There would be 12.8 times more acres where fluid minerals NSO stipulations would be applied and 14 percent fewer acres where CSU stipulations would be applied to fluid mineral leases than under Alternative A.

By managing more lands as closed to fluid mineral leasing, fewer actions could occur that might release pollutants capable of contaminating surface water during runoff or contaminating aquifers during groundwater recharge. Also, there would be fewer actions that could affect groundwater and surface water availability. By managing more acreage with fluid minerals NSO stipulations than under Alternative A there would be less potential for effects

from spills and surface-disturbing activities associated with fluid mineral development than those open to fluid mineral leasing.

Applying NSO stipulations would additionally protect these other water resources from fluid mineral development effects, compared with Alternative A. This would result not only within 1,000 feet of perennial or intermittent streams, but also within 1,000 feet of lakes, ponds, reservoirs, 100-year floodplains, wetlands, and riparian areas.

Closing state-designated source water protection areas to fluid mineral leasing and geologic exploration would provide additional protection to these water resources from development and exploration effects. Implementing a CSU stipulation for the Madison Aquifer would help prevent effects on water quality and quantity in the recharge areas, compared with Alternative A.

Unlike Alternative A, fluid mineral leasing would not be deferred under Alternative B; therefore, new fluid mineral leasing would be more likely to affect water quality, quantity, and the physical characteristics of the watershed under Alternative B. However, overall short-term and long-term surface disturbance effects would be similar to Alternative A.

On BLM-administered lands, approximately 330 total acres in the short term could be disturbed by access roads, flow lines, and well pads; approximately 72 acres could be disturbed in the long term (**Table W-1, Appendix W**). These effects are discussed in **Appendix W**.

Under Alternative B, 2.1 times more acres would be unavailable for livestock grazing than under Alternative A, reducing the potential for some of the greatest effects on water quality from improper grazing, as described in **Appendix W**. In addition, forage allocation on grazed acres would be 50 percent less under Alternative B than under Alternative A.

Although the types of effects would be the same as under Alternative A, this combined reduction in acres grazed and percentage allowable for forage could profoundly reduce the magnitude of effects from grazing, compared with Alternative A, especially during periods of drought. For example, White et al. (1983) found that sediment yield was 20 percent higher in a grazed watershed, compared to an ungrazed watershed, while Olness et al. (1975) found that sedimentation was worse in heavily grazed areas than in areas of rotational or lighter use. Additional management during drought periods would further reduce the potential effects on water resources during these periods where effects might be greater.

Surface use stipulations for and around recreation areas are more extensive than under Alternative A. They reduce the potential for water quality effects from the surface-disturbing activities caused by fluid mineral development and described in **Appendix W**. Reduced OHV recreation use would reduce the effects on water quality described under Alternative A, although effects would still occur in localized areas.

The types of effects from OHV travel designations would be the similar to those described under Alternative A. However, there would be no acres closed to OHV travel, 15 percent fewer acres where OHV travel is limited to designated routes, and 5.1 times fewer acres where OHV travel is seasonally limited than under Alternative A. However, Alternative B would have less potential for effecting water resources than under Alternative A because 209,000 acres would be closed to all motorized use, which includes OHVs and motorized travel for administrative purposes. Types of effects would be the same as described under Alternative A. The types of effects on water resources would be the same as described under Alternative A. However, 8.3 times fewer acres in the planning area would be managed as open to ROWs, and 17.8 times more acres would be managed as ROW exclusion. Therefore, effects on water resources from ROW authorizations on BLM-administered lands would be less than under Alternative A. In particular, riparian and wetland areas would be managed as ROW exclusion, reducing the potential direct effects on water resources in these areas, in comparison to Alternative A.

Managing only 9,800 acres as available for disposal, a 76 percent decrease from Alternative A, would reduce the potential for effects from agricultural and irrigated crop development, one of the greatest contributors to impairment, as compared with Alternative A.

Under Alternative B, 45.7 times more acres of land in the planning area would be closed to timber harvest than under Alternative A, reducing the effects from timber harvest, in comparison to Alternative A. The effects in areas where timber harvesting is allowed would be the same as described under Alternative A.

Under Alternative B there would be 40 percent more acreage managed as ACECs than under Alternative A. The expansion of the Collar Gulch ACEC and management as ROW exclusion would protect a larger portion of the associated watersheds from the surface-disturbing effects described in **Appendix W**. The effects of managing ACECs would be similar to those under Alternative A.

Determining 89.9 miles of stream segments as suitable for inclusion in the NWSRS would result in added protection to water resources, compared with Alternative A, by formalizing the interim protective measures, and implementing ROW and energy development restrictions.

Alternative C

The effects on water resources from surface water impoundments management would be similar to those described under Alternative A. Management actions under Alternative C would likely increase the percent of streams in PFC, reducing the potential for direct effects on water resources, as described under Alternative A. The effects on water quality from management for soil resources would be similar to those described under Alternative A. However, implementing BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would help reduce effects on water quality by limiting soil erosion caused by surface-disturbing activities.

Under Alternative C, effects from adaptive management for climate variability would be the same as those described under Alternative B. Under Alternative C, effects from management actions for vegetation communities would generally be the same as those described under Alternative A. The percentage of riparian and wetland miles in PFC would likely increase, though at a slower rate than under Alternative A due to the increase in percentage of forage under Alternative C. Restricting draining, burning, filling, or leveling wetlands would result in the same added protection for water quality from fluid mineral leasing, as described under Alternative B.

Under Alternative C, management actions to restore habitat for special status species, in addition to maintaining and enhancing habitat, would generally indirectly reduce effects on water resources, in comparison to Alternative A. Specific actions to enhance fish and aquatic communities would further reduce effects on the physical characteristics of streams and on water quality and quantity, in comparison to Alternative A.

The effects of fire and fuels management on water resources under Alternative C would be the same as those described under Alternative A; however, there would be 6 percent more acres managed as Category B and 12 percent fewer acres managed as Category C than under Alternative A. There would be less opportunity for effects from prescribed fire for these acres than under Alternative A.

Under Alternative C, 52 percent more acres would be managed as VRM Class III and 22 percent more acres would be managed as VRM Class IV than under Alternative A. The area managed as VRM Class I and Class II would decrease; 5.8 times fewer acres would be managed as VRM Class I and 7.5 times fewer acres would be managed as VRM Class II than under Alternative A. The decrease in class for much of the decision area would allow for more effects on the physical characteristics of water resources and a greater potential for surface-disturbing activities that could affect water quality than under Alternative A.

Under Alternative C, there would be approximately the same number of acres of federal mineral estate open to fluid mineral leasing as under Alternative A. There would be 7.1 times more acres where fluid minerals NSO stipulations would be applied and 2.5 times fewer acres where CSU stipulations would be applied to fluid mineral leases than under Alternative A. By having more acreage with NSO stipulations than under Alternative A, there would be less potential for effects from potential spills and surface-disturbing activities associated with fluid mineral development than those open to fluid mineral leasing or those with fluid minerals CSU stipulations. Effects from NSO stipulations related to water resources would be the same under Alternative C as those described under Alternative A.

In areas open to fluid mineral leasing, effects would be from the increased risk of water quality impairment through spills, leaks, or increased erosion and sedimentation and the risk of water depletions during production. However, overall short-term and long-term surface disturbance effects would be similar to Alternative A.

On BLM-administered lands, approximately 384 total acres could be disturbed in the short term from access roads, flow lines, and well pads; in the long term, approximately 79 acres could be disturbed (**Table W-1, Appendix W**). The types of effects of fluid mineral leasing on water resources under Alternative C would be the same as those described under Alternative A.

Developing appropriate design features or conditions of approval for oil and gas operations near residences using a groundwater well or spring would result in the same effects on domestic water supplies as under Alternative B. Fluid minerals NSO stipulations to protect fisheries, fishing reservoirs, special status fisheries, and water bird nesting colonies would additionally reduce the potential for direct effects on water resources from fluid mineral leasing.

Although Alternative C would open the same number of acres to livestock grazing as under Alternative A, the effects could be much greater due to an increased percentage of allowable forage from 40 to 60 percent. The types of effects of livestock grazing under Alternative C would be the same as those described under Alternative A; however, the magnitude of effect could be much greater, depending on the season of use and especially during droughts. In addition, the absence of a minimum rest period after major disturbances under Alternative C could compound the increased forage allocation and would indirectly allow for greater effects on water resources from overuse than under Alternative A. Because livestock grazing is a primary cause of impairment, management for grazing could have some of the greatest effects on water quality under this alternative.

Under Alternative C, the development of staging and parking areas and other recreation facilities and increasing accessibility to recreation areas (e.g., Snowy Mountains ERMA) could result in additional surface disturbance. This would increase the potential for effects on water quality, in comparison to Alternative A. Surface use stipulations for and around recreation areas would be similar to those under Alternative B and would reduce the potential for effects on water resources from fluid mineral development, in comparison to Alternative A. Other effects would be similar to those described under Alternative A.

Under Alternative C, the types of effects from OHV travel designations would be similar to those described under Alternative A. However, consideration of at-risk watersheds and riparian resources when determining designation criteria would minimize effects on water resources, in comparison to Alternative A and as described under Alternative B.

The types of effects of land use authorizations on water resources would be the same as those described under Alternative A. However, 1.2 times fewer acres in the planning area would be managed as open to ROWs, 5.8 percent more acres would be managed as ROW exclusion, and 1.1 times more acres would be managed as ROW avoidance than under Alternative A. Therefore, there would be reduced effects on water resources from ROW authorizations than under Alternative A. In particular, fewer acres of riparian and wetland areas would be managed as open to ROWs, reducing the potential for direct effects on water quality in these areas, although road and utility corridor development would be avoided in these areas if practicable under both alternatives. Effects from disposal of BLM-administered lands would be the same as those described under Alternative B.

Alternative C would close half the acres of land closed to timber harvest closed under Alternative A, increasing the potential for effects from timber harvest, in comparison to Alternative A. The effects in areas where timber harvesting is allowed would be the same as those described under Alternative A. Adhering to the Montana Water Quality BMPs would limit effects on water resources from erosion.

No areas would be designated as ACECs; therefore, there would be no special management for the protection of the relevant and important values of the potential ACECs, which could indirectly benefit water resources. ROW development would be possible under Alternative C and could have the same effects as described under Alternative A.

Releasing the 27 stream segments, or 89.9 miles of streams, from interim management protections would increase the risk of authorized surface-disturbing activities affecting water resources, in comparison to Alternative A. However, BMPs, mitigation measures, and water resource stipulations for fluid mineral leases would continue to limit surface-disturbing activities on or near these streams.

Alternative D

Management actions aimed at increasing or maintaining the connectivity of watersheds in the planning area could affect all indicators for surface water and groundwater. Decreasing the number of major surface water impoundments from 19 to 11 would increase the water quantity for instream flow and would have effects similar to those described under Alternative B. However, this would only effect approximately 55 percent of the miles reconnected by removing impoundments under Alternative B, resulting in improved water quality, in comparison to Alternative A.

Under Alternative D, effects from adaptive management for climate would be similar to those described under Alternative B; however, they would be more pronounced, because the stocking rate is 50 percent greater under Alternative D. Increased utilization by livestock can affect the capacity of the rangelands/watersheds to buffer against drought effects and climate variability. This would be due to increased potential for sedimentation, as described in **Appendix W**.

Effects on water resources from management activities for soil resources under Alternative D would be similar to those under Alternative B. Management actions to prioritize sensitive areas for soil protection, including biological soil crusts and sensitive soils, would reduce the potential for water quality effects in these areas, in comparison to Alternative A. By reducing soil compaction and supporting the health of soil-stabilizing vegetation, the potential for erosion and sedimentation into streams would be reduced.

Requiring plans for mitigation and practicing BMPs would also reduce the potential for continued water quality effects, in comparison to Alternative A. However, effects on water quality from erosion and sedimentation may still occur from natural processes in the planning area, especially during floods or periods of high precipitation, where sedimentation and nutrient deposit into streams would increase. Under Alternative D, riparian and wetland communities would be managed to increase the percentage of lotic riparian wetland miles in PFC or DFC or their capability by incorporating design features, applying a fluid minerals NSO stipulation within riparian and wetland areas, and applying a fluid minerals CSU stipulation within 300 feet of riparian and wetland areas.

Establishing riparian management zones and allowable use stipulations in water, riparian and wetland areas, and floodplains would reduce the potential for effects on water quality and quantity associated with authorized use activities, as described in **Appendix W**. Restrictions on draining, burning, filling, or leveling of wetlands would reduce the direct effects on water quality from nutrient loading and sedimentation, as well as maintaining water availability in these areas, in comparison to Alternative A.

Management actions to protect fish and wildlife and special status species would continue to indirectly reduce effects on water resources under Alternative D in the same ways as under Alternative A. Maintaining cold and warm water priority habitats for native fish and aquatic communities, in combination with MFWP fish management objectives, would additionally reduce the potential for effects on water resources, in comparison to Alternative A.

In riparian and wetland areas, the effects of fire on water resources would be similar to those described under Alternative A. Managing 24 percent fewer acres as Category B and managing 46 percent more acres as Category C would increase the potential for the use of prescribed fire in the additional acres managed as Category C, in comparison to Alternative A. This could increase groundwater availability in these areas and the potential for short-term effects on water quality, as described in **Appendix W**, in comparison to those managed as Category B.

Under Alternative D, there would be a 21 percent more acres managed as VRM Class II and 22 percent more acres managed as VRM Class III than under Alternative A. In these areas there would be less of a chance of effects on the physical characteristics of water resources, compared with lands managed as VRM Class IV and

undesigned under Alternative A. There would also be less chance of effecting water quality due to restrictions on surface-disturbing activities.

Under Alternative D, there would be 1 percent fewer acres of federal mineral estate open to fluid mineral leasing than under Alternative A. There would be 8.1 times more acres where fluid minerals NSO stipulations would be applied, and 2.2 times more acres where CSU stipulations would be applied to fluid mineral leases than under Alternative A. By managing more lands as closed to fluid mineral leasing, fewer actions could occur that might release pollutants capable of contaminating surface water during runoff or contaminating aquifers during groundwater recharge. Also, fewer actions would occur that could affect groundwater and surface water availability.

By having more acreage with fluid minerals NSO and CSU stipulations than under Alternative A, there would be less potential for effects from potential spills and surface-disturbing activities associated with fluid mineral development than those open to fluid mineral leasing. Surface use stipulations for recreation and visitor services, especially on fishing reservoirs, would restrict fluid mineral leasing that could otherwise result in surface-disturbing activities and water quality effects. Stipulations related to water resources would be the same as those described under Alternative B; however, they would not include a CSU stipulation for the Madison Aquifer.

However, overall short-term and long-term surface disturbance effects would be similar to Alternative A. On BLM-administered lands, approximately 366 acres could be disturbed in the short term from access roads, flow lines, and well pads; in the long term, approximately 77 acres could be affected (**Table W-1, Appendix W**). These effects are discussed in **Appendix W**.

The effects of livestock grazing on water resources under Alternative D would be similar to those described under Alternative A. The acres available and unavailable for grazing are the same under both alternatives, and both would allocate approximately 40 percent forage for grazing. However, Alternative D would include more site-specific determinations of grazing management, which would allow for more flexibility and informed decision-making.

Increased access opportunities and concentrated recreation sites, especially near reservoirs and creeks (e.g., parts of the Judith ERMA), would allow for increased effects from surface-disturbing activities in these areas, in comparison to Alternative A, as described in **Appendix W**.

The effects of travel management under Alternative D would be similar to those described under Alternative C.

The types of effects on water resources from land use authorizations would be the same under Alternative D as those described under Alternative A. However, 27 percent fewer acres would be managed as open to ROWs, so effects on water quality from surface-disturbing activities would be less than those described under Alternative A. Effects from disposal of BLM-administered lands would be the same as those described under Alternative B.

The effects of commercial timber harvesting would be similar to those effects discussed under Alternative C. However, 25.8 times more acres would be managed as closed to forest product sales and harvest. In these areas, there would be no effects associated with the use of logging equipment.

The effects of managing ACECs would be similar to those discussed under Alternative A. However, managing 14 percent more acres as ACECs, especially by including more restrictions in the Collar Gulch and Chicago Gulch watersheds, would reduce the potential for direct and indirect effects on water quality in these areas, in comparison to Alternative A. ROW development within these areas would be possible under Alternative D and could have the same effects as described under Alternative A, although management would be more protective.

Effects from management of WSRs would be the same as those described under Alternative C.

Cumulative

The cumulative effect analysis area used to analyze cumulative effects on water quality and watershed resources extends outside of the planning area, following fourth-order watershed boundaries. In particular, the mountainous areas upstream of BLM-administered lands were included, given that actions in these areas would have effects

downstream in BLM-administered areas. Fourth-order watersheds were used as the basic unit of analysis because effects from most management actions proposed under the RMP are not expected to have cumulative, hydrologic influence beyond this scale.

Given that the hydrologic influence of the surrounding area is primarily focused in the stream channels and that delineation of the analysis area was based on watershed boundaries, the area of analysis is sufficient.

There are approximately 2,821 acres of total surface disturbance from ROW authorizations in the planning area. ROW authorizations have increased in the past and are anticipated to increase in the future to accommodate development. These activities cause surface disturbances by removing vegetation, displacing and compacting soils, and altering soil structure. The result is exposed surfaces that increase the potential for runoff and erosion, which delivers sediment and contaminants to nearby waterways. Sedimentation in waterways can change water chemistry and have geomorphic adjustments that could have negative effects on stream function. ROW actions, such as increasing recreation development on rivers, have affected water quality directly. These effects would continue as ROW actions continue to increase in number.

A history of oil and gas leasing has affected water quality through surface-disturbing actions resulting in erosion and sedimentation into streams. These activities, in combination with increased ROW actions and continued effects from grazing, could continue to effect water quality. Fluid mineral development has also affected water quantity, through consumptive use and withdrawals. These effects, combined with other uses such as irrigation for agriculture, could reduce groundwater availability. Oil and gas leasing is expected to remain stable for the life of the RMP, due to a limited amount of land remaining with high potential for development. Therefore, the effects caused by fluid mineral leasing are likely to remain the same in the future.

Livestock grazing has created impoundments for stock water, surface disturbances to riparian vegetation and soils, and transportation of nutrients into surface water, effecting both water quantity and quality. Grazing has generally decreased in the past and is expected to remain stable or to continue to slightly decrease in the future due to a lack of area for new development.

Irrigated agriculture for growing winter feed or supplemental forage for livestock grazing is a major consumptive use of water. Changes in BLM forage allocations for livestock could affect the amount of water necessary to support livestock grazing operations. For example, decreases in BLM forage availability could require increases in water use for irrigation to offset that forage loss. Or irrigated hay for winter feed could be changed to a different crop with greater or lesser water requirements. However, given the predominance of private land in the planning area, it is unlikely that changes in BLM-authorized forage availability would make measurable changes to consumptive use of water for irrigated agriculture. Therefore, the continued use of livestock impoundments, combined with water for fluid mineral development and irrigation, could reduce water availability in the future.

Water quality degradation from livestock grazing and irrigation for supplemental feed on lands not administered by the BLM have major effects on the water quality of surface water systems that run through or are hydrologically connected to BLM-administered lands. Vegetation removal from livestock grazing, in combination with surface-disturbing activities from ROW and fluid mineral development, could contribute to increased erosion and sedimentation into streams, resulting in decreased water quality, higher stream temperatures, and wider stream channels. Contamination from livestock waste into streams, combined potential hazardous material spills from motorized vehicles, and fluid mineral development could contribute to decreased water quality.

Recreation has increased in the past and is expected to increase in the future. The increase of vehicle-based recreation, in combination with other surface-disturbing activities, could increase sediment levels in water. Increased recreation on and near rivers would increase the potential for direct effects on water quality, as previously described.

Past development of impoundments to store surface water for stock water, wildlife, and fisheries has decreased water availability and quality downstream. However, the rate of development of impoundments has decreased, along with other surface water appropriations, and is expected to continue to decrease in the future. In contrast, the construction of domestic wells and irrigation wells in Montana has increased in the past 20 years (Metesh 2012); it is anticipated to continue to grow in proportion to population growth. Although some wells have been

plugged in the planning area, continued growth of wells is expected; this, in combination with groundwater use for fluid mineral development, would continue to effect groundwater availability as well as the replenishment of surface water resources where groundwater reaches the surface in seeps and springs.

Climate models predict a long-term increase in temperature and precipitation in Montana (BLM 2010). In addition, a decrease is anticipated in the snowpack, which provides water to unregulated streams, prairie streams, and intermittent streams in spring and summer (BLM 2010). This, combined with rising temperatures, could affect water availability during warmer months, when water demand is highest. An increase in precipitation during these months may somewhat mitigate these issues by contributing to a short-term increase in stream flow on mountain, prairie, and ephemeral streams.

As described in the AMS (BLM 2018), temperature is one of the primary causes for impairment of streams in the planning area. Higher temperatures, in combination with an expected increase in the occurrence and severity of wildfires and the removal of vegetation from surface-disturbing activities could raise stream temperatures and alter their physical characteristics so that they are no longer functional or sustainable; however, the application of BMPs and mitigation measures will help meet the objective of achieving 80 percent of lotic riparian-wetland in PFC.

Under all alternatives, the BLM’s ability to influence water resource conditions through management actions is directly proportional to the BLM’s relative administration of lands. As described in the AMS (BLM 2018), the BLM manages only a small percentage of water bodies in the planning area and the magnitude of effects on water resources from BLM management are expected to be commensurate. Water resources would be protected under all alternatives due to management in accordance with the CWA, the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota (BLM 1997), and other applicable state and federal water quality standards. Adhering to these standards would reduce many of the effects from future actions.

Site-specific mitigation and BMPs for surface-disturbing activities under Alternatives B, C, and D would further reduce effects on water resources, in comparison to Alternative A. Actions under Alternative B would close the most acres to ROW developments, fluid mineral leasing, and OHV travel, resulting in the greatest reduction of effects from surface-disturbing activities.

Alternatives B and D would result in the greatest reduction of effects from livestock grazing. Decreasing the percent of watershed disconnected by impoundments under Alternative B and D would contribute to greater water flow and water quality than under Alternatives A and C. However, approximately 90 percent of the impoundments in the planning area exist on lands not administered by the BLM, and the BLM would have little authority over how these water bodies would be managed.

4.2.4 Vegetation Communities
Comparative Effect Summary Tables

Table 4-21 through Table 4-27 provide a summary of quantitative effects on water resources by alternative.

Table 4-21
Comparison of Fire Management Categories by Priority Vegetation Type Under Each Alternative (Acres)

Vegetation Type	Fire Management Category	Alternative			
		A	B	C	D
All Priority Vegetation Types	B	426,500	322,900	452,800	322,900
	C	223,700	129,800	197,200	327,100
	D	0	197,200	0	0
Ponderosa Pine Breaks and Badlands	B	52,200	51,600	52,200	51,600
	C	120,200	600	120,200	120,900
	D	0	120,200	0	0

Vegetation Type	Fire Management Category	Alternative			
		A	B	C	D
Montane Forests and Meadows	B	65,500	3,200	79,200	3,200
	C	13,700	75,900	0	75,900
	D	0	0	0	0
Sagebrush/Grasslands	B	269,500	239,400	271,000	239,400
	C	72,100	31,600	70,500	102,100
	D	0	70,500	0	0
Grasslands	B	8,700	2,400	19,000	2,400
	C	10,300	16,600	0	16,600
	D	0	0	0	0
Riparian/Wetland Communities	B	17,000	14,900	17,600	14,900
	C	6,400	2,700	5,800	8,400
	D	0	5,800	0	0
Other	B	13,600	11,400	13,800	11,400
	C	1000	2,400	700	3,200
	D	0	700	0	0

Source: BLM GIS 2015a

Table 4-22
Comparison of VRM Classes by Priority Vegetation Type Under Each Alternative (Acres)

Vegetation Type	VRM Class	Alternative			
		A	B	C	D
All Priority Vegetation Types	I	15,800	16,900	2,700	15,900
	II	105,000	329,400	14,100	125,400
	III	193,300	92,300	292,900	235,500
	IV	280,500	212,400	341,500	274,500
	Unassigned	56,800	0	0	0
Ponderosa Pine Breaks/Badlands	I	0	0	0	0
	II	22,600	141,400	0	75,100
	III	80,500	13,100	131,900	71,600
	IV	67,300	18,400	41,000	26,300
	Unassigned	2,600	0	0	0
Montane Forests and Meadows	I	10,500	11,100	1,700	10,600
	II	37,100	41,600	9,200	3,300
	III	3,900	19,500	40,500	57,900
	IV	400	7,200	28,100	7,700
	Unassigned	27,600	0	0	0
Sagebrush/Grasslands	I	300	600	300	300
	II	36,800	125,700	400	37,800
	III	98,300	50,000	101,100	87,400
	IV	194,200	165,500	240,000	216,300
	Unassigned	12,200	0	0	0
Grasslands	I	4,900	5,100	700	4,900
	II	2,900	6,800	4,400	4,800
	III	900	4,900	8,900	7,200
	IV	600	2,300	5,100	2,100
	Unassigned	9,900	0	0	0
Riparian/Wetland Communities	I	100	100	0	100
	II	3,200	10,800	100	4,000
	III	5,200	2,700	8,400	7,700
	IV	12,000	9,800	14,800	11,700
	Unassigned	2,900	0	0	0

Vegetation Type	VRM Class	Alternative			
		A	B	C	D
Other	I	0	0	0	0
	II	2,400	3,100	0	400
	III	4,500	2,100	2,100	3,700
	IV	6,000	9,800	12,500	10,400
	Unassigned	1,600	0	0	0

Source: BLM GIS 2015a

**Table 4-23
Comparison of Fluid Minerals Leasing Stipulations by Priority Vegetation Type Under Each Alternative (Acres)**

Vegetation Type	Fluid Minerals Leasing Stipulation	Alternative			
		A	B	C	D
All Priority Vegetation Types	Closed to fluid mineral leasing	2,000	195,600	2,000	6,900
	Open to fluid mineral leasing subject to standard stipulations	604,000	410,000	604,000	599,000
	Open to fluid mineral leasing subject to NSO	18,500	376,300	272,300	352,700
Ponderosa Pine Breaks/Badlands	Closed to fluid mineral leasing	0	103,200	0	1,500
	Open to fluid mineral leasing subject to standard stipulations	167,400	64,200	167,400	165,900
	Open to fluid mineral leasing subject to NSO	1,800	57,600	21,300	84,700
Montane Forests and Meadows	Closed to fluid mineral leasing	1,200	9,400	1,200	1,700
	Open to fluid mineral leasing subject to standard stipulations	64,500	56,200	64,500	64,000
	Open to fluid mineral leasing subject to NSO	8,200	52,000	18,500	13,300
Sagebrush/Grasslands	Closed to fluid mineral leasing	200	75,900	200	2,900
	Open to fluid mineral leasing subject to standard stipulations	329,000	8,400	329,000	326,300
	Open to fluid mineral leasing subject to NSO	5,500	233,600	210,600	230,500
Grasslands	Closed to fluid mineral leasing	500	900	500	700
	Open to fluid mineral leasing subject to standard stipulations	8,800	600	8,800	8,700
	Open to fluid mineral leasing subject to NSO	900	7,500	2,500	2,300
Riparian/Wetland Communities	Closed to fluid mineral leasing	0	5,700	0	100
	Open to fluid mineral leasing subject to standard stipulations	21,000	15,400	21,000	20,900
	Open to fluid mineral leasing subject to NSO	1,900	14,800	11,500	13,900
Other	Closed to fluid mineral leasing	0	500	0	100
	Open to fluid mineral leasing subject to standard stipulations	13,400	12,800	13,400	13,200
	Open to fluid mineral leasing subject to NSO	300	10,800	7,800	8,000

Source: BLM GIS 2015a

Table 4-24
Comparison of Grazing Allocations by Priority Vegetation Type Under Each Alternative (Acres)

Vegetation Type	Grazing Allocation	Alternative			
		A	B	C	D
All Priority Vegetation Types	Available to livestock grazing	645,800	439,500	648,400	531,600
	Unavailable to livestock grazing	5,400	211,700	2,700	119,600
Ponderosa Pine Breaks/Badlands	Available to livestock grazing	171,500	65,400	172,900	103,500
	Unavailable to livestock grazing	1,400	107,500	0	69,500
Montane Forests and Meadows	Available to livestock grazing	77,800	65,200	77,800	68,700
	Unavailable to livestock grazing	1,700	14,300	1,700	10,800
Sagebrush/Grasslands	Available to livestock grazing	340,300	263,700	341,500	310,700
	Unavailable to livestock grazing	1,600	78,100	300	31,100
Grasslands	Available to livestock grazing	18,400	13,900	18,400	14,100
	Unavailable to livestock grazing	700	5,200	700	5,000
Riparian/Wetland Communities	Available to livestock grazing	23,300	17,300	23,400	20,200
	Unavailable to livestock grazing	0	6,100	0	3,200
Other	Available to livestock grazing	14,500	13,900	14,500	14,500
	Unavailable to livestock grazing	0	500	0	0

Source: BLM GIS 2015a

Table 4-25
Comparison of Travel Management by Priority Vegetation Type Under Each Alternative (Acres)

Vegetation Type	Travel Management	Alternative			
		A	B	C	D
All Priority Vegetation Types	Closed to motorized travel*	2,700	209,000	2,700	2,700
	Closed to OHV travel	13,000	0	0	0
	Restricted seasonally for OHV travel**	147,800	28,700	147,800	147,800
	Limited to designated routes for OHV	487,600	413,500	500,600	487,600
Ponderosa Pine Breaks/Badlands	Closed to motorized travel*	0	106,100	0	0
	Closed to OHV travel	0	0	0	0
	Restricted seasonally for OHV travel**	81,700	9,400	81,700	81,700
	Limited to designated routes for OHV	91,200	57,400	91,200	91,200
Montane Forests and Meadows	Closed to motorized travel*	1,700	14,200	1,700	1,700
	Closed to OHV travel	8,800	0	0	0
	Restricted seasonally for OHV travel**	0	0	0	0
	Limited to designated routes for OHV	69,000	65,300	77,800	69,000
Sagebrush/Grasslands	Closed to motorized travel*	300	77,100	300	300
	Closed to OHV travel	0	0	0	0
	Restricted seasonally for OHV travel**	61,200	18,500	61,200	61,200
	Limited to designated routes for OHV	280,300	246,200	280,300	280,300

Vegetation Type	Travel Management	Alternative			
		A	B	C	D
Grasslands	Closed to motorized travel*	700	5,000	700	700
	Closed to OHV travel	4,200	0	0	0
	Restricted seasonally for OHV travel**	0	0	0	0
	Limited to designated routes for OHV	14,200	14,100	18,400	14,200
Riparian/Wetland Communities	Closed to motorized travel*	0	6,100	0	0
	Closed to OHV travel	0	0	0	0
	Restricted seasonally for OHV travel**	18,800	600	4,500	4,500
	Limited to designated routes for OHV	4,500	16,700	18,900	18,800
Other	Closed to motorized travel*	0	500	0	0
	Closed to OHV travel	0	0	0	0
	Restricted seasonally for OHV travel**	400	100	400	400
	Limited to designated routes for OHV	14,100	13,800	14,100	14,100

Source: BLM GIS 2015a

*Prohibits all motorized travel, including administrative and permitted uses.

**Limited to designated routes for OHV when not restricted.

Table 4-26
Comparison of Rights-of-Way and Special Use Authorization Management by Priority
Vegetation Type Under Each Alternative (Acres)

Vegetation Type	ROW Allocation	Alternative			
		A	B	C	D
All Priority Vegetation Types	ROW avoidance	378,700	341,500	345,500	446,600
	ROW exclusion	15,700	278,800	2,700	18,000
	Open to ROWs	270,500	30,800	302,900	186,600
Ponderosa Pine Breaks/Badlands	ROW avoidance	59,000	43,200	58,900	125,800
	ROW exclusion	0	127,500	0	100
	Open to ROWs	113,900	2,300	114,000	47,000
Montane Forests and Meadows	ROW avoidance	18,600	40,600	300	100
	ROW exclusion	10,500	30,300	1,700	10,900
	Open to ROWs	59,800	8,600	77,500	68,400
Sagebrush/Grasslands	ROW avoidance	262,700	224,700	260,900	288,100
	ROW exclusion	300	101,800	300	1,600
	Open to ROWs	78,800	15,400	80,600	52,100
Grasslands	ROW avoidance	10,700	10,600	200	4,000
	ROW exclusion	4,900	6,300	700	5,100
	Open to ROWs	7,900	2,200	18,100	10,000
Riparian/Wetland Communities	ROW avoidance	15,700	11,800	14,100	17,400
	ROW exclusion	100	10,500	0	100
	Open to ROWs	7,600	1,100	9,300	5,900
Other	ROW avoidance	12,000	10,700	11,200	11,300
	ROW exclusion	0	2,400	0	100
	Open to ROWs	2,400	1,400	3,300	3,300

Source: BLM GIS 2015a

Table 4-27
Comparison of ACECs by Priority Vegetation Type Under Each Alternative (Acres)

Priority Vegetation	Alternative A	Alternative B	Alternative C	Alternative D
Ponderosa pine breaks/badlands	1,400	1,400	200	1,400
Montane forests and meadows	5,100	17,800	0	12,900
Sagebrush/grasslands	1,300	3,000	4,200	2,400
Grasslands	100	8,900	0	8,800
Riparian/wetland communities	0	500	100	400
Other	0	300	700	0
Total	8,000	31,900	5,200	26,000

Source: BLM GIS 2015a

Effects Common to All Alternatives

Managing to protect major paleontological resources of scientific interest and caves and karst may provide incidental protection of priority vegetation types; however, this effect would occur only in localized areas.

Under all alternatives, the BLM could, as needed, change permit terms, adjust AUMs for livestock, implement grazing systems, require rotation or deferment, and impose utilization limits. It also could implement additional measures, such as range improvements, as necessary and feasible to reduce effects. Intensive livestock management can reduce the magnitude of the effects listed above by allowing vegetation to adequately rest and recover between periods of domestic grazing. However, vegetation may be damaged until it is detected and management is changed.

Current management provides opportunities for coal exploration and development; however, because there is limited resource potential and no coal leasing has occurred in the last 20 years, no development of federal coal or oil shale resources is anticipated. Therefore, no effects on priority vegetation communities are expected from coal or oil shale management. Similarly, locatable mineral development in the planning area would likely remain uneconomical for the life of the RMP; therefore, no effects on vegetation communities are expected.

Nonenergy solid leasable mineral interest primarily consists of prospecting permits for diamonds and garnets, and this level of interest is anticipated to stay the same for the life of the RMP. Nonenergy solid leasable mineral prospecting would have a negligible localized effect on vegetation communities.

Effects from salable mineral developments include direct vegetation removal or trampling; however, salable mineral development is primarily for sand and gravel needed for road surfacing and generally requires limited access and development. Therefore, the effects of salable mineral developments on vegetation communities would occur in localized areas, typically next to roads.

Fluid mineral leasing stipulations would not avoid developing areas already leased. In these areas, vegetation removal, trampling, and fragmentation would occur if leases were developed.

Recreation in the planning area is expected to continue and may affect all priority vegetation communities by trampling, fragmentation, soil compaction, and increased likelihood of invasive or noxious weed spread. Recreation activities are dispersed throughout the planning area, thus minimizing effects in any one location. However, more intensive effects would occur in areas that are heavily used. In the riparian and wetland priority vegetation community, recreation could affect stream functionality and vegetation structural diversity through removal, trampling, or disturbance of vegetation and soils. Recreation use in the montane forests and meadows priority vegetation community could lead to erosion and sedimentation of cold water aquatic priority habitats.

Under all alternatives, management of the Square Butte WSA would afford protections from surface-disturbing activities to 500 acres of grasslands, 1,200 acres of montane forests and meadows, 200 acres of sagebrush/grasslands, and fewer than 50 acres of riparian and wetland communities and ponderosa breaks/badlands (BLM GIS 2015a). Considering the size of the WSA, the effects would be localized.

Managing BLM-administered lands to prevent contamination with hazardous substances would provide long-term, widespread protection to priority vegetation communities from risks associated with hazardous waste disposal or landfill facilities.

Continued use of the Missouri Breaks Back Country Byway would affect the ponderosa pine breaks and badlands priority vegetation type through the risk of spreading noxious or invasive weeds, and through fugitive dust, although these effects would be localized.

The greater sage-grouse management objective would protect PHMA from anthropogenic disturbances that would reduce distribution or abundance of greater sage-grouse. Resource use restrictions in PHMA and GHMA would minimize direct removal or fragmentation in the sagebrush/grassland priority vegetation type where it overlaps with PHMA and GHMA (59 and 17 percent of the priority vegetation type, respectively).

Fuels treatments in PHMA and GHMA would be designed and implemented with an emphasis on protecting existing sagebrush ecosystems, and fire management would emphasize suppression. Such fuels treatments and more intensive fire management would aim to enhance the sagebrush component of the sagebrush/grasslands priority vegetation type. Habitat management for greater sage-grouse and other sagebrush species obligates would also remove conifers encroaching into sagebrush habitats. In addition, greater sage-grouse management would include actions specific to riparian areas and wet meadows. Wet meadows would be managed with an emphasis on maintaining a perennial component, with diverse species richness. This management would support vegetation diversity in the riparian and wetland community vegetation type.

Over 900 water impoundments on lands not administered by the BLM would continue to affect watershed connectivity and the presence or absence of riparian/wetland vegetation through manipulation of water availability and flow rates in all affected waterways.

The application of BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would likely reduce effects on vegetation associated with authorized land uses or activities such as road, pipeline, or power line construction; mineral development; range improvements; forest management activities; and recreational activities. BMPs and mitigation would reduce or eliminate the removal or alteration of vegetation communities and would decrease the likelihood of the spread of noxious or invasive weeds.

Requiring a reclamation plan (**Appendix G**) for all surface-disturbing activities across all alternatives would stabilize disturbed areas in the short term and stabilize landscapes in the long term, reducing potential effects from loss of vegetation cover, erosion and sedimentation, and the proliferation of noxious or invasive weeds.

Alternative A

Under Alternative A, fugitive dust emissions from surface-disturbing activities may result in dust deposition onto adjacent vegetation. The effects of dust on natural communities may alter the competitive balance between species in vegetation communities (Farmer 1993, p. 72); however, the extent of this effect would depend on soil conditions, weather trends, and vegetation resiliency to dust. The effects of climate variability on vegetation communities are discussed in the context of other reasonably foreseeable future actions, under *Cumulative*.

Current management direction does not require avoidance of sensitive soils in the planning area until project-level implementation. However, prior to authorizing any surface-disturbing activity, the BLM may apply mitigation measures for soils with high erosion susceptibility, steep slopes, sparse vegetation, and shallow soil depth. These measures would help mitigate the effects of soil erosion associated with surface-disturbing activities, such as inhibiting vegetation regeneration and succession, reducing vegetation cover, species richness, seed retention, and altering seed germination and plant establishment (Juying et al. 2009). Nevertheless, it would not prevent effects on any of the priority vegetation communities.

Areas affected by recent or high intensity wildfire (particularly VCC 2 and VCC 3 areas, which dominate much of the ponderosa pine breaks/badlands priority vegetation community) would likely be more susceptible to incision caused by increased runoff and debris flow. Soil erosion from authorized activities or resource uses, in combination with soil erosion from natural disturbances, could increase sediment levels in riparian/wetland

communities. This could result in a long-term trend toward decreased water depths in lentic systems as sediment is deposited.

Management of water impoundments would continue to affect watershed connectivity by restricting water flow to the lower-elevation habitats of the ponderosa pine breaks/badlands, montane forests and meadows, sagebrush/grasslands, grasslands, and riparian/wetlands community priority vegetation types. Womack (2012) found that in the Box Elder Watershed adjacent to the planning area, stock ponds are reducing peak flow rates by 12.66 percent to 24.08 percent and reducing runoff volumes by 10.1 percent to 16.84 percent, depending on the return interval of the storm. Riparian/wetland vegetation would be limited in disconnected stream or wash segments. Fluid mineral leasing stipulations for floodplains would have a negligible effect on priority vegetation types, as nearly all leasing would be deferred.

Priority vegetation types are not specifically identified or managed for under Alternative A. However, general vegetation management would include inventory, monitoring, silviculture prescriptions, and adaptive management strategies. Monitoring in the montane forests and meadows and ponderosa pine breaks/badlands priority vegetation types would help to assess and track insect infestations or other forest health indicators. Forest health treatments and the associated silvicultural prescriptions in these priority vegetation types would emulate natural disturbance regimes in order to achieve long-term DFCs. However, as discussed in the AMS (BLM 2018), in montane forests and meadows, overall health is in decline for many conifer stands, and drought and overstocking has prompted increased mortality from insect and disease outbreaks.

Conifer encroachment into meadows and aspen stands would likely continue. Additionally, VCC 2 and VCC 3 conditions could continue to dominate the ponderosa pine breaks/badlands priority vegetation type, as current management does not prioritize vegetation treatments in these areas. Under current management, trends in the montane forests and meadows and ponderosa pine breaks/badlands priority vegetation types are likely to continue.

Under Alternative A, riparian/wetland communities would be managed to achieve or make significant and measurable progress toward Lewistown Standard 2; that is, that riparian and wetland areas be in PFC. Because PFC is an indicator for this priority vegetation type, management to improve or maintain PFC would help to achieve or maintain the desired plant communities and to support important attributes associated with the cold water and warm water aquatic priority habitats (e.g., water quality and quantity). However, because a large percentage of the riparian/wetland areas have been human modified, they may not be restored to reach their natural potential, but rather an altered potential.

Within sagebrush/grasslands and grasslands priority vegetation types outside of PHMA, conifer encroachment would likely continue, which could affect the ability of this vegetation type to support other resource values, such as sagebrush-dependent wildlife. In addition, cutting grass or hay seed would reduce residual plant height, soil compaction due to heavy equipment, thereby impeding future plant growth, and potential incidental harvesting of native vegetation.

In general, fish and wildlife management would help protect priority vegetation types by maintaining and enhancing suitable habitat for all wildlife species, with an emphasis on present and potential habitat for nesting waterfowl, crucial wildlife winter ranges, non-game habitat, and fisheries. Minimizing or preventing road and trail development in crucial big game and upland bird habitat areas would protect these areas from direct vegetation removal. Since crucial big game and upland bird habitat are found throughout the planning area, this management would affect all priority vegetation types to limited extents.

Stipulations for fluid minerals leasing (**Appendix L**), and BMPs and mitigation measures (**Appendix F**) for biological resources and special status species would restrict surface-disturbing activities, which would reduce the likelihood of vegetation trampling, removal, or fragmentation. Applying a fluid minerals NSO stipulation to fishing reservoirs would have a negligible effect on vegetation communities because most fluid mineral leasing is deferred under current management.

As discussed in the AMS (BLM 2018), fire management categories provide broad fire and fuels management direction, based on ecological, social, economic, and political considerations. These range from Category A, where

fire is not desired at all, to Category D, where fire is desired and there are no constraints on its use. **Table 4-21** shows acres of fire management category by priority vegetation type. Under Alternative A, no BLM-administered lands would be managed as Category A or D.

Within the ponderosa pine breaks/badlands vegetation type, most lands (120,200 acres) would continue to be managed under Category C, where fire would be desired, but there would be constraints on its use. VCC 2 and VCC 3 communities would dominate much of this vegetation type, leading to continued departure from the natural vegetation regime. Continued use of prescribed burning may be used in this vegetation type to reduce fuel loads, although trends in understory growth and tree density would likely continue in most areas.

Within montane forests and meadows, most land would be managed under Category B, meaning unplanned fire would cause negative effects (not necessarily to vegetation resources but to other values, such as private lands).

Lands managed under Category B dominate the sagebrush/grassland vegetation type. Large unplanned fires could remove the Wyoming sagebrush component in the sagebrush/grassland community. Unplanned fires in grasslands may also change species composition or structure.

Most riparian/wetland areas are managed as Category B. While unplanned fire could cause negative effects on other resources, it could also result in increased groundwater availability by reducing demand in shallow water tables. This could increase the extent of riparian and wetland habitats and the number of stabilizing hydric plants (Tucker and Marlow 2006).

Cultural and heritage resource BMPs and mitigation measures (**Appendix F**) under Alternative A would help protect and maintain priority vegetation communities from other resource uses that might otherwise result in the removal or alteration of vegetation. Because cultural and heritage resources are widespread, this effect is applicable to all priority vegetation types. Effects would be concentrated in localized areas.

Management of VRM classes would influence the size, shape, and number of acres included in a forest health project or could limit certain disturbances, particularly road building, which could restrict access to vegetation management projects. VRM Class I would be the most restrictive on vegetation treatments and disturbances, while VRM Class IV would be the least restrictive.

Table 4-22, Comparison of VRM Classes by Priority Vegetation Type Under Each Alternative (Acres) shows the distribution of VRM classes by vegetation type.

Managing 22,600 acres as VRM Class I and Class II in the ponderosa pine breaks/badlands vegetation type could restrict the types of fuel treatments that may be implemented in these areas. Most lands in this vegetation type would be managed as VRM Class III and Class IV, where there would be greater flexibility in creating fuel breaks or conducting vegetation treatments. However, other surface-disturbing activities would also be more likely to occur in these areas.

Approximately 59 percent of montane forests and meadows would be managed as VRM Class I and Class II under Alternative A. Certain disturbances would be limited in these areas, thereby reducing effects from surface-disturbing activities. There would also be greater restrictions on the types of fuels treatments that could be implemented on insect-infested stands or other areas.

Sagebrush/grasslands would be largely managed as VRM Class III and Class IV, except for 36,800 acres managed as VRM Class II and 300 acres managed as VRM Class I. Managing VRM Class I and Class II areas would help to protect and maintain the sagebrush component of this vegetation type. Risk of habitat fragmentation or vegetation removal would be greater in the 304,700 acres managed as VRM Class III and Class IV or unassigned, but there would also be more options in conducting vegetation treatments.

Most grasslands would be managed as VRM Class I and Class II, which would help to maintain community structure and composition in this vegetation type.

In riparian and wetland areas, most lands are managed as VRM Class III and Class IV. In these areas there would be a greater chance of effects on structural diversity, compared with lands managed as VRM Class I and Class II.

Under current management, there are no lands identified or managed for the protection of wilderness characteristics, and there would be no effect on vegetation communities.

Despite the large number of acres managed as open to fluid mineral leasing (see **Table 4-23**, Comparison of Fluid Minerals Leasing Stipulations by Priority Vegetation Type Under Each Alternative (Acres), minimal vegetation removal from oil and gas leasing and development is likely to occur under Alternative A, as total oil and gas development in the decision area is expected to be approximately 88 acres of long-term disturbance on BLM-administered lands (**Table W-1**, **Appendix W**). The LFO would continue to defer fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. (Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO.) Development would be limited to leases not requiring special wildlife stipulations. Because of this, effects on vegetation from fluid mineral development would continue to be low. The limited effects on priority vegetation communities may include trampling, removal, or fragmentation.

Table 4-24, Comparison of Grazing Allocations by Priority Vegetation Type Under Each Alternative (Acres), shows how livestock grazing allocations are distributed by priority vegetation type. In areas unavailable to livestock grazing, there would be no direct effect on vegetation communities, but an increase in fuel loads could be a potential indirect effect. In areas available to livestock grazing, the effects include an increased risk of noxious or invasive weed spread, some of which are more flammable than the native plants. This could increase the severity of wildfire. This indirect effect is applicable to all priority vegetation types. Applying a minimum rest period of two growing seasons after major disturbances and monitoring forage allocations would reduce, but not eliminate, the risk of noxious or invasive weed spread.

The sagebrush/grasslands vegetation type would have the most acres available to livestock grazing, followed by ponderosa pine breaks/badlands. However, grazing in the ponderosa pine breaks/badlands vegetation type is generally less than the amount of grazing that occurs on the grassland and sagebrush/grassland vegetation communities, given the lack of understory forage production.

Managing for recreation and visitor services under Alternative A would restrict other resource uses that might otherwise affect priority vegetation communities. Effects on vegetation communities are likely to continue as a result of increased demand for recreation opportunities. Because access is a limiting factor for recreation, the effects would likely be concentrated in existing SRMAs and ERMAs.

Effects on priority vegetation communities along designated travel routes include the increased risk of noxious or invasive weed spread, altered soil structure, and soil erosion. When soils are severely disturbed, vegetation cover can be reduced significantly (Ouren et al. 2007). **Table 4-25**, Comparison of Travel Management by Priority Vegetation Type Under Each Alternative (Acres), shows acres closed and acres limited to existing routes for OHV travel by priority vegetation type.

In areas closed to OHV travel, there would be no effects on priority vegetation communities, except for those from administrative or permitted motorized travel. In areas where OHV use is limited to designated routes, there would be a higher risk of invasive weed spread. This is because OHVs and humans can carry and spread invasive weed seeds.

Construction of new routes would cause fragmentation and create edge habitats, which could change vegetation and encroachment of nonnative and invasive species (Ouren et al. 2007).

Table 4-26, Comparison of Rights-of-Way and Special Use Authorization Management by Priority Vegetation Type Under Each Alternative (Acres), shows areas managed for ROWs as open, avoidance, or exclusion by priority vegetation type. Surface-disturbing activities associated with land use authorizations under Alternative A could result in vegetation fragmentation and changes to vegetation structure. ROW construction and maintenance could increase the risk of invasive or noxious weed spread in montane forests and meadows, ponderosa pine breaks/badlands, sagebrush/grasslands, and grassland vegetation communities. Areas managed as ROW exclusion would protect priority vegetation communities from effects associated with new ROW authorizations. Areas managed as ROW avoidance would also protect priority vegetation communities from new ROW authorizations in certain areas but would not preclude new construction of infrastructure.

Acres open to ROWs are greatest in the vegetation communities of ponderosa pine breaks/badlands (113,900 acres), sagebrush/grasslands (78,800 acres), and montane forests and meadows (59,800 acres). Effects on vegetation from new ROW authorizations would be greatest in these areas.

Timber harvesting occurs almost entirely in the montane forests and meadows priority vegetation community. Effects on vegetation would be disproportionately greater in this vegetation community compared with all other priority vegetation communities. Timber harvesting activities could result in short-term surface disturbance and trampling of vegetation from the use of logging equipment. However, tractor logging would generally be limited to slopes with sustained grades of less than 45 percent and when soils are dry or frozen to minimize rutting and soil compaction.

While effects on the montane forests and meadows priority vegetation community are likely to continue, rehabilitating skid trails and temporary roads with seeding or scarification, or both, would promote reclamation. The effects of surface disturbance from timber harvest activities could be short term or long term, depending on the steepness of the slope, soil conditions, and weather conditions.

Silvicultural prescriptions would be used under Alternative A. While these prescriptions may support healthy forest conditions by restoring forest composition and diversity, current management lacks specific direction for how silviculture would be implemented to achieve DFCs.

Indirect effects of timber harvesting may occur on other priority vegetation communities under Alternative A. Use of equipment may influence the introduction or spread of noxious weeds along roads and skid trails (Birdsall et al. 2012). Where equipment travels across or near riparian/wetland vegetation communities, seeds from noxious or invasive weeds may be transported by lotic water systems to lower elevation warm water aquatic priority habitats and adjacent terrestrial vegetation communities.

Lands managed as ACECs would encompass the priority vegetation types of ponderosa pine breaks/badlands, montane forests and meadows, sagebrush/grasslands, and grasslands. ACECs would also encompass riparian/wetland communities, although this would include fewer than 50 acres and is therefore rounded to 0 acres. **Table 4-27** shows the distribution of ACECs by vegetation type.

Limiting surface-disturbing activities (e.g., OHV travel, ROW authorizations, and disposal of forest products) in lands managed as ACECs under Alternative A would help to retain vegetation function and protect endemic plant communities. Montane forests and meadows would be the dominant vegetation type managed as an ACEC, and effects would be greatest in this community.

Continued management of the Lewis and Clark and Nez Perce NHTs and the Continental Divide NST could affect montane forests and meadows, riparian/wetland communities, sagebrush/grasslands, and grasslands through vegetation trampling or spread of noxious or invasive weeds. However, these effects would be negligible, as trails would be managed to conserve, protect, and restore trail resources, which includes adjacent vegetation in the trail corridor.

Managing 27 stream segments as eligible for inclusion in the NWSRS and adhering to interim protective management guidelines would support functioning wetland/riparian vegetation conditions in both warm water and cold water aquatic priority habitats.

Alternative B

Under Alternative B, required design features (RDFs) for reducing fugitive dust emission would reduce dust deposition onto adjacent vegetation. As a result, implementing air resource reasonable foreseeable developments (RFDs) would reduce the likelihood of dust deposition effects on vegetation for all priority vegetation types, as described under Alternative A.

Implementing adaptive management strategies to identify specific climate vulnerabilities would allow for more vegetation management flexibility compared with Alternative A. Considering changes in climate when proposing restoration seeding of native plants would support resilient vegetation in areas undergoing restoration. The effects from climate management would be applicable to all priority vegetation communities. The effects of climate

variability on vegetation communities are discussed in the context of other reasonably foreseeable future actions, under *Cumulative*.

Avoiding and mitigating disturbance to biological soil crusts would help maintain soil functioning condition in sagebrush/grasslands and grasslands priority habitats. Implementing a fluid minerals NSO stipulation on badlands and rock outcrop would protect sections of the ponderosa pine breaks/badlands priority vegetation type from surface-disturbing activities. Applying a fluid minerals NSO stipulation on slopes susceptible to mass failure and sensitive soils would reduce erosion risk in these areas and would allow for increased vegetation establishment and cover, when compared with Alternative A.

Implementing fluid minerals NSO stipulations for soils would provide for long-term protection of vegetation resources. Because NSO stipulations for soils are greater under Alternative B compared with Alternative A, the extent of protection would be larger. However, soil erosion and sedimentation are likely to continue in the planning area due to natural processes.

As with Alternative A, areas affected by recent or high intensity wildfire would likely be more susceptible to soil erosion and vegetation scouring. This would be the case in VCC 2 and VCC 3 areas, which dominate much of the ponderosa pine breaks/badlands priority vegetation community. There could be instances of short-term influx of sediment into riparian/wetland vegetation communities, particularly before vegetation is reestablished after floods or high precipitation. This could result in a long-term trend toward decreased water depths in lentic systems as sediment is deposited.

Increased runoff and debris flow can also cause riparian and wetland communities to incise after wildfires, causing movement away from PFC.

Under Alternative B, water resources would be managed to increase the percent of riparian and wetland areas in potential natural community or at their capability by decreasing the percent of watershed disconnected by impoundments. This would increase riparian/wetland vegetation communities along lotic systems, while decreasing the amount of riparian vegetation communities along lentic systems (impoundments).

Increasing watershed connectivity and removing water impoundments could change flow regimes, which could affect vegetation structure and successional evolution of riparian communities. If removing impoundments were to result in flow variations, phreatophytic vegetation¹ would be favored over emergent or submerged species to a greater extent than under Alternative A. Managing for watershed connectivity may increase the distribution of riparian vegetation propagules² and promote establishment of diverse riparian/wetland vegetation communities.

Establishing riparian management zones and applying allowable use stipulations for fluid minerals leasing (**Appendix L**) and BMPs and mitigation measures for authorized land uses and activities (**Appendix F**) in water, riparian areas, wetlands, and floodplains would result in long-term protection of riparian/wetland vegetation communities from effects associated with authorized use activities. Long-term protection of riparian/wetland vegetation communities from surface-disturbing activities would be more comprehensive under Alternative B compared with Alternative A, as BMPs and stipulations are more extensive.

Unlike Alternative A, under Alternative B, five priority vegetation communities would be spatially defined and managed to maintain diverse ecological conditions. Commercial seed harvesting would be allowed in many areas, facilitating the improvement or restoration of habitat by using native seeds that have been collected locally. Vegetation management effects on each of these priority vegetation types are as follows:

- Ponderosa pine breaks/badlands—Treatments in VCC 2 and VCC 3 areas would help to restore species composition and structure, which are currently substantially altered from their historical range at both the patch and landscape levels. This management would reduce the likelihood of higher severity wildfire and would help to restore natural fire regimes.

¹Plants or trees that rely on groundwater

²Part of a plant that can detach from it to propagate, such as a bud or spore

- Montane forest and meadows—Forest health treatments in VCC 2 and VCC 3 areas would help restore species composition and structure in montane forests and meadows. Treatments and silvicultural prescriptions would attempt to mimic natural disturbance regimes using nonmechanical treatments and prescribed fire. Restoring five-needle pine stands, aspen, and meadows would be a priority in the planning area. However, the emphasis on non-mechanical treatments would limit the BLM’s ability to achieve DFCs in overstocked stands.
- Sagebrush/grasslands—Emphasis on restoring crested wheatgrass stands to native grass, forb, and sagebrush species would result in a local shift in species composition. Managing for large intact blocks of sagebrush/grasslands would limit conifer encroachment.
- Grasslands—Use of wildfire, prescribed fire, and mechanical methods would help to improve ecological conditions and maintain VCC.
- Riparian/wetland communities—Riparian and wetland communities would be managed to increase the percent of riparian and wetland areas in potential natural community or at their capability. In addition, restricting draining, burning, filling, or leveling of wetlands under Lease Notice MT-LN Grasslands-Wetlands would provide added protection to habitat for aquatic and riparian vegetation from fluid mineral leasing.

In addition to management specific to priority vegetation communities, actions under Alternative B would include inventory, control, and monitoring of noxious weeds. Because noxious weeds are found in all priority vegetation types, this management would support the maintenance of native plant conditions across all vegetation types (unlike Alternative A, where the objective is to control, eradicate, or contain noxious plants to maintain native rangelands).

Domestic sheep or goat allotments would not be permitted within 20 miles of occupied bighorn sheep habitat; however, biological weed control may be used on a case-by-case basis. Similarly, a smaller class of livestock grazing would not be permitted within the grizzly bear Primary Conservation Area (PCA) or Zone I once the bear is delisted; however, individual cases may be considered for weed control.

Unlike Alternative A, all fish, wildlife, and special status species are nested under at least one priority vegetation type, even if not explicitly stated. The health of special status species is tied to the health of the priority habitats and vegetation that they depend on. Therefore, managing for habitats to support MFVWP big game herd unit objectives and fish management objectives and having well-distributed healthy populations of fish and wildlife would also support the maintenance and improvement of priority vegetation communities. In addition, fish and wildlife habitat management under this alternative would aim to improve or maintain deciduous woody vegetation. Furthermore, managing native, naturalized and exotic species will maintain or improve the genetic diversity of natural ecosystems and benefit fish, wildlife, and special status species and their habitats.

Fish and aquatic communities would be managed to maintain and improve cold and warm water aquatic priority habitats. This would allow for persistence or expansion of riparian/wetland vegetation communities.

Fluid mineral leasing stipulations (**Appendix L**) for fish and wildlife would protect priority vegetation communities by prohibiting or restricting surface occupancy, thereby reducing potential effects associated with vegetation removal, trampling, and fragmentation. These effects would occur on all priority vegetation communities.

Table 4-21 shows fire desirability (as indicated by the management category), by priority vegetation type. Unlike Alternative A, Alternative B would emphasize Category D fire management for most of the ponderosa pine breaks/badlands vegetation type. Fire prescriptions, in combination with other vegetation treatments, would help to maintain or reduce VCC and would restore natural fire regimes.

Fire management in the montane forests and meadows would emphasize Category C management for most areas. Hazardous fuels would be reduced by planned and unplanned fires, which would help to restore or maintain VCC.

Much of the sagebrush/grasslands vegetation type would continue to be managed as Category B, and the effects would be similar to those discussed under Alternative A.

In riparian/wetland communities, the effects of fire would be similar to those described under Alternative A. In addition, managing 5,800 acres as Category D would allow for more flexibility in the use of fire to reduce fuel loads along riparian corridors.

Cultural and heritage resource management under Alternative B would have effects similar to those discussed under Alternative A. Additional fluid mineral leasing closures and lease notice stipulations would afford added protection to all priority vegetation communities, although this effect would occur only in localized areas.

Alternative B would increase acres managed as VRM Class I and Class II and would decrease acres managed as VRM Class III and Class IV, when compared with Alternative A. **Table 4-22** shows the distribution of VRM classes by vegetation type. As a result, there would be greater restrictions on activities that disturb the surface or vegetation. There would also be reduced flexibility in conducting vegetation treatments and creating fuel breaks. This effect would occur on all priority vegetation communities.

Identifying and managing lands for the protection of their wilderness characteristics would restrict resource uses (e.g., ROWs, construction of new roads, OHV travel, and energy developments) and would protect vegetation communities from trampling, degradation, fragmentation, or removal. Most lands with wilderness characteristics would be located in the ponderosa pine breaks/badlands vegetation type (106,100 acres) and the sagebrush/grasslands vegetation type (76,200 acres), where the effects would be greatest. Effects would also occur for 4,100 acres in grasslands, 9,600 acres in montane forests and meadows, and 6,000 acres in riparian and wetland communities.

Fluid mineral closures under Alternative B would provide for long-term protection of 311,000 acres, encompassing portions of all priority vegetation communities, from trampling, fragmentation, or direct removal due to fluid mineral leasing.

Table 4-23 shows the distribution of fluid mineral allocations by priority vegetation type. Similar to Alternative A, minimal vegetation removal from oil and gas leasing and development is likely to occur under Alternative B. This is because total oil and gas development in the decision area is expected to disturb less than 100 acres in the long term on BLM-administered lands (**Table W-1, Appendix W**).

If the Heath shale play in southern Petroleum County proved to be economical, drilling and production in that area could greatly increase. Southern Petroleum County is primarily characterized by the sagebrush/grasslands priority vegetation type. As such, effects on the sagebrush/grasslands priority vegetation type would be disproportionately greater than for other vegetation communities.

Under Alternative B, 30,000 acres would be unavailable for livestock grazing, an increase of 15,400 acres compared with Alternative A. **Table 4-24** shows how livestock grazing allocations are distributed by priority vegetation type. With fewer acres available and fewer permits and leases issued, fewer cooperative range improvement agreements for control of noxious weeds by permittees/lessees would be developed. This would result in the BLM being the primary source for weed control throughout the planning area. Given the larger area, more resources would be required to control weeds effectively.

Managing additional acres of sagebrush/grasslands and grasslands as unavailable to grazing would favor tall grass species in the short term. Understory production would decrease in the long term, unless adequate disturbance is received. In grazed areas, short-grass conditions would be favored. However, allocating less forage base to livestock compared with Alternative A would result in more vegetation cover where grazing occurs (particularly grasslands and sagebrush/grasslands).

Surface use BMPs and mitigation measures (**Appendix F**) for authorized recreation and visitor service would restrict other resource uses that might otherwise affect priority vegetation communities. Recreation areas are widespread, and restrictions would occur on all priority vegetation types. Because recreation BMPs are more extensive than Alternative A, there would be increased protection of vegetation communities.

More acres would be closed to motorized travel under Alternative B, but vegetation in these areas would not be noticeably trampled, since the entire area is limited to existing routes. Demand for recreation opportunities is

likely to continue, and vegetation trampling or disturbance may occur. However, effects would likely occur in localized areas.

Table 4-25 shows travel management allocations for each of the five priority vegetation communities in the planning area. The effects of travel management would be similar to those described under Alternative A. However, more acres would be designated as closed to motorized travel for all priority vegetation types, except montane forests and meadows. As a result, there would be fewer effects in these areas.

Table 4-26 shows areas managed for ROWs as open, avoidance, or exclusion by priority vegetation type. The types of effects on vegetation communities would be the same as described under Alternative A. However, fewer acres would be managed as open to ROWs for all vegetation types, and more acres would be managed as ROW exclusion. Therefore, effects on vegetation communities from ROW authorizations on BLM-administered lands would be less than under Alternative A.

Additional acres would be closed to timber harvest under Alternative B compared with Alternative A. In these areas, montane forest stands would trend toward later seral stage, increased canopy cover, and more standing dead or downed trees. In areas where timber harvesting is allowed, the direct and indirect effects on vegetation communities would be the same as described under Alternative A. In the areas closed to forest harvest, forest health will continue to decline and fuel loads will increase, potentially resulting in stand-replacing wildfire or insect outbreaks.

Lands managed as ACECs would encompass all priority vegetation communities, as shown in **Table 4-27**. The effects of managing ACECs would be similar to those discussed under Alternative A. However, managing additional acres of montane forests and meadows, sagebrush/grasslands, grasslands, and riparian/wetlands as ACECs would afford more comprehensive protection to these vegetation communities compared with Alternative A.

Managing national trails would have a similar effect as described under Alternative A. In addition, surface use stipulations along corridors would provide added protection to priority vegetation communities from fluid mineral leasing in these areas.

Determining stream segments as suitable for inclusion in the NWSRS would result in added protection to riparian/wetland vegetation communities, compared with Alternative A, by formalizing the interim protective measures and implementing ROW and energy development restrictions.

Alternative C

The effects of air resource management and adaptive management for climate under Alternative C would be the same as described under Alternative B. The effects of climate variability on vegetation communities are discussed in the context of other reasonably foreseeable future actions, under *Cumulative*.

Soil-disturbing activities could result in loss of topsoil, reduced vegetation cover, inhibition of vegetation regeneration and succession, and altered seed germination and plant establishment. Because soil-disturbing activities are widespread in the planning area, the effects would be applicable to all priority vegetation types. However, adhering to BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would minimize the direct effects on vegetation communities.

As with Alternative A, areas affected by recent or high intensity wildfire would likely be more susceptible to soil erosion and at greater risk of scouring, as would surface disturbances on areas identified as sensitive soils. This would be the case particularly in VCC 2 and VCC 3 areas, which dominate much of the ponderosa pine breaks/badlands priority vegetation community. Instances of short-term influx of sediment into riparian/wetland vegetation communities would likely occur. This could result in a long-term trend toward decreased water depths in lentic systems as sediment is deposited.

Management of water impoundments would continue to affect watershed connectivity by restricting water flow to the lower-elevation habitats of the ponderosa pine breaks/badlands, sagebrush grasslands, grasslands, and riparian/wetlands community priority vegetation types. The percent of lotic riparian/wetland vegetation

communities in PFC would likely increase. However, because a large percentage of the riparian/wetland areas have been artificially modified, they may not be restored to reach their natural potential. The effects of implementing a floodplain stipulation would be the same as described under Alternative A.

Under Alternative C, five priority vegetation communities would be spatially defined and managed to maintain diverse ecological conditions. Effects from commercial seed harvesting would be similar to those described for Alternative B, though more areas would be open for harvesting and restoration treatments under Alternative C. This could increase the amount of native seed that is collected, thus allowing more areas to benefit from restoration with native seed. Vegetation management effects on each of these priority vegetation types are as follows:

- Ponderosa pine breaks/badlands—The effects would be similar to those described for Alternative B. However, an increased emphasis on mechanical treatments could improve ecological conditions; markets and available resources are not likely to be substantially different between the alternatives.
- Montane forests and meadows—Forest health treatments in VCC 2 and VCC 3 areas would help restore species composition and structure in montane forests and meadows. Commercial and pre-commercial thinning would reduce stand densities and the risk of future stand-replacing wildfire and insect and disease outbreaks. Restoration of five-needle pine stands, aspen, and meadows would also be a priority within the planning area.
- Sagebrush/grasslands—Managing for large intact blocks of sagebrush/grasslands would limit conifer encroachment. Grazing allotments would trend toward meeting Standards for Rangeland Health (BLM 1997).
- Grasslands—Maintaining and maximizing utilization of forage in areas preferred by livestock would increase the potential for effects as described for sagebrush/grasslands in **Appendix W**. Effects from cutting grass or hay seed would be the same as under Alternative A.
- Riparian/wetland communities—Lotic and lentic riparian/wetland vegetation communities in PFC would likely increase, though at a slower rate than under Alternative A due to the increase in AUMs under Alternative C. Restricting draining, burning, filling, or leveling of wetlands under Lease Notice MT-LN Grasslands-Wetlands would provide added protection to habitat for aquatic and riparian vegetation from fluid mineral leasing, compared with Alternative A.

The effects of managing noxious and invasive weeds would be the same as discussed under Alternative B.

Managing for habitats to support MFVP big game herd unit and fish and wildlife management objectives to promote well distributed healthy populations of fish and wildlife would also support the priority vegetation communities that these species depend on, as described for Alternative B. Continued management of sport fishery reservoirs would retain lentic vegetation communities in these areas.

Fluid mineral leasing stipulations (**Appendix L**) and closures specific to fish and wildlife would also protect the associated priority vegetation communities.

Table 4-21 shows fire desirability (as indicated by management category) by priority vegetation type, relative to the total number of acres for that vegetation type. The effects of fire management on ponderosa pine breaks/badlands vegetation types would be similar to those effects described under Alternative A.

The effects of fire management on montane forests and meadows would be similar to those effects described under Alternative A, except that all of this vegetation type would be managed as Category B.

The effects of fire on sagebrush/grasslands would be similar to those effects described under Alternative A, although ES&R measures would help to restore native vegetation. All grasslands would be managed as Category B, and fire suppression would likely increase fuel loads.

In riparian/wetland areas, the effects would be the same as those described under Alternative A.

Cultural and heritage resource management under Alternative C would have effects similar to those discussed under Alternative A. Additional fluid mineral leasing notice stipulations (**Appendix L**) would afford added protection to all priority vegetation communities, although this effect would occur only in localized areas.

Alternative C would decrease acres managed as VRM Class I and Class II and would increase acres managed as VRM Class III and Class IV, when compared with Alternative A. **Table 4-22** shows the distribution of VRM classes by vegetation type. There would be fewer limitations on conducting vegetation treatments or creating fuel breaks, but there would also be fewer restrictions on activities that disturb the surface or vegetation. Long-term effects on vegetation structural diversity, composition, and cover for all priority vegetation types would be more likely as a result.

Fluid mineral closures and NSO stipulations under Alternative C would provide for long-term protection of a portion of all priority vegetation communities in the planning area from trampling, fragmentation, or direct removal due to fluid mineral leasing. **Table 4-23** shows which priority vegetation types these closures and stipulations would be applied to. Similar to Alternative A, minimal vegetation removal from oil and gas leasing and development is likely to occur under Alternative C. This is because total oil and gas development in the decision area is expected to disturb less than 100 acres in the long term on BLM-administered lands (**Table W-1, Appendix W**).

The effects of livestock grazing on vegetation communities would be similar to those discussed under Alternative A, and grazing allocations by priority vegetation communities would also be the same, as shown in **Table 4-24**. Because most grazing occurs on sagebrush/grasslands and grassland priority vegetation communities, effects would be most widespread in those areas. However, given the increase in AUMs under Alternative C, riparian and wetland areas may experience the greatest concentration of effects, as described in **Appendix W**. Effects from livestock may require BLM intervention to move riparian and wetland areas toward PFC, thereby slowing the movement toward PFC over the long term, compared with Alternative A.

Developing staging and parking areas and other recreation facilities could remove or trample vegetation. Increased accessibility to recreation areas (e.g., Snowy Mountains ERMA) may result in the direct removal of vegetation and could indirectly increase the risk of noxious weed spread, both of which are long-term effects. These effects could affect all priority vegetation types, depending on where new facilities and access routes are constructed. Where recreation is concentrated near reservoirs and creeks (e.g., parts of the Judith SRMA), riparian/wetland vegetation could be disturbed. Recreation stipulations would maintain the protection of riparian/wetland vegetation communities from fluid mineral development.

Table 4-25 shows travel management allocations for each of the five priority vegetation communities in the planning area. The effects of travel management would be similar to those described under Alternative A. Consideration of at-risk watersheds, riparian resources, forest resources, and other vegetation when determining designation criteria would minimize effects (such as vegetation trampling, removal, or fragmentation) to all priority vegetation types.

Table 4-26 shows areas managed for ROWs as open, avoidance, or exclusion by priority vegetation type. The types of effects on vegetation communities from ROW development would be the same as described under Alternative A. However, fewer acres would be managed as open to ROWs in the ponderosa pine breaks/badlands, sagebrush/grasslands, and riparian/wetland communities vegetation types. In these areas, effects on vegetation (such as vegetation trampling, removal, or fragmentation) would be less. More acres would be open to ROWs in the montane forests and meadows and grasslands communities. As such, effects on vegetation cover, function, and structural diversity would be greater than under Alternative A in these areas.

Commercial timber harvesting would occur throughout the montane forests and meadows priority vegetation type under Alternative C. An increased probable sale quantity compared with Alternative A would result in more use of pre-commercial and commercial treatments. Pre-commercial thinning and other silvicultural practices would result in the short-term removal of woody vegetation and reduced canopy cover. Additionally, commercial timber harvesting would result in more treatments, thereby increasing the resiliency of the forest to wildfires and insect and disease outbreaks.

Managing woodlands to prevent expansion into other communities would limit conifer encroachment into sagebrush/grasslands vegetation communities. Other changes to vegetation composition include the expansion of aspen stands. Surface disturbance and vegetation trampling from the use of logging equipment would likely occur. Where new roads and temporary roads are constructed, there would be an increased risk of noxious weed spread and erosion in the montane forests and meadows priority vegetation type. However, adhering to the Montana Water Quality BMPs would limit erosion and would allow for short-term restoration of temporary roads.

No areas would be designated as ACECs; therefore, there would be no special management for the protection of the relevant and important values of the potential ACECs, which could limit surface-disturbing activities and indirectly certain vegetation communities.

Managing national trails under Alternative C would have the same effect on vegetation communities as under Alternative B.

Releasing the 27 stream segments from interim management protections would increase the risk of authorized activities affecting riparian/wetland vegetation communities. However, BMPs and mitigation measures for authorized land uses or activities (**Appendix F**), and water resource stipulations for fluid mineral leases (**Appendix L**) would continue to limit surface-disturbing activities on or near these streams and would have indirect effects on vegetation.

Alternative D

The effects of air resource management and adaptive management for climate under Alternative D would be the same as those described under Alternative B. The effects of climate variability on vegetation communities are discussed in the context of other reasonably foreseeable future actions, under *Cumulative*.

Soil-disturbing activities could result in loss of topsoil, reduced vegetation cover, inhibition of vegetation regeneration and succession, and altered seed germination and plant establishment. Because soil-disturbing activities are widespread in the planning area, the effects would be applicable to all priority vegetation types. However, adhering to BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would minimize these direct effects on vegetation communities. Applying a fluid minerals CSU stipulation on sensitive soils would restrict surface disturbance in all priority vegetation types.

Areas affected by recent or high intensity wildfire would likely be more susceptible to soil erosion and at greater risk of scouring. This would be the case particularly in VCC 2 and VCC 3 areas, which dominate much of the ponderosa pine breaks/badlands priority vegetation community. Instances of short-term influx of sediment into riparian/wetland vegetation communities would likely occur. This could result in a long-term trend toward decreased water depths in lentic systems as sediment is deposited.

Water resources would be managed to maintain or decrease the percent of watershed disconnected by impoundments. This would maintain or increase riparian/wetland vegetation along lotic systems, while maintaining or decreasing the amount of riparian vegetation along lentic systems, as discussed under Alternative B. Improved wetland/riparian vegetation connectivity would occur. A fluid minerals NSO stipulation in riparian areas, wetlands, and floodplains would protect the riparian/wetland priority vegetation type from fluid mineral development.

Under Alternative D, five priority vegetation communities would be spatially defined and managed to maintain diverse ecological conditions. Effects from commercial seed harvesting would be as described for Alternative B. Vegetation management effects on each of these priority vegetation types are as follows:

- Ponderosa pine breaks/badlands—The effects would be the same as under Alternative B.
- Montane forests and meadows—The effects would be the same as under Alternative C.
- Sagebrush/grasslands—Using pastures dominated by crested wheatgrass for spring livestock grazing would defer livestock grazing on pastures dominated by native grasses and forbs. Allowing farming, herbicides, or fire would provide management flexibility to restore crested wheatgrass monocultures to native plants. Managing for large intact blocks of sagebrush/grasslands would limit conifer encroachment.

- Grasslands—Use of wildfire, prescribed fire, and mechanical methods would help to improve ecological conditions and maintain VCC.
- Riparian/wetland communities—These would be managed to increase the percent of lotic miles in PFC or DFC, or at their capability by incorporating design features, applying a fluid minerals NSO stipulation within riparian and wetland areas, and applying a fluid minerals CSU stipulation within 300 feet of riparian and wetland areas. However, because a large percentage of the riparian/wetland areas have been human modified, they may not be restored to reach their natural potential but rather an altered potential. This would increase riparian/wetland vegetation communities along lotic systems, while decreasing the amount of riparian vegetation communities along lentic systems, as discussed under Alternative B. NSO and CSU stipulations would protect riparian/wetland vegetation from fluid mineral leasing and development.

In addition to management specific to priority vegetation communities, actions under Alternative D would include inventory, control, and monitoring of noxious weeds. Because noxious weeds are found in all priority vegetation types, this management would support maintaining native plant conditions across all vegetation types.

Domestic sheep or goat allotments would not be permitted within 9 miles of occupied bighorn sheep habitat; however, biological weed control may occur on a case-by-case basis. Grizzly bear management effects would be as described under Alternative B.

Managing for habitats to support MFWP big game herd unit and fish and wildlife management objectives to promote well distributed, healthy populations of fish and wildlife would also support the priority vegetation communities that these species depend on as described under Alternative B.

Fish and aquatic communities would be managed to maintain and improve cold and warm water aquatic priority habitats, which would allow for persistence or expansion of riparian/wetland vegetation communities.

Fluid mineral leasing NSO stipulations (**Appendix L**) for special status species would also protect the priority vegetation communities that these species are associated with from future oil and gas development.

Table 4-21 shows fire desirability, by priority vegetation type, relative to the total number of acres for that vegetation type. In ponderosa pine breaks/badland communities, most lands (120,900 acres) would be managed as Category C, and the effects would be the same as under Alternative C. In montane forests and meadows, the effects would be the same as those described under Alternative B.

The effects of fire managed in sagebrush/grassland communities would be similar to those effects described under Alternative B, except no acres would be managed as Category D. In grasslands, the effects would be the same as those described under Alternative B.

In riparian/wetland communities, the effects would be similar to those described under Alternative B; however, there would be more acres with constraints on fires use. The effects on cultural and heritage resources would be the same as described under Alternative B.

Table 4-22 shows the distribution of VRM classes by vegetation type. Increasing the acres of ponderosa pine breaks and badlands managed as VRM Class II would increase vegetation protection from surface-disturbing activities, but would still allow for the use of prescription treatments to maintain or reduce VCC. Fewer acres would be managed as VRM Class I or Class II in montane forests and meadows. There would be fewer visual resource BMPs in this priority vegetation type that would indirectly protect vegetation. Within sagebrush/grasslands, the effects would be similar to those described under Alternative A. Within grasslands and riparian/wetland communities, more acres would be designated as VRM Class II and Class III, and fewer acres would be undesignated VRM. This would result in more comprehensive management, which could indirectly affect vegetation by restricting certain types of surface-disturbing activities.

The effects of identifying and managing lands for the protection of their wilderness characteristics would be similar to those effects described under Alternative B, but in a smaller area of influence. Alternative D designates 68,100 acres of lands with wilderness characteristics in the ponderosa pine breaks/badlands vegetation type, 29,200 acres in sagebrush/grassland vegetation type, and 3,100 acres in riparian/wetland communities.

Fluid mineral closures and NSO stipulations under Alternative D would provide for long-term protection of all priority vegetation communities from trampling, fragmentation, or direct removal due to fluid mineral leasing. **Table 4-23** shows which priority vegetation types these closures and stipulations would be applied to. Similar to Alternative A, minimal vegetation is likely to be removed from oil and gas leasing and development under Alternative D. This is because total oil and gas development in the decision area is expected to cause less than 100 acres of long-term disturbance on BLM-administered lands (**Table W-1, Appendix W**).

The effects of livestock grazing on vegetation communities would be similar to those discussed under Alternative A, and grazing allocations by priority vegetation communities would also be the same, as shown in **Table 4-24**. Because most grazing occurs on sagebrush/grasslands and grasslands priority vegetation communities, effects would be widespread in those areas.

Surface use stipulations (**Appendix L**) for recreation and visitor uses would restrict fluid mineral leasing that might otherwise result in trampling, removal, or fragmentation of priority vegetation habitats. Developing access opportunities (e.g., new trail opportunities in the Judith Mountains SRMA) would result in long-term removal of vegetation in localized areas. These effects could affect all priority vegetation types, depending on where access developments are constructed. Where recreation is concentrated near reservoirs and creeks (e.g., parts of the Judith ERMA), disturbance of riparian and wetland vegetation could occur in localized areas.

Table 4-25 shows travel management allocations for each of the five priority vegetation communities in the planning area. The effects of travel management would be similar to those described under Alternative C.

Table 4-26 shows areas managed for ROWs as open, avoidance, or exclusion by priority vegetation type. The types of effects on vegetation communities would be the same as described under Alternative A. However, fewer acres would be managed as open to ROWs in the ponderosa pine breaks/badlands, sagebrush/grasslands, and riparian/wetland communities vegetation types. In these areas, effects on vegetation would be less. More acres would be open to ROWs in the montane forests and meadows and grasslands communities. As such, effects on vegetation cover, function, and structural diversity would be greater than Alternative A in these areas.

The effects of commercial timber harvesting would be similar to those discussed under Alternative C. However, additional acres would be managed as closed to commercial wood product sales. In these areas, there would be reduced effects associated with the use of logging equipment.

Lands managed as ACECs would encompass portions of all priority vegetation communities as shown under **Table 4-27**. The effects of managing ACECs would be similar to those discussed under Alternative A. However, managing additional acres of montane forests and meadows, sagebrush/grasslands, grasslands, and riparian/wetlands as ACECs would afford more comprehensive protection to these vegetation communities, compared with Alternative A.

The effects of managing national trails and WSRs would be the same as identified under Alternative C.

Cumulative

Ponderosa Pine Breaks/Badlands

Wildfire risk in Montana is predicted to increase due to a combination of climate variations on temperature, precipitation, and wind (BLM 2010). The objectives and actions under Alternatives B, C, and D that emphasize vegetation treatments in this priority vegetation type would help to restore natural fire regimes and forest health on BLM-administered lands; they also would reduce stand density and the risk of stand-replacing wildfires. VCC 2 and VCC 3 conditions would likely persist on lands not administered by the BLM under all alternatives. On lands not administered by the BLM, where fire-generated stands of similar age occur, there would be a high susceptibility to infestation by mountain pine beetle, because these areas would not necessarily receive forest treatments to improve ecological health.

Montane Forests and Meadows

Temperature increases may change species composition and range in montane forests and meadows across all alternatives, regardless of landownership. Under Alternatives B, C, and D, vegetation treatments in the montane forests and meadows would reduce the risk of insect infestations and the rate of conifer encroachment into

historical meadows and would help to maintain or improve VCC. This would be in combination with vegetation treatments on lands not administered by the BLM (e.g., the Lewis and Clark National Forest). Alternatives C and D are more effective in restoring historical composition through restoration. In comparison, Alternative B would emphasize natural disturbances to change conditions in montane forests and meadows.

Because much of the montane forests and meadows habitat in the planning area are managed by other entities and is therefore not in the decision area, BLM management would have a limited effect on forest health in these areas. As such, conifer encroachment into historical meadows and aspen communities is likely to continue under all alternatives, as is the trend toward fuel accumulations and spread of insect infestations.

Sagebrush/Grasslands

Much of the sagebrush/grasslands priority vegetation type is not in the decision area. Sagebrush/grasslands health on lands not administered by the BLM would continue to be influenced by the lack of fire, historical overgrazing, OHV and recreation use, oil and gas development, ROW use and construction, and private land development. Under the action alternatives, managing lands to minimize fragmentation of large blocks of habitat, in combination with conservation efforts for greater sage-grouse and other sagebrush species obligates on lands not administered by the BLM (e.g., improved grazing practices on private lands and conservation easements) would help to maintain or restore sagebrush/grasslands priority habitats.

Alternative B would likely restore the largest area by emphasizing restoration of crested wheatgrass seedings. In contrast, Alternative C would manage crested wheatgrass seedings as spring use pastures. Alternative D would implement a combination of spring use and restoration. There is no similar management under Alternative A.

Grasslands

Cumulative effects on grasslands would be similar to those described under sagebrush/grasslands.

Riparian/Wetland Communities

The condition of riparian/wetland areas on BLM-administered lands is often a function of management occurring upstream and downstream on multiple ownerships. BLM-administered lands comprise approximately 5 percent of the total watershed area. In these mixed-ownership watersheds, the BLM's ability to achieve PFC in riparian-wetland areas may be limited by the capability of the site due to effects on lands not administered by the BLM. These effects include upstream effects, such as alterations in sediment delivery or stream flow, channel or floodplain manipulations, and sources of invasive species; downstream effects, such as head cut migration and channel and floodplain manipulations; and effects next to riparian/wetland areas, such as channel and floodplain manipulations (e.g., highways and railroads). Where these effects occur, it may be impossible to achieve PFC, and the site capability may be the highest level of functionality that can be achieved.

In locations where the underlying hydrologic and geomorphic processes that drive riparian and wetland habitat conditions are functioning properly, BLM management can have a significant influence on the conditions of BLM-administered riparian and wetland habitats, irrespective of segments that the BLM does not administer. In such locations, actions that minimize and mitigate surface disturbance and promote healthy, deep-rooted plant communities are usually sufficient to achieve PFC. However, on BLM-administered riparian and wetland areas, where upgradient hydrologic and geomorphic drivers are highly altered on land that the BLM does not administer, the BLM's ability to influence riparian and wetland conditions is limited.

In the planning area, this is common, especially where contributing watersheds are highly modified by agriculture, forestry practices, and water diversions. Therefore, in highly altered watersheds, there are ownership and socioeconomic constraints on the BLM's ability to improve conditions.

If the riparian-wetland areas still produce attributes and functions allowing them to function properly, then they would still be managed for the resource values associated with the altered potential. However, there are some riparian/wetland areas with permanent structures or activities that have been modified to such an extent that they are largely considered artificial and no longer produce natural ecologic functions. These areas will be managed accordingly.

In addition, riparian/wetland vegetation depends highly on the quantity of water available. Decreasing the percent of watershed disconnected by impoundments under Alternatives B and D would contribute to more lotic riparian vegetation in the planning area by increasing the volume of water available at lower elevations. However, numerous impoundments occur on lands not administered by the BLM, and the BLM would have little authority over how these water bodies would be managed. As a result, under all alternatives, water impoundments on lands not administered by the BLM would continue to affect watershed connectivity and the presence or absence of riparian/wetland vegetation.

In lentic systems, reduced water depth due to sediment deposits, combined with other water uses on lands not administered by the BLM (e.g., irrigation or fluid mineral depletions) could result in reduced water availability under all alternatives, thereby reducing the health and vigor of wetland vegetation.

4.2.5 Fish and Wildlife

Effects Common to All Alternatives

The application of BMPs and mitigation measures (**Appendix F**) for surface-disturbing activities would likely reduce effects on fish and wildlife associated with authorized land uses or activities such as road, pipeline, or power line construction; mineral development; range improvements; and recreational activities. BMPs and mitigation would reduce or eliminate the removal or alteration of habitat.

Requiring a reclamation plan (**Appendix G**) for all surface-disturbing activities across all alternatives would stabilize disturbed areas in the short term and stabilize landscapes in the long term, reducing potential effects from loss or alteration of habitat.

Fish and Aquatic Communities

Because no development of federal coal resources is anticipated, there would be no effects on aquatic species from management. Similarly, locatable mineral development in the planning area would likely remain uneconomical for the life of the RMP, so no effects are expected.

Nonenergy solid leasable mineral prospecting would have a negligible effect on fish and other aquatic species.

Salable mineral development is primarily for sand and gravel needed for road surfacing and generally requires limited development adjacent to roadways. Changes in water quality through sediment inputs could occur in areas adjacent to roads and downstream from developments, depending on the intensity of operation.

Fluid mineral leasing stipulations (**Appendix L**) would not prevent development in areas already leased; here, the risk of effects on fish and other aquatic species would be greater. In the riparian and wetland community, recreation could affect stream functionality and reduce water quality through soil disturbance and erosion. Recreation use in the montane forests and meadows community could also lead to erosion and sedimentation of cold water aquatic priority habitats. This indirectly affects fish and aquatic communities by habitat alteration or loss, stress, and reduced recruitment, particularly for sediment-intolerant species, such as salmonids (Behnke 1979).

Under all alternatives, the Square Butte WSA would be subject to resource use restrictions that afford protections from surface-disturbing activities to wildlife in this area. Resource use restrictions in WSAs would likely provide protection to fish and aquatic communities by limiting surface disturbance and risk of sediment influx into cold water aquatic priority habitats. Effects would be the same as those identified in **Appendix W**.

Resource use restrictions in PHMAs and GHMAs would protect wildlife from direct removal and habitat fragmentation on BLM-administered lands. Use restrictions would not apply to private lands, which make up most of the sagebrush/grasslands priority vegetation type. Wet meadows would be managed with an emphasis on maintaining a perennial component, which would protect species that use these habitats from disturbance.

Wildlife and Habitat

Effects from coal, locatable and nonenergy minerals would be as described above for aquatic species.

WSAs and recreational uses would also affect wildlife in ways similar to aquatic species, with the additional potential effect of vehicular mortality to terrestrial wildlife species, including small mammals, reptiles, amphibians, and ground-nesting birds.

Because recreation and interest in exploring caves is expected to continue to increase, the risk of exposing bats to white-nose syndrome (WNS) would continue. Interim management for WNS is to use containment and decontamination procedures to reduce, but not eliminate, this risk.

Fuels treatments in PHMAs and GHMA would support long-term maintenance of a sagebrush component. Conifer encroachment would be reduced, benefitting wildlife that use sagebrush/grasslands habitat, while reducing habitat for species that use conifers.

The effects on wildlife habitat from lands and realty management would be similar to those discussed under **Section 4.2.4**. Additional effects are wildlife habitat fragmentation, avoidance, interference with movement, and increased likelihood of injury or death. Bird deaths and injuries could occur from colliding with, or being electrocuted by, transmission lines and other ROW structures (APLIC 2012). However, adhering to recommended practices for raptor protection would minimize this risk.

If ROWs for wind projects are authorized, there could be a risk of bird death or injury due to collision with wind turbine blades. Surface-disturbing land use authorization activities would generate noise and would result in habitat avoidance and increased risk of vehicular collisions. Effects would be fewer in areas managed as ROW exclusion or ROW avoidance.

Resource use restrictions in the Square Butte WSA would provide protection to priority species by reducing effects associated with habitat avoidance and risk of death through vehicle collisions. Under all alternatives, montane forests and meadows is the dominant vegetation type in the Square Butte WSA; therefore, effects would be greatest on species associated with this vegetation type.

Special Status Wildlife, Including Priority Species

Effects from coal, salable minerals, and locatable minerals would be as described above for aquatic species. Recreation would affect priority species in ways similar to other wildlife, including habitat loss, disturbance, noise, and vehicular mortality.

Management goals, objectives, and actions would maintain or increase greater sage-grouse and other sagebrush obligate species abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem. This analysis incorporates effects on greater sage-grouse from the Lewistown Field Office Greater Sage-Grouse Proposed Resource Management Plan Amendment and Final Environmental Impact Statement by reference (BLM 2015a).

Alternative A

Fish and Aquatic Communities

Temperatures are anticipated to continue to rise in the planning area (BLM 2010). An increase in stream temperatures could affect habitat suitability, particularly for cold water aquatic priority habitats, and could increase the risk of hybridization of invasive and native fish species (Muhlfeld et al. 2014). Salmonid species are particularly sensitive to warmer water temperature.

Soil-disturbing activities would affect water quality for fish and aquatic communities through increased turbidity or alteration of habitats. Soil erosion from authorized activities or resource uses, in combination with soil erosion from natural disturbances, would increase sediment levels in warm and cold-water aquatic habitats. In lentic systems, this could result in a long-term trend toward decreased reservoir volume as sediment is deposited, which would reduce habitat over time for game fisheries.

Similarly, sediment deposition in lotic systems could fill scour pools over the short term. However, because periods of high flows may flush or redistribute sediment, responses would be variable. In general, species associated with warm water aquatic priority habitats are more sediment tolerant than those species associated

with cold water aquatic priority habitats (Bramblett et al. 2005); therefore, an increase in sediments and turbidity is likely to have a greater effect on those species associated with cold water aquatic habitats.

Sediment influxes in cold water aquatic habitats could alter mountain stream habitats (if sediment levels are greater than the stream can effectively move) and increase turbidity. These effects could contribute to the continued decline of salmonid species. Some fish species would be less effected by sediment influxes. These are special status warm water species that tolerate high sediment levels (e.g., sturgeon chub and sauger) and other fish that do not have special status and can tolerate turbidity.

Water impoundments would continue to affect habitat connectivity and water availability for fish and other aquatic species by altering natural flow and thermal and sediment regimes. For species associated with warm water aquatic priority habitats, impoundments may reduce water quantity by limiting flow through intermittent and ephemeral prairie streams and by reducing or eliminating perennial pools.

Priority vegetation types are not specifically identified or managed for under Alternative A; however, riparian and wetland communities would be managed to improve or maintain PFC. PFC demonstrates the presence of physical attributes within an aquatic system (e.g., vegetation, large woody debris, and diverse ponding and channel characteristics), which may serve as important habitat components for warm or cold-water aquatic species. As such, managing for PFC would support functional habitat conditions for fish and aquatic communities.

Wildfire would affect cold and warm water aquatic habitats by reducing or removing aquatic vegetation that provides shade and cover. This could change stream temperature, which could be detrimental to cold water species. Recovery of streamside vegetation would likely result in a gradual decrease in stream temperatures; however, elevated temperatures may occur for a decade or two (Dunham et al. 2003), particularly where fires result in a transition to a new vegetation community. However, because disturbance (including fire) is a fundamental characteristic of aquatic ecosystems, many species have life histories that are shaped by, and may depend on, such events (Dunham et al. 2003).

Where wildfires affect riparian and wetland vegetation communities, there would be a short-term reduction or loss of aquatic invertebrates and algae (Rieman et al. 2012), which could affect food availability for fish and aquatic species. Additionally, wildfires may increase sediments in cold water habitats, which could affect habitat suitability for salmonids.

As discussed in **Section 4.2.4**, riparian and wetland communities are mostly managed as Category B (17,000 acres), with some areas managed as Category C (6,400 acres). Wildfire suppression under Alternative A would focus on the increasing fuel loads near streams and rivers that could put these areas at a greater risk of high intensity fire. A high intensity wildfire would have the greatest effect on fish and aquatic communities in isolated stream segments or on small networks in steep, confined drainages (particularly those in cold water aquatic priority habitats).

Severe fires in these areas are likely to burn a large proportion of the headwaters and riparian corridor (Rieman et al. 2012). However, fire severity and its effects depend on numerous factors, such as season, weather conditions, accessibility, and timing; therefore, effects would be variable.

Fire suppression could affect fish and aquatic communities through the use of retardants, heavy machinery, dozer lines, fuel breaks, and other surface disturbances. Such activities could increase the sediment and turbidity in stream reaches over the short term, particularly when surface-disturbing suppression occurs near or next to stream reaches, and may result in the loss or reduction of streamside vegetation. Additionally, chemicals used for wildfire suppression may have a toxic effect on aquatic organisms, although the duration and extents of these effects are poorly understood (Rieman et al. 2012).

Erosion and water use from oil and gas development of existing leases is likely to continue under Alternative A. However, the LFO would continue to defer fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. (Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO.) Total oil and gas development in the decision area would continue to be

limited to leases not requiring special wildlife stipulations. Because of this, effects from fluid mineral development would continue to be low.

On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 456 acres; long-term disturbance could affect approximately 88 acres (**Table W-1, Appendix W**). On existing leases or new leases, water depletions could affect groundwater inputs in lotic systems and may reduce carrying capacity for warm and cold-water aquatic species.

Improper livestock grazing may degrade riparian areas and affect streambank stability and structure, which could affect fish and aquatic communities. Changes in streamside vegetation could affect water temperature, and animal waste could elevate nutrient levels. In addition, cattle trampling on trout redds and other aquatic organisms can result in a loss of eggs or direct mortality. However, adhering to the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota (BLM 1997) for grazing would reduce the risk of improper grazing effects on fish and aquatic communities.

Effects on warm and cold-water aquatic communities are likely to continue as a result of increased recreation. Because access is a limiting factor for recreation, the effects would likely be concentrated in existing SRMAs and ERMAs. Increased recreation in aquatic areas would also increase the risk of aquatic nuisance species (ANS) spread and establishment. ANS have the potential to reduce or displace native aquatic species.

Indirect effects on fish and aquatic communities from travel and transportation management would primarily result from erosion and sediment influx in cold water habitats. This can result in habitat alteration or loss, stress, and reduced recruitment, particularly for sediment-intolerant species, such as salmonids (Behnke 1979).

The continued use of motorized vehicles and OHVs would contribute to sediment inputs in riparian habitats. In areas closed to motorized travel and/or OHV travel, there would be minimal effects on fish and other aquatic species. In areas where OHV use is limited or limited seasonally, there would be a higher risk of erosion and sediment inputs and thus a higher risk to fish and aquatic communities.

Permitted surface-disturbing activities associated with land use authorizations may increase erosion and sediment levels, which could affect aquatic species habitat availability and complexity. Areas managed as ROW exclusion would continue to protect warm and cold-water aquatic priority habitats from erosion and water quality degradation. Areas managed as ROW avoidance would also protect priority vegetation communities from new ROW authorizations but would not preclude new infrastructure. Sediment influx into cold water aquatic habitats would continue to contribute to turbidity, risk of habitat alteration, reduced recruitment, and increased stress.

Forests, woodlands, and special products are harvested almost entirely in the montane forests and meadows priority vegetation community, which is interspersed with cold water aquatic priority habitats. Timber harvesting, including haul route construction and use, could result in surface disturbance and sediment influx in cold water streams. In addition, removing trees along streams and other waterways could alter aquatic habitats by increasing water temperature and reducing the potential for large woody debris recruitment, which could decrease habitat complexity (Bisson et al. 1987; Bragg et al. 2000). However, ground-based logging equipment would generally be limited to slopes with an average grade of less than 45 percent, and the season of logging would be limited to avoid soil compaction and rutting.

Logging methods in riparian areas would follow the Montana Guide to Streamside Management Zone Law and Rules to minimize the amount of sediment-laden overland flow that reaches stream channels. These measures would help to limit the extent of sediment influx, and potential for habitat alteration, but they would not preclude the effects of increased water temperature and reduced potential for large woody debris recruitment. Sediment influx and increased temperature and reduced large woody debris recruitment into warm and cold-water aquatic habitats may still occur; nevertheless, effects on fish and aquatic communities from timber harvest would generally be minimized. This would come about through the use of site-specific analysis to determine stream-side buffers, which best maintain or improve the physical and biological integrity of the riparian area.

Lands managed as ACECs would help to protect fragile fish and aquatic communities by restricting other resource uses. Continued management of the Collar Gulch ACEC would provide continued protection to the westslope cutthroat trout and maintenance or improvement of its habitat.

Interim management guidelines for stream segments that are eligible for inclusion in the NWSRS would protect the free-flowing nature of these segments. They also would disallow any action that would diminish water quality, thereby protecting aquatic communities.

Wildlife and Habitat

Management of water impoundments would continue to affect watershed connectivity and water availability for wildlife.

Priority vegetation types are not specifically identified or managed for under Alternative A; therefore, it would lack a comprehensive landscape-level approach for managing priority vegetation types and wildlife species associated with them. Noise generated by silviculture prescriptions may result in short-term effects on wildlife (e.g., habitat avoidance) and long-term effects on habitat (e.g., restoration of natural fire regimes, as discussed under **Section 4.2.4**).

In general, wildlife management would minimize loss, fragmentation, or degradation of wildlife habitat. However, the lack of comprehensive planning for wildlife would limit the BLM's ability to protect and maintain species associated with specific priority vegetation types. Management for special status species would provide habitat protection for species that do not have special status designation.

Wildfire could result in short-term or long-term effects on wildlife, including habitat avoidance, displacement, and potentially direct mortality. High-intensity wildfires could also lead to long-term changes in wildlife habitat composition and structure, as discussed under **Section 4.2.4**. However, wildfires may also increase habitat patchiness, providing wildlife with a diversity of vegetation conditions from which to select food and cover (Smith 2000).

Trees killed by fires may provide nest sites for woodpeckers and for secondary cavity nesters, such as other birds and mammals (Smith 2000). Wildfire suppression activities, including fire line construction and the use of vehicles and helicopters, may result in short-term noise disturbance and habitat avoidance effects.

Management of VRM classes may limit or prohibit certain disturbances, which could influence the potential for noise or wildlife disturbances. In VRM Class I and Class II areas, restrictions on authorized activities would reduce the likelihood of habitat avoidance due to noise or physical removal or loss of habitat. In VRM Class III and Class IV areas, there would be fewer restrictions on authorized activities that could affect visual resources and, therefore, a greater likelihood of noise or disturbance to wildlife.

Wildlife avoidance and habitat fragmentation from oil and gas drilling and development on existing leases would continue under Alternative A. However, the LFO would continue to defer fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. (Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO.) Oil and gas development in the decision area would continue to be limited to leases not requiring special wildlife stipulations. Because of this, effects from fluid mineral development would continue to be low.

On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 456 acres; long-term disturbance could affect approximately 88 acres (**Table W-1, Appendix W**). Existing oil field waste pits may pose a risk to birds by entrapping them in oil, causing death or illness.

In grazing areas, there would be less cover for wildlife that depend on tall grass herbaceous vegetation. Structural range improvements could provide perches for raptors, where they can prey on small mammals and birds. In addition, fences could create barriers for certain wildlife by blocking or hindering movements, seasonal migrations, and access to forage and water.

Recreation that results in more human-caused noise would have a greater disruptive effect on wildlife. These activities include OHV use and hunting. Additionally, lead shot ingestion by raptors and other wildlife species can lead to elevated lead exposure and poisoning (Fisher et al. 2006).

Effects on wildlife habitat from travel, transportation management, and access would correspond to effects on priority vegetation communities, as discussed under **Section 4.2.4**. Restricting OHVs to designated routes during the hunting season would likely improve big game habitat and make game available.

Forests, woodlands, and special products are harvested almost entirely in the montane forests and meadows priority vegetation community; therefore, effects on wildlife species that are associated with this vegetation type, such as elk, would be greater than species associated with the lower-elevation vegetation types. Forest logging equipment would generate noise and could result in short-term habitat avoidance and risk of death from vehicle collisions.

Timber harvesting may also remove nesting habitat for forest-dependent bird species. Clear-cutting blocks would be limited to fewer than 10 acres, and in these areas, species that use edge habitats would be favored. The use of silviculture prescriptions would help to support healthy forest conditions and wildlife habitat, as discussed under **Section 4.2.4**.

Lands managed as ACECs would help to protect wildlife habitat by restricting other resource uses. ACECs under Alternative A would encompass ponderosa pine breaks and badlands, montane forests and meadows, sagebrush/grasslands, and grasslands vegetation types and species that inhabit those areas. ACECs would also encompass riparian and wetland communities, although this would affect fewer than 50 acres. Therefore, the habitats would be protected for species associated with these vegetation types.

Special Status Wildlife, Including Priority Species

All priority species and special status species fall under at least one priority vegetation type (see **Appendix E**). Therefore, management for and effects on priority habitats and vegetation have a direct link to management of priority and special status species. Because effects on priority vegetation types are discussed under **Section 4.2.4**, this section has only a limited description of effects on priority species and special status species habitats; instead, it focuses on the indicators listed above.

Priority vegetation types are not specifically identified or managed for under Alternative A. Therefore, Alternative A would lack a comprehensive landscape-level approach for managing priority vegetation types and priority species associated with them.

In general, fish and wildlife management would minimize habitat degradation for priority and special status species. Priority species are not specifically identified under Alternative A, although current management does include actions that support the protection or persistence of priority species. Emphasizing consistency with the NCDE Grizzly Bear Recovery Plan would limit the likelihood of resource use conflicts with grizzly bears. Seventy-one acres of prairie dog towns would be maintained, which would provide habitat for short-grass-dependent birds and would provide foraging habitat for ferruginous hawks and other raptors. Prohibiting domestic sheep grazing from overlapping bighorn sheep habitat would continue to limit, but not eliminate, the risk of disease transmission.

Water impoundments may serve as mosquito breeding habitats, which could pose a risk to nearby greater sage-grouse populations. West Nile virus would continue to play an important role in recruitment and survival rates for both chicks and adults, as discussed in the LFO Greater Sage-Grouse Proposed RMP Amendment (BLM 2015a).

The effects of wildfire on priority species would be the same as discussed under *Wildlife and Habitat*.

The effects of coal, locatable, and nonenergy leasable minerals and energy resources on priority species would be similar to those discussed under *Wildlife and Habitat*.

Under Alternative A PHMA would not be open for new commercial mineral material sales and only for free use mineral material development. The effects of free use salable mineral development within PHMA could degrade,

fragment, and remove sage-grouse habitat where they occur and cause sage-grouse disturbance and avoidance. However, stipulations for free use salable mineral use would follow all applicable RDFs and effects to sage-grouse would be minimal.

Wildlife avoidance and habitat fragmentation from oil and gas drilling and development on existing leases would continue under Alternative A. However, the LFO would continue to defer fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. (Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO.) Oil and gas development in the decision area would continue to be limited to leases not requiring special wildlife stipulations. Because of this, effects from fluid mineral development would continue to be low.

The effects of livestock grazing on special status wildlife, including priority species, would be similar to those effects described under *Wildlife and Habitat*. Range improvements, lack of residual cover, and concentrated livestock use would have the greatest effect on greater sage-grouse, as fences and the absence of cover may provide predation opportunities or may present a collision hazard.

Recreation that increases human-caused noise would have a greater disruptive effect on priority species. These activities include using OHVs for hunting.

Effects on priority species habitat from travel, transportation management, and access would correspond to effects on priority vegetation communities, as discussed under **Section 4.2.4**.

The effects on priority species habitat from lands and realty management would be similar to those discussed under **Section 4.2.4**. Additional effects are wildlife habitat fragmentation, avoidance, interference with movement, and increased likelihood of injury or death. ROW structures could increase predation on greater sage-grouse from raptors and corvids.³

If ROWs for wind projects are authorized, there could be a risk of bird death or injury due to collision with wind turbine blades. Surface-disturbing land use authorization activities would generate noise and would result in habitat avoidance and increased risk of vehicular collisions. Effects would be less in areas managed as ROW exclusion or ROW avoidance.

Clear-cutting blocks would be limited to fewer than 10 acres. In these areas, species that use edge habitats would be favored. The use of silviculture prescriptions would help to support healthy forest conditions and wildlife habitat, as discussed under **Section 4.2.4**.

The effects of managing ACECs would be the same as described under *Wildlife and Habitat*.

Alternative B

Fish and Aquatic Communities

Under Alternative B, fugitive dust emission controls would reduce dust deposition on aquatic habitats. Reducing dust would reduce the transmission of sediment and pollutants into adjacent water bodies and would improve water quality in both cold water and warm water aquatic systems. However, because dust deposition into aquatic habitats is not a significant pollutant source, this effect would be negligible.

Unlike Alternative A, Alternative B would implement adaptive management strategies to address climate variability, in order to enhance habitat connectivity. This would indirectly allow for more management flexibility to maintain or restore aquatic habitat.

Avoiding and mitigating disturbance to biological soil crusts and adhering to BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would provide for long-term protection of riparian/wetland vegetation communities, as discussed under **Section 4.2.4**. This management would have greater effects on

³Species such as crows and ravens

species associated with cold water aquatic priority habitats. This is because they are generally less sediment tolerant than warm water aquatic species.

Under Alternative B, water resources would be managed to increase the percent of lotic riparian-wetland miles by decreasing the percent of watershed disconnected by impoundments. This would result in a conversion of lentic vegetation communities to lotic vegetation communities in areas where impoundments are removed.

Increasing watershed connectivity and removing water impoundments could change flow, temperature, and sediment regimes to more closely resemble pre-impoundment conditions. This could result in a seasonal increase in water quantity in warm water aquatic priority habitats, particularly in intermittent and ephemeral stream systems below the impoundments.

Reestablishing pre-impoundment flow regimes may increase seasonal scour pools, which provide refuge for warm water fish and aquatic communities during summer. In addition, streamside woody vegetation could increase, which would indirectly affect water temperature by reducing direct solar radiation.

Establishing riparian management zones and applying BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) in water, riparian areas, wetlands, and floodplains would result in long-term improvements in riparian/wetland vegetation and associated aquatic systems. This would help to regulate water temperature and habitat quality (e.g., bank cover, bank stability, and other hydrologic features and functions), thereby maintaining suitable habitat for fish and aquatic communities.

Under Alternative B, five priority vegetation communities would be spatially defined and managed to maintain diverse ecological conditions. Vegetation management effects on each of these priority vegetation types are discussed in **Section 4.2.4**. Riparian and wetland community systems would be managed to increase the percent of lotic riparian wetland miles. This would increase riparian/wetland vegetation communities along lotic systems, improving habitat for species associated with warm water intermittent and ephemeral systems.

Fish and wildlife management under Alternative B would maintain and improve BLM-administered lands for cold water and warm water aquatic priority habitats for native species. In addition, the goals, objectives, and actions for fish and aquatic communities would support habitat preservation or expansion for special status fish species in warm and cold-water aquatic habitats. It would do this by increasing watershed connectivity and water availability. Fluid mineral leasing stipulations (**Appendix L**) for fish and wildlife would help protect water corridors and would reduce the likelihood of effects on fish and other aquatic species habitats (e.g., sedimentation, water depletions, and risk of spills or leaks that could affect water quality and habitat suitability).

The effects of wildfire on fish and aquatic habitat would be similar to those described under Alternative A. However, there would be a greater fire desirability in riparian and wetland communities; that is, fire management would dictate fewer constraints on the use of fire (see **Section 4.2.4**). As such, there could be an increase in the number of occurrences of short-term sediment influx into waterways due to fire; this could affect habitat suitability for certain fish and aquatic communities. However, increased fire desirability could also help restore natural fire regimes. It would reduce the risk of high intensity fires that cause long-term effects on water temperatures and habitat suitability for fish and aquatic communities.

In addition, the effects of fire suppression, as described under Alternative A (e.g., increased turbidity, and disturbance or removal of streamside vegetation), would be less than under Alternative A. Where fire suppression near streams and reservoirs does occur, implementing ES&R would minimize the effects. This would reduce erosion and sedimentation in nearby cold and warm water aquatic habitats.

Identifying and managing lands for the protection of their wilderness characteristics would restrict resource uses (e.g., ROWs, construction of new roads, OHV travel, and other energy developments) and would protect fish and aquatic communities from habitat disturbance or resource uses that could affect water quality and quantity. These effects would be concentrated on approximately 6,000 acres, which consist of riparian and wetland communities. This differs from Alternative A, which does not identify lands with wilderness characteristics (BLM GIS 2015a).

Unlike under Alternative A, the LFO would not defer leasing for fluid minerals in nominated parcels in important wildlife areas. Therefore, fluid minerals could be developed in important wildlife areas, as well as other areas outside the important wildlife areas. This could affect fish and other aquatic species. However, fluid mineral closures under Alternative B would provide for long-term protection of fish and other aquatic species on 200,600 acres. These closures would reduce these types of effects in both important and non-important wildlife areas. Approximately 5,700 acres would be protected, consisting of the riparian and wetland priority vegetation type. In these areas, aquatic species would be protected from water quality impairment resulting from soil disturbance, vegetation removal, and erosion.

Overall, short- and long-term surface disturbance effects from fluid minerals would be similar to those under Alternative A. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 330 acres; long-term disturbance effects could affect approximately 72 acres (**Table W-1, Appendix W**).

Fluid mineral leasing stipulations (**Appendix L**) would not prevent development of areas already leased; in these areas, risk of effects on fish and other aquatic species would be greater than areas that have not been leased.

Under Alternative B, 30,000 acres would be unavailable for livestock grazing, an increase of 15,400 acres over Alternative A. In cold and warm water riparian and wetland areas, 1,700 acres would be unavailable to grazing. This reduction in grazing in riparian areas would protect fish and other aquatic species from possible erosion and sedimentation in cold water streams, resulting from vegetation removal and trampling by livestock. In addition, there would be less risk of water quality effects due to livestock waste. Fish and other aquatic species would experience improved habitat conditions from grazing restrictions under this alternative.

Fluid minerals leasing surface use stipulations (**Appendix L**) for protecting recreation and visitor service values would restrict mineral development that could disturb fish and aquatic communities. Because recreation stipulations are more extensive than under Alternative A, there would be increased protection of fish and aquatic communities.

Not designating any reservoirs as ERMA's under this alternative could reduce the likelihood of introduction or spread of ANS, compared with Alternative A.

Under Alternative B, management would close 209,000 acres to motorized travel in sensitive areas, or more than 13 times the combined closure for OHV and motorized travel under Alternative A (BLM GIS 2015a). The closures would protect habitat for fish and other aquatic species by eliminating all motorized vehicle use (including administrative and permitted use), which disturbs soil, resulting in sedimentation and erosion in waterways. Thus, under Alternative B, both cold and warm water aquatic systems would be protected from damage associated with motorized travel, more than under Alternative A.

Under Alternative B, areas managed for ROW exclusion would increase from Alternative A, while areas open to ROWs would decline. This management would reduce soil loss, vegetation loss, and erosion in riparian and wetland communities, protecting habitat for fish and other aquatic species. Preserving soil and vegetation would improve water quality in both cold water and warm water aquatic systems. Areas managed as ROW avoidance would also protect natural systems from new ROW authorizations but would not prevent new infrastructure.

Under Alternative B, 206,300 additional acres would be closed to timber harvest, compared with Alternative A. In these areas, erosion and soil loss would be reduced, leading to reduced turbidity and potentially higher water quality in cold water streams. In areas where timber harvesting is allowed, the direct and indirect effects on aquatic species would be the same as under Alternative A.

Lands managed as ACECs would encompass all priority vegetation communities, including 500 additional acres of riparian and wetland vegetation. The types of effects from managing ACECs would be similar to those identified under Alternative A. However, managing additional acres of riparian/wetlands and other priority communities as ACECs would afford more comprehensive watershed protection than under Alternative A. It would do this by limiting surface-disturbing activities that might otherwise contribute to increased sediment and turbidity in streams. For example, Collar Gulch ACEC would be managed to protect a strain of westslope cutthroat trout,

and designation of the Sun River ACEC would provide habitat protection to fish and aquatic species found in the Sun River.

Determining stream segments as suitable for inclusion in the NWSRS would result in added protection to aquatic species over Alternative A. This would come about by formalizing the interim protective measures and implementing ROW and energy development restrictions.

Wildlife and Habitat

Alternative B would implement adaptive management strategies to address climate variability in order to enhance habitat connectivity. This would indirectly allow for more management flexibility to maintain or restore habitat.

Avoiding and mitigating disturbance to biological soils crusts and implementing fluid minerals NSO stipulations for soils would provide for long-term protection of all priority vegetation communities, as discussed under **Section 4.2.4**. Therefore, soil resource management would also protect wildlife associated with these priority vegetation types. It would do this by restricting surface-disturbing activities, such as fluid mineral development and ROW authorizations, which might otherwise affect wildlife through noise, habitat avoidance and removal, and degradation.

Under Alternative B, water resources would be managed to increase the percent of lotic riparian-wetland miles by decreasing the percent of watershed disconnected by impoundments. Increasing watershed connectivity and removal of water impoundments could increase seasonal water availability for wildlife along ephemeral and intermittent streams, as compared with Alternative A. However, removal of impoundments would reduce water availability for wildlife in lentic systems.

Unlike Alternative A, Alternative B defines five priority vegetation communities and would manage them to maintain diverse ecological conditions. Vegetation management effects on each of these priority vegetation types are discussed in **Section 4.2.4**. Riparian and wetland communities would be managed to increase the percent of lotic riparian wetland miles, which would increase riparian/wetland vegetation communities along lotic systems, thereby improving streamside wildlife habitat.

For ponderosa pine breaks/badlands, treatments would help to restore vegetation species composition to reduce the likelihood of high severity wildfire and help to restore natural fire regimes. This would reduce the risk of a catastrophic wildfire that could kill wildlife and have long-term habitat effects by removing nesting, cover, or foraging habitat. In montane forests and meadows, restoring areas affected by disease would help to improve ecological function and forest health for forest-dwelling wildlife. In sagebrush/grasslands, restoring native grass, forb, and sagebrush species and limiting conifer encroachment would help sustain grassland and sagebrush birds.

Fish and wildlife management would provide for the long-term protection of wildlife and wildlife habitat. Mitigation for migratory birds during activity-level planning would reduce the likelihood of mortality. Implementing the most current raptor protection standards (instead of antiquated recommendations, as under Alternative A) would reduce the likelihood of raptor death. Improving or maintaining deciduous woody vegetation would provide nesting, cover, and forage habitat for a variety of wildlife species, particularly those associated with the montane forests and meadows vegetation type.

The types of effects of wildfire on wildlife and habitat would be similar to those discussed under Alternative A. However, in general there would be more fire desirability for all priority vegetation types, as discussed under **Section 4.2.4**. Short-term effects may include increased instances of habitat avoidance; however, long-term restoration of natural fire regimes would improve wildlife habitat.

Identifying and prioritizing the protection of lands with wilderness characteristics would restrict resource uses (e.g., ROWs, road construction, OHV travel, and other energy developments), and would protect wildlife from disturbance and nest and habitat destruction. Most lands with wilderness characteristics would be located in the ponderosa pine breaks/badlands vegetation type (106,100 acres) and the sagebrush/grasslands vegetation type (76,200 acres). Effects on wildlife and habitats would be greatest in these areas. Effects would also occur on 4,000 acres in grasslands, 9,600 acres in montane forests and meadows, and 6,000 acres in riparian and wetland

communities. Compared with Alternative A, there would be greater protection of wildlife and habitats in these areas.

Unlike under Alternative A, the LFO would not defer fluid mineral leasing of nominated parcels in important wildlife areas. Therefore, there could be fluid minerals development in these areas and in others outside the important wildlife areas. This could affect wildlife and habitat in these areas. However, fluid mineral closures under Alternative B would provide for long-term protection in 200,600 acres from trampling, fragmentation, and direct removal due to fluid mineral leasing. These closures would reduce these types of effects in both important and non-important wildlife areas. Fluid mineral leasing stipulations (**Appendix L**) for wildlife would reduce population disturbance and habitat destruction. It would do this by restricting surface occupancy and vegetation removal, trampling, and habitat fragmentation.

Overall short- and long-term surface disturbance effects would be similar to Alternative A. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 330 acres; long-term disturbance effects could affect approximately 72 acres (**Table W-1, Appendix W**). If new leases were issued, effects could include wildlife avoidance, increased movement rates, and probabilities of flight response in affected areas (Wisdom et al. 2004; Rowland et al. 2004).

Under Alternative B, 30,000 acres would be unavailable for livestock grazing, an increase of 15,400 acres over Alternative A. In these areas tall-grass wildlife species (e.g., grasshopper sparrows) would be favored over short-grass species (e.g., chestnut-collared longspurs). In areas where livestock grazing is permitted, forage allocations would be approximately half that of Alternative A. This reduction in AUMs would result in less forage consumed by livestock and would promote sustainable vegetation and cover for grassland- and sagebrush-dwelling birds and other wildlife, although habitat quality may be reduced for species that prefer short-grass or heavily grazed areas (Krausman et al. 2009).

Fluid mineral leasing stipulations (**Appendix L**) for protecting recreation and visitor service values would restrict uses that might disturb wildlife and habitat.

Under Alternative B, management would close 209,000 acres to motorized travel in sensitive areas. The closures would protect habitat for wildlife by prohibiting all motorized vehicle use (including administrative and permitted use), which can kill and disturb wildlife, increase soil disturbance and vegetation trampling, and result in sedimentation and erosion in waterways. However, restricting OHVs in Chain Buttes and East Indian Butte BMAs (28,700 acres) during the hunting season would likely improve big game habitat and make game available. Overall, under Alternative B, wildlife would be protected from mortality, disturbance, nest destruction, and habitat damage associated with motorized travel, more than under Alternative A.

Under Alternative B, areas managed for ROW exclusion would increase, while areas open to ROWs would decline. This management would reduce soil loss, vegetation loss, and erosion in priority vegetation communities, protecting habitat for wildlife that inhabit these areas.

Areas managed as ROW avoidance would also protect natural systems from new ROW authorizations but would not prevent new infrastructure. Construction of wind energy facilities could result in effects on birds, as discussed under Alternative A; however, fewer acres would be available for wind energy development.

Additional acres of montane forest would be closed to timber harvest under Alternative B compared with Alternative A. Habitat avoidance from noise and risk of death from vehicle collisions would be less than under Alternative A.

The effects of managing ACECs would be similar to those identified under Alternative A. However, under Alternative B, managing additional acres of riparian/wetlands and other priority communities as ACECs would afford more comprehensive protection to wildlife. Blind Horse, Chute Mountain, Deep Creek/Battle Creek, and Ear Mountain areas would be established as ACECs to protect wildlife habitat under Alternative B. Judith Mountains would protect scenic values and also provide incidental protection to wildlife.

Determining stream segments as suitable for inclusion in the NWSRS would result in added protection to riparian wildlife habitat compared to Alternative A. This would come about by formalizing the interim protective measures and implementing ROW and energy development restrictions.

Special Status Wildlife, Including Priority Species

Implementing fluid minerals NSO stipulations for soils and other avoidance and mitigation measures for soils would reduce the likelihood of fragmentation of special status wildlife and priority species habitats. Reducing fragmentation of prairie dog colonies could help maintain or expand habitat for species associated with priority habitat (e.g., burrowing owl and mountain plover). Any fluid minerals NSO stipulations in GHMA could provide additional protection to greater sage-grouse populations and other sagebrush obligate species. Soil stipulations would be more comprehensive under Alternative B compared with Alternative A; therefore, protecting special status wildlife and priority species would be greater.

Under Alternative B, water resources would be managed to increase the percent of lotic riparian-wetland miles by decreasing the percent of watershed disconnected by impoundments. Increasing watershed connectivity and removing water impoundments could reduce mosquito breeding habitat, which could reduce the effects of mortality or recruitment on greater sage-grouse.

Establishing riparian management zones and applying fluid minerals leasing stipulations (**Appendix L**) in water, riparian areas, wetlands, and floodplains would result in greater long-term protection to special status and priority wildlife habitat. This is particularly the case for those species associated with riparian/wetland communities, when compared with Alternative A.

All special status and priority species are found in at least one priority vegetation type, even if not explicitly stated. The health of special status species is tied to the health of the priority habitats and vegetation that they depend on. Therefore, identifying and managing for priority vegetation communities would help maintain or improve populations and habitats for special status wildlife and priority species. Vegetation management effects on each of these priority vegetation types are discussed in **Section 4.2.4**.

For species associated with ponderosa pine breaks/badlands, treatments would help to restore vegetation species composition to reduce the likelihood of high severity wildfire and improve VCC. In sagebrush/grasslands, restoring native grass, forb, and sagebrush species and limiting conifer encroachment would help sustain greater sage-grouse and other sagebrush obligate species populations.

Fish, wildlife, and special status species management would minimize habitat degradation and resource use conflicts for special status and priority species. Maintaining and expanding bighorn sheep habitat would allow for population expansion. Prohibiting sheep or goat allotments within 20 miles of occupied bighorn sheep habitat would reduce the risk of disease transmission, compared with Alternative A.

Implementing a food storage order in the grizzly bear recovery zone and Zone I would reduce the likelihood of bear/human conflicts caused by unsecured food, compared with Alternative A. Managing at least one Category 2 complex of prairie dog towns (1,000 or more acres) would provide habitat for special status birds associated with short-grass habitats (e.g., mountain plovers and breeding habitat for burrowing owls). In addition, prairie dog towns could provide foraging habitat and prey for ferruginous hawks and other raptors.

The effects of wildfire and ecology on priority species would be the same as those discussed under *Wildlife and Habitats*.

Identifying and prioritizing the protection of lands with wilderness characteristics would restrict resource uses (e.g., ROWs, new roads, OHV travel, and energy developments) and would protect priority and special status wildlife from disturbance and nest and habitat destruction. Most lands with wilderness characteristics would be in the ponderosa pine breaks/badlands vegetation type (106,100 acres) and the sagebrush/grasslands vegetation type (76,200 acres). Effects on special status wildlife and priority species would be greatest in these areas.

Effects would also occur on 4,100 acres in grasslands, 9,600 acres in montane forests and meadows, and 6,000 acres in riparian/ and wetland communities. Compared with Alternative A, there would be greater protection of special status wildlife and priority species in these areas.

The effects of salable mineral material sales on priority species would be the same as those discussed under Alternative A. The effects of fluid minerals leasing and development on priority species would be the same as those discussed under *Wildlife and Habitats*.

The types of effects of livestock grazing on priority species and special status wildlife species would be similar to those discussed under *Wildlife and Habitats*. In addition, reduced AUMs would provide more vegetation for wildlife and watershed functions. This would increase the amount of habitat for tall-grass bird associates and reduce amounts of mid- and short-grass habitats. For example, a reduction in AUMs would provide additional nest cover and concealment for Brewer's sparrow; while preferred habitat for the chestnut-collared longspur (short to medium grasses that have been recently grazed) would be reduced (Salo et al. 2004). The types of effects of recreation, visitor services, travel, transportation management, and access on special status wildlife and priority species would be the same as those described under *Wildlife and Habitat*.

The types of effects of lands and realty on special status wildlife and priority species would be similar to those described under *Wildlife and Habitat*. ROW avoidance and exclusion areas protect special status and priority species habitat, as discussed under **Section 4.2.4**.

More acres of montane forest would be closed to timber harvest under Alternative B than Alternative A. In these areas, noise, habitat avoidance, and removal of habitat would be reduced for grizzly bears and other special status species associated with montane forests and meadows. In areas where timber harvesting is allowed, the direct and indirect effects on special status wildlife and priority species would be the same as under Alternative A.

The types of effects of ACECs on special status wildlife and priority species would be similar to those described under *Wildlife and Habitat*. Montane forests and meadows would be the dominant vegetation type in the ACECs under Alternative B; therefore, habitat protections would be greatest for grizzly bears and other special status wildlife associated with this vegetation type.

Determining stream segments as suitable for inclusion in the NWSRS would result in more protection for special status wildlife and priority species associated with riparian/wetland communities than under Alternative A.

Alternative C

Fish and Aquatic Communities

The effects of air resource management and adaptive management for climate variability under Alternative C would be the same as described under Alternative B.

As with Alternative A, soil-disturbing activities could result in loss of topsoil, reduced vegetation cover, erosion, and sedimentation of warm water and cold-water aquatic priority habitats. Effects would be greater on those species that are sediment intolerant (i.e., cold water aquatic species). However, adhering to BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would minimize the direct effects on aquatic species.

Areas affected by recent or high intensity wildfire would likely be more susceptible to soil erosion and at greater risk of scouring, as would surface disturbances on areas with sensitive soils. However, unlike Alternative A, management for implementing ES&R would help to mitigate these effects. Instances of short-term influx of sediment into reservoirs would likely still occur from soil-disturbing activities (both natural and anthropogenic). This could result in a long-term trend toward decreased reservoir volume and reduced habitat for game fisheries as sediment is deposited. Similarly, sediment deposition in lotic systems could fill scour pools over the short term. However, because periods of high flows may flush or redistribute sediment, responses of warm and cold-water fish would be variable.

Similar to Alternative A, management of water impoundments would continue to affect flow, thermal, and sediment regimes of warm water aquatic priority habitats. However, the percent of lotic riparian/wetland

vegetation communities in PFC would likely increase as a result of mandatory requirement of Standards for Rangeland Health (BLM 1997), which may provide additional suitable habitat to fish and other aquatic species by improving the condition of NF riparian/wetland communities.

Under Alternative C, five priority vegetation communities would be spatially defined and managed to maintain diverse ecological conditions for wildlife, including fish and other aquatic species. In riparian and wetland communities, restrictions on draining, burning, filling, and leveling wetlands would provide added protection to fish and other aquatic species, compared with Alternative A. This would come about by reducing the risk of water quality impairment and potential mortality to individuals.

Fish and wildlife management under Alternative C would maintain and improve priority habitat requirements for cold water sport fishes. This would likely result in maintaining or increasing populations for these species. This is unlike Alternative A, which does not specifically identify and manage for cold water sport fisheries. Managing for cold water sport fishes also supports habitat for other cold-water fish and aquatic communities (e.g., westslope cutthroat trout). This management is unlikely to affect trends for warm water fisheries, and reservoirs would continue to support populations for these species.

Fluid mineral leasing stipulations (**Appendix L**) and closures specific to fish and wildlife would also protect the riparian/wetland communities for which those species are associated with, as discussed under **Section 4.2.4**.

The effects of fire management on fish and aquatic communities would be similar to those effects described under Alternative A. Within riparian/wetland communities, there would be 600 additional acres managed as Category B, instead of Category C, when compared to Alternative A. In this area, fire desirability would be less, and the effects associated with fire suppression described under Alternative A would be more likely to occur. However, implementing ES&R would minimize these short-term effects. This would reduce erosion and sedimentation in nearby cold and warm water aquatic habitats.

Similar to Alternative B, the LFO would not defer fluid mineral leasing on nominated parcels in important wildlife areas. There would be only 800 acres closed to leasing under Alternative C. Therefore, there could be fluid mineral development in important wildlife areas, as well as other areas outside the important wildlife areas. This could affect fish and other aquatic species. However, fluid mineral closures and NSO stipulations under Alternative C would provide for long-term protection of aquatic species from disturbance, death, or habitat loss due to fluid mineral leasing. Within riparian/wetland communities, 11,500 acres would be open to fluid mineral leasing, subject to NSO, 9,500 acres would be open to fluid mineral leasing, subject to standard stipulations, and no areas would be closed.

In areas open to fluid mineral leasing, effects would include increased risk of water quality impairment through spills, leaks, or increased erosion and sedimentation and risk of water depletions during production. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 384 acres; long-term disturbance could affect approximately 79 acres (**Table W-1, Appendix W**).

The effects of livestock grazing on aquatic species would be the same as those discussed under Alternative A.

Developing recreation facilities could disturb or kill wildlife or increase disturbance of aquatic habitat. Where recreation is concentrated near reservoirs and creeks (e.g., parts of the Judith SRMA), aquatic species disturbance is particularly likely, and there would be a higher risk of introducing ANS. In areas where recreation access is improved, such as in the Snowy Mountains SRMA, there would be a greater likelihood of disturbance to fish and aquatic communities compared with Alternative A. Stipulations associated with recreation sites would maintain the protection of riparian and wetland areas from fluid mineral development, protecting fish and aquatic communities from disturbance and the potential for habitat alteration.

The effects of travel management would be similar to those described for Alternative A. Taking into consideration watersheds, riparian resources, and forest resources when determining designation criteria would help to avoid effects on sensitive aquatic species habitat.

In most areas, the types of effects on aquatic species would be the same as described under Alternative A. However, fewer acres would be managed as open to ROWs in riparian and wetland communities. In these areas, effects on fish and other aquatic species would be reduced, compared with Alternative A.

Commercial timber harvesting could decrease vegetation cover and increase the likelihood of erosion and sedimentation of waterways, as discussed under Alternative A. Fewer areas would be closed to harvesting compared with Alternative A, so there would be a greater risk of short-term sediment inputs. This could affect habitat suitability for cold water fish and aquatic communities. Where new and temporary roads are constructed, there would be an increased risk of erosion into cold water aquatic habitat.

No areas would be designated as ACECs; therefore, there would be no special management for the protection of the relevant and important values of the potential ACECs, which could limit surface-disturbing activities and indirectly benefit fish and aquatic communities.

Releasing 27 stream segments from interim management protections would increase the risk of authorized activities affecting fish and aquatic communities in certain areas, compared with Alternative A. However, BMPs and mitigation measures for authorized uses or activities (**Appendix F**), and fluid minerals leasing stipulations (**Appendix L**) for water resources would continue to limit surface-disturbing activities on or near these streams.

Wildlife and Habitat

The effects of air resource and adaptive management for climate variability under Alternative C would be the same as described under Alternative B.

Soil-disturbing activities could result in loss of topsoil and reduced vegetation cover, which might otherwise provide important nesting, foraging, and wintering habitat for wildlife. Because soil-disturbing activities are widespread in the planning area, the effects would be applicable to species found in all priority vegetation types. However, adhering to BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would minimize the direct effects on wildlife.

Managing water impoundments would continue to affect watershed connectivity and water availability for wildlife. The percent of lotic riparian and wetland vegetation communities in PFC would likely increase, providing additional habitat for wildlife species in these areas.

Under Alternative C, five priority vegetation communities would be spatially defined and managed to maintain diverse ecological conditions for wildlife. For ponderosa pine breaks/badlands, effects would be the same as under Alternative B. For montane forests and meadows, restoration of areas where five-needle pine habitats are being affected by disease would help to improve ecological function and forest health for wildlife species inhabiting this area.

Commercial and pre-commercial vegetation thinning prescriptions could result in short-term habitat avoidance or displacement of wildlife associated with this vegetation type. Managing for large intact blocks of sagebrush/grasslands would limit conifer encroachment and reduce predation on wildlife in sagebrush/grasslands habitat.

In riparian/wetland communities, restrictions on draining, burning, filling, and leveling wetlands would provide added protection to habitat for wildlife using riparian/wetland habitats, compared with Alternative A.

Fish and wildlife management would provide for the long-term protection of wildlife and wildlife habitat, as discussed under Alternative B. However, fluid mineral leasing stipulations (**Appendix L**) and closures specific to fish and wildlife are less widespread, so the extent of these effects would be less than that described under Alternative B.

The effects of fire management on wildlife and habitat would be similar to those effects described under Alternative A. However, there would be more acres managed as Category B and fewer acres managed as Category C. As a result, fire desirability would be less, and there would be an increase in effects associated with

fire suppression (e.g., short-term noise disturbance and habitat avoidance). High-intensity wildfires could lead to changes in wildlife habitat composition and structure, as discussed under **Section 4.2.4**.

VRM management would influence wildlife and their habitat, as discussed under Alternative A. However, under Alternative C, there would be fewer acres managed as VRM Class I and Class II and more acres managed as VRM Class III and Class IV. As such, there would be a greater likelihood of noise and habitat effects on wildlife in all priority vegetation types, compared with Alternative A.

Similar to Alternative B, the LFO would not defer fluid mineral leasing of nominated parcels in important wildlife areas. Therefore, there could be fluid minerals development in important wildlife areas and others outside the important wildlife areas. This could affect wildlife and habitat in these areas.

Fluid mineral closures and NSO stipulations under Alternative C would protect wildlife long term in these areas from disturbance or habitat loss due to fluid mineral leasing. Areas closed to future leasing would protect wildlife in priority vegetation communities; however, lands closed to leasing would constitute less than 6 percent of grassland communities and less than 2 percent for all other vegetation types (BLM GIS 2015a).

Fluid minerals NSO stipulations are more extensive than acres closed to leasing. They would provide the greatest protection to wildlife and habitat associated with the sagebrush/grasslands priority vegetation types (210,600 acres). In areas open to leasing and subject to standard stipulations, effects would be wildlife avoidance, habitat fragmentation, increased movement rates, probabilities of flight response (Wisdom et al. 2004), and increased daily movements and home ranges (Rowland et al. 2004).

On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 384 acres; long-term disturbance effects could affect approximately 79 acres (**Table W-1, Appendix W**).

The effects of livestock grazing on wildlife would be the same as discussed under Alternative A.

Developing recreation facilities could disturb or kill wildlife or destroy nesting and foraging habitat. Increased accessibility to recreation areas, such as in the Snowy Mountains ERMA, compared with Alternative A, may result in more disturbances to wildlife. Where recreation is concentrated near reservoirs and creeks, for example, in parts of the Judith SRMA, wildlife disturbance is particularly likely. Recreation stipulations would maintain the protection of riparian/wetland areas from fluid mineral development, protecting wildlife from disturbance.

The effects of travel management would be the same as described for Alternative A.

The types of effects on wildlife from lands and realty management would be the same as described under Alternative A. However, fewer acres would be managed as open to ROWs in the ponderosa pine breaks/badlands, sagebrush/grasslands, and riparian/wetland communities vegetation types; in these areas, effects on wildlife would be reduced.

More acres would be open to ROWs in the montane forests and meadows and grasslands communities. As such, effects on nesting habitat, disturbance, and risk of mortality from construction, and increased predation from the structures would be greater than under Alternative A. Fewer acres would be managed as open for wind energy development; however, authorizing wind farms could still result in bird injury or death.

Commercial timber harvesting would occur throughout the montane forests and meadows priority vegetation type. Pre-commercial thinning and other silviculture practices would result in the short-term removal of woody vegetation and reduced canopy cover for wildlife, including nesting birds. Managing woodlands to prevent expansion into other communities would limit conifer encroachment into sagebrush/grasslands vegetation communities more than under Alternative A. This would protect species with habitat in sagebrush/grassland and reduce perches for predators. Where new and temporary roads are constructed, there would be an increased risk of mortality and disturbance to wildlife caught on the road.

No areas would be designated as ACECs; therefore, there would be no special management for the protection of the relevant and important values of the potential ACECs, which would limit surface-disturbing activities and benefit wildlife and wildlife habitat.

Releasing 27 stream segments from interim management protections would increase the risk of authorized activities affecting wildlife. However, BMPs, mitigation measures for authorized land uses or activities (**Appendix F**), and fluid minerals leasing stipulations (**Appendix L**) for water resources would continue to limit surface-disturbing activities on or near these streams.

Special Status Wildlife, Including Priority Species

Implementing avoidance/mitigation measures for soils would reduce the likelihood of fragmentation of special status wildlife and priority species habitats, as described under *Wildlife and Habitat*.

The effects of water resources would be similar to those discussed under Alternative B. In addition, water impoundments would continue to serve as mosquito breeding habitats, which could pose a risk to nearby greater sage-grouse populations. West Nile virus would continue to play an important role in recruitment and survival rates for both chicks and adults, as discussed in the LFO Greater Sage-Grouse Proposed RMP Amendment (BLM 2015a).

Under Alternative C, five priority vegetation communities would be spatially defined and managed to maintain diverse ecological conditions for wildlife. The effects on special status wildlife and priority species would be similar to those described under Alternative B.

Commercial and pre-commercial vegetation thinning prescriptions could result in short-term habitat avoidance or displacement for special status species and priority species associated with montane forests and meadows. However, these actions, as well as objectives to increase deciduous conifers, shrubs, and meadows in the montane forests and meadows priority vegetation type, would improve habitat conditions for special status species that require meadows and early seral vegetation components.

Fish, wildlife, and special status species management would minimize habitat degradation for special status and priority species. Prohibiting sheep or goat allotments and reviewing and reclassifying sheep allotments adjacent to occupied bighorn sheep habitat would reduce the risk of disease transmission. Implementing a food storage order in the grizzly bear recovery zone would reduce the likelihood of bear/human conflicts caused by unsecured food.

Managing for Category 3 prairie dog towns could help to provide a source for natural dispersal from Category 1 and 2 habitats following a plague outbreak. However, not managing Category 1 or 2 prairie dog towns on BLM-administered lands would reduce habitat for special status birds associated with short-grass habitats, such as mountain plovers and breeding habitat for burrow owls. These conditions would resemble conditions under Alternative A.

The effects of wildfire on special status wildlife and priority species would be the same as discussed under *Wildlife and Habitats*.

Under Alternative C, PHMA would be open to new mineral material sales for both free and commercial use following disturbance guidelines and other applicable conservation measures. Effects of commercial salable mineral sales within PHMA would be the same as described under Alternative A but could result in greater level of sage-grouse avoidance and disturbance, and habitat fragmentation or removal than the other alternatives.

The effects of coal, locatable, and nonenergy minerals and energy on special status wildlife and priority species would be the same as discussed under *Wildlife and Habitat*.

The types of effects of livestock grazing on special status wildlife and priority species would be the same as those discussed under Alternative A.

The effects of recreation and visitor services on special status wildlife and priority species would be the same as discussed under *Wildlife and Habitat*.

The effects of travel management would be similar to those described for Alternative A. Consideration of watersheds, riparian resources, forest resources, and other vegetation when determining designation criteria would help to avoid effects on special status wildlife and priority species.

The types of effects on special status wildlife and priority species would be the same as described under Alternative A. However, fewer acres would be managed as open to ROWs in the ponderosa pine breaks/badlands, sagebrush/grasslands, and riparian/wetland communities vegetation types. Special status wildlife and priority species associated with these vegetation types would experience fewer effects, such as habitat degradation, fragmentation, nest destruction, and loss of foraging habitat, compared with Alternative A. More acres would be open to ROWs in the montane forests and meadows and grasslands communities; as such, effects on nesting habitat, disturbance, and risk of mortality from construction and increased predation from the structures would be greater than under Alternative A.

The types of effects on special status wildlife and priority species from harvesting timber would be the same as those described under *Wildlife and Habitat*.

No areas would be designated as ACECs; therefore, there would be no special management for the protection of the relevant and important values of the potential ACECs, which could limit surface-disturbing activities and benefit special status wildlife, including priority species.

Releasing 27 stream segments from interim management protections would increase the risk of authorized activities affecting special status wildlife and priority species that use riparian/wetland areas. However, BMPs and mitigation measures for authorized land uses or activities (**Appendix F**), and fluid minerals leasing stipulations (**Appendix L**) for water resources would continue to limit surface-disturbing activities on or near these streams.

Alternative D

Fish and Aquatic Communities

The effects of air resource and adaptive management for climate variability under Alternative D would be the same as described under Alternative B.

Soil-disturbing activities could result in loss of topsoil, reduced vegetation cover, erosion, and sedimentation into warm water and cold-water aquatic priority habitats, similar to Alternative A. Effects would be greater on those species that are sediment intolerant (i.e., cold water aquatic species). However, adhering to BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would minimize the direct effects on fish and aquatic communities.

Areas affected by recent or high intensity wildfire would likely be more susceptible to soil erosion and at greater risk of scouring, as would surface disturbances on areas identified as sensitive soils. However, unlike Alternative A, implementing ES&R would help to mitigate these effects. Instances of short-term influx of sediment into riparian and wetland vegetation communities would likely still occur. This could change aquatic habitat associated with increased sedimentation. This, in turn, could reduce the depth of scour pools and reservoirs.

Water resources would be managed to maintain or decrease the percent of watershed disconnected by impoundments. This management would convert lentic vegetation communities to lotic vegetation communities in areas where impoundments are removed. Increasing watershed connectivity and removing water impoundments could return stream reaches to their pre-impoundment hydrologic, sediment, and temperature regimes. This could result in a seasonal increase in water quantity in warm water aquatic priority habitats, particularly in intermittent and ephemeral stream systems below the impoundments.

Reestablishing pre-impoundment flow regimes may increase seasonal scour pools, which provide refugia for warm water fish and aquatic communities during the summer. In addition, streamside woody vegetation could increase, which would indirectly affect water temperature by reducing direct solar radiation.

Protecting riparian vegetation reduces sedimentation and turbidity in waterways, improving habitat for aquatic species. A fluid minerals NSO stipulation in riparian areas, wetlands, and floodplains would provide greater

protection to the riparian/wetland priority vegetation type from fluid mineral development, compared with Alternative A. This would improve water quality for fish and reduce disturbance to fish and aquatic communities.

Under Alternative D, the effects of actions associated with vegetation management on fish and aquatic communities would be similar to those described under Alternative B. In addition, defining DFCs for lotic riparian/wetlands would provide for complex riparian terrestrial and aquatic habitats that support both warm and cold-water aquatic species.

The types of effects of fish and wildlife management on fish and other aquatic species would be similar to those discussed under Alternative B. However, in reservoirs managed in coordination with MFWP for recreational fisheries, management would focus on maintaining habitat and populations of native and desired nonnative fish. In these areas, populations of desired nonnative fish would be maintained or would increase.

The effects of wildfire on fish and aquatic habitat would be similar to those described under Alternative A. However, in riparian/wetland communities, 2,100 fewer acres would be managed as Category B, and 2,000 more acres would be managed as Category C, compared with Alternative A. Therefore, there would be a greater fire desirability in riparian and wetland communities; that is, fire management would dictate fewer constraints on the use of fire (see **Section 4.2.4**). As such, there could be an increase in the number of occurrences of short-term sediment influx into waterways due to fire; this could affect habitat suitability for certain fish and aquatic communities. However, increased fire desirability could also help restore natural fire regimes over the long term. It would reduce the risk of high intensity fires that cause long-term effects on water temperatures and habitat suitability for fish and aquatic communities.

In addition, the effects of fire suppression (e.g., increased turbidity and disturbance or removal of streamside vegetation) would be less than under Alternative A. Where fire suppression activities near streams and reservoirs does occur, implementing ES&R would minimize the effects. This would reduce erosion and sedimentation in nearby cold and warm water aquatic habitats.

Identifying and prioritizing the protection of lands with wilderness characteristics would restrict resource uses (e.g., ROWs, construction of new roads, OHV travel, and other energy developments) and would protect fish and aquatic communities from habitat disturbance or resource uses that could affect water quality and quantity. These effects would be concentrated on approximately 3,100 acres which consist of riparian and wetland communities. This differs from Alternative A, which does not identify lands with wilderness characteristics (BLM GIS 2015a).

Similar to Alternative B, the LFO would not defer fluid mineral leasing of nominated parcels in important wildlife areas. Therefore, there could be fluid minerals development in important wildlife areas others outside the important wildlife areas. This could affect fish and other aquatic species.

Fluid mineral NSO stipulations under Alternative D would provide for long-term protection of fish and other aquatic species in 13,900 acres of riparian and wetland communities (BLM GIS 2015a), an increase of 12,000 acres over Alternative A. In riparian/wetland communities open to leasing and subject to standard stipulations (2,100 acres), the effects would be the same as described under Alternative C. However, overall short- and long-term surface disturbance effects would be similar to those under Alternative A.

On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads (existing and RFD scenario) could affect approximately a total of 366 acres; long-term disturbance could affect approximately 77 acres (**Table W-I, Appendix W**). The effects of livestock grazing on aquatic species would be the same as Alternative A.

Fluid minerals leasing stipulations (**Appendix L**) for recreation and visitor services values would restrict fluid mineral leasing that might otherwise result in disturbance and reduction in water quality for fish and aquatic communities. In areas where recreation is concentrated near reservoirs and creeks, there is increased potential for vegetation loss, erosion and sedimentation, disturbance to fish and aquatic communities, and introduction of ANS.

The effects of travel management would be the same as those described under Alternative C.

The types of effects from lands and realty on aquatic species would be the same as described under Alternative A. However, fewer acres would be managed as open to ROWs in the riparian/wetland vegetation type. This management would reduce soil and vegetation loss and erosion in riparian/wetland areas, protecting habitat for fish and other aquatic species. Preserving soil and vegetation would improve water quality in both cold water and warm water aquatic systems.

The effects of commercial timber harvesting would be similar to effects identified under Alternative C. However, additional acres would be managed as closed to timber sales and harvest. In these areas, erosion and soil loss would be reduced, leading to reduced turbidity and potentially higher water quality in cold water streams. In areas where timber harvesting is allowed, the direct and indirect effects on aquatic species would be the same as under Alternative A.

The effects of managing ACECs would be similar to those discussed under Alternative A. Under Alternative D, Sun River and Collar Gulch ACECs would be designated for approximately the same acreage as under Alternative B. Collar Gulch ACEC would be designated for protection of westslope cutthroat trout and would also protect other fish and other aquatic species found in this location. Although Sun River would be designated to protect cultural resources, aquatic species would also be protected by restrictions on resource use activities that disturb soil, remove vegetation, and effect water quality.

Wildlife and Habitat

The effects of air resource and adaptive management for climate variability under Alternative D would be the same as under Alternative B.

Soil-disturbing activities could result in loss of topsoil and reduced vegetation cover, which might otherwise provide important nesting, foraging, or wintering habitat for wildlife. Because soil-disturbing activities are widespread in the planning area, the effects would be applicable to species nested under all priority vegetation types. However, adhering to BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would minimize the direct effects on wildlife in vegetation communities. Applying a fluid minerals CSU stipulation on sensitive soils would restrict surface disturbance in all habitat types relative to Alternative A.

Under Alternative D, water resources would be managed to maintain or increase the percent of lotic riparian-wetland miles by decreasing the percent of watershed disconnected by impoundments. Increasing watershed connectivity and removal of water impoundments could increase seasonally available water for wildlife. However, removing impoundments would reduce water availability for wildlife in lentic systems.

Under Alternative D, five priority vegetation communities would be defined and managed to maintain diverse ecological conditions. In ponderosa pine breaks and badlands, effects would be the same as under Alternative B; in montane forests and meadows, effects would be the same as under Alternative C. In sagebrush/grasslands and grasslands, effects would be the same as under Alternative C.

Riparian and wetland communities would be managed to increase riparian/wetland vegetation communities along lotic systems, while decreasing the amount of riparian vegetation communities along lentic systems which would increase seasonal water availability for wildlife. Fluid minerals NSO and CSU stipulations in riparian/wetland communities would reduce noise disturbance effects on wildlife.

Fish and wildlife management would provide for the long-term protection of wildlife and wildlife habitat as discussed under Alternative B.

Active fire management would help to maintain or restore wildlife habitats. In ponderosa pine breaks/badland vegetation communities, effects would be the same as Alternative C. In montane forests and meadows and in grasslands, the effects would be the same as those described under Alternative B. In riparian/wetland communities, the effects would be similar to those effects described under Alternative B. In sagebrush/grasslands communities, effects also would be similar to those effects described under Alternative B, except no acres would be managed as Category D (natural fire regime).

Sagebrush in the Breaks FMU outside of greater sage-grouse habitats would experience less fire than under Alternative B; however, the patchy distribution would not change species expected to occur under either alternative.

VRM management would influence wildlife and wildlife habitat, as discussed under Alternative A. Increasing the acres of ponderosa pine breaks and badlands managed as VRM Class II would reduce the likelihood of noise or habitat disturbance to species associated with this vegetation type from ROW authorizations and minerals and energy developments. However, other disturbance regimes (e.g., wildfire), are still likely to occur in these areas.

Fewer acres would be managed as VRM Class I or Class II in montane forests and meadows, and there would be a greater likelihood of noise or habitat disturbance to species associated with this vegetation type from timber harvesting, ROW developments, and minerals and energy developments.

Within sagebrush/grasslands, the effects would be similar to those described under Alternative A. Within grasslands and riparian/wetland communities, more acres would be designated as VRM Class II and Class III, and fewer acres would be undesignated VRM. This would result in more comprehensive management, which could indirectly affect wildlife and their habitat by restricting certain types of surface-disturbing activities.

Identifying and prioritizing the protection of lands with wilderness characteristics would restrict resource uses (e.g., ROWs, road construction, OHV travel, and other energy developments), and would protect wildlife from disturbance and nest and habitat destruction. Most lands with wilderness characteristics would be located in the ponderosa pine breaks/badlands vegetation type (68,100 acres) and the sagebrush/grasslands vegetation type (29,200 acres). Effects on wildlife and habitats would be greatest in these areas. Effects would also occur on 3,100 acres in riparian and wetland communities. Compared with Alternative A, there would be greater protection of wildlife and habitats in these areas.

Similar to under Alternative B, the LFO would not defer leasing fluid minerals on nominated parcels in important wildlife areas. Therefore, there could be fluid minerals development in important wildlife areas and others outside the important wildlife areas. This could affect wildlife and habitat in these areas.

Fluid mineral closures and NSO stipulations under Alternative D would provide for long-term protection of all priority vegetation communities and wildlife species from trampling, nest destruction, traffic mortality, noise, or other disturbance due to fluid mineral leasing (see **Appendix L**).

Future leasing could result in the loss, degradation, and fragmentation of wildlife habitat. Areas closed to leasing would protect wildlife in priority vegetation communities; however, lands closed to leasing constitute less than 7 percent of grasslands communities and less than 2 percent for all other vegetation types. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 366 acres; long-term disturbance effects could affect approximately 77 acres (**Table W-1, Appendix W**).

The effects of livestock grazing on wildlife would be the same as Alternative A.

Fluid minerals leasing stipulations (**Appendix L**) for recreation and visitor services values would restrict activities that might otherwise result in disturbance and loss of habitat for wildlife species. Developing access opportunities (e.g., new trail opportunities in the Judith Mountains) would result in long-term increased human traffic and potential for noise disturbance to wildlife. Where recreation is concentrated near reservoirs and creeks, where much wildlife activity occurs, disturbance would increase.

The effects of travel management would be the same as those under Alternative A.

The types of effects on wildlife from lands and realty would be the same under Alternative A. However, fewer acres would be managed as open to ROWs in the ponderosa pine breaks/badlands, sagebrush/grasslands, and riparian/wetland communities vegetation types. In these areas, effects on wildlife and habitat would be less. More acres would be open to ROWs in the montane forests and meadows and grasslands communities. As such, effects on wildlife species would be greater than under Alternative A in these areas.

The effects of commercial timber harvesting would be similar to those under Alternative C. However, additional acres would be managed as closed to timber sales and harvest. In these areas, there would be no disturbance to wildlife from logging equipment.

The effects of managing ACECs would be similar to those discussed under Alternative B. Under Alternative D, Sun River and Collar Gulch ACECs would be designated for approximately the same acreage as under Alternative B. Although Sun River is designated for cultural resources, it would provide incidental protection to wildlife species within its boundaries, from disturbance and risk of death associated with resource uses that might otherwise occur in these areas. Effects on wildlife from ACECs would be similar to Alternative A.

Special Status Wildlife, Including Priority Species

Implementing fluid minerals CSU stipulations for sensitive soils and other avoidance and mitigation (**Appendix L**) measures for soils would reduce the likelihood of fragmentation of special status wildlife and priority species habitats from new fluid mineral leases. CSU stipulations for sensitive soils in prairie dog colonies, greater sage-grouse GHMA, and other special status wildlife or priority species habitats would provide added protection to populations from fluid mineral development.

The effects of managing water resources on special status wildlife and priority species would be the same as under Alternative B.

Five priority vegetation communities would be spatially defined and managed to maintain diverse ecological conditions for wildlife under Alternative D. The effects on special status wildlife and priority species would be similar to those described under Alternative B. In addition, commercial and pre-commercial vegetation thinning prescriptions could result in short-term habitat avoidance or displacement for special status species and priority species associated with montane forests and meadows.

Fish, wildlife, and special status species management would minimize habitat degradation and resource use conflicts for special status and priority species. Maintaining and expanding bighorn sheep habitat would allow for population expansion. Prohibiting sheep or goats within 9 to 20 miles of bighorn sheep would provide a larger buffer than Alternative A to reduce the risk of disease transmission.

Implementing a food storage order in the grizzly bear recovery zone and Zone I would reduce the likelihood of bear/human conflicts caused by unsecured food, compared with Alternative A. This is because no such food storage order would be implemented under Alternative A.

Managing for at least one Category 2 complex of prairie dog towns (1,000 or more acres) would provide habitat for special status birds associated with short-grass habitats (e.g., mountain plovers and breeding habitat for burrowing owls). In addition, prairie dog towns could provide foraging habitat and prey for ferruginous hawks; Alternative A lacks management for large tracts of prairie dog towns.

Active fire management would help to maintain or restore wildlife habitats. In ponderosa pine breaks/badland vegetation communities, effects would be the same as Alternative C. In montane forests and meadows and in grasslands, the effects would be the same as those described under Alternative B. In riparian/wetland communities, the effects would be similar to those described under Alternative B.

In sagebrush/grasslands communities, the effects of wildfire would be similar to those described under Alternative B, except no acres would be managed as Category D (natural fire regime).

Identifying and prioritizing the protection of lands with wilderness characteristics would restrict resource uses (e.g., ROWs, new roads, OHV travel, and energy developments) and would protect priority and special status wildlife from disturbance and nest and habitat destruction. Most lands with wilderness characteristics would be in the ponderosa pine breaks/badlands vegetation type (68,100 acres) and the sagebrush/grasslands vegetation type (29,200 acres). Effects on special status wildlife and priority species would be greatest in these areas. Effects would also occur on 3,100 acres in riparian and wetland communities. Compared with Alternative A, there would be greater protection of special status wildlife and priority species in these areas.

The effects of salable mineral material sales on special status species would be the same as those discussed under Alternative A.

The effects of coal, locatable, and nonenergy minerals and energy on special status wildlife and priority species would be the same as those discussed under *Wildlife and Habitat*.

The effects of livestock grazing on wildlife would be the same as described under Alternative A.

The effects of recreation and visitor services on special status wildlife and priority species would be the same as discussed under *Wildlife and Habitat*.

The effects of travel management would be the same as described under Alternative A.

The types of effects on wildlife from lands and realty management would be the same under Alternative A. However, fewer acres would be managed as open to ROWs in the ponderosa pine breaks/badlands, sagebrush/grasslands, and riparian/wetland communities vegetation types. In these areas, effects on special status priority wildlife would be less. More acres would be open to ROWs in the montane forests and meadows and grasslands communities. As such, effects on special status wildlife and priority species associated with these vegetation communities would be greater than under Alternative A.

The types of effects of commercial timber harvesting on special status wildlife and priority species would be similar to those under Alternative A. However, 114,200 additional acres would be managed as closed to timber sales and harvest. In these areas, there would be no disturbance to special status wildlife and priority species that use these areas from noise associated with logging equipment or loss of habitat.

The effects of managing ACECs would be similar to those discussed under Alternative A. Under Alternative D, additional acres of grasslands, montane forests and meadows, riparian/wetland, and sagebrush/grasslands would be managed as ACECs. Although these ACECs may be designated for other resources (e.g., cultural values), ACEC management would provide incidental protection to priority wildlife species in its boundaries, from disturbance and risk of mortality associated with resource uses that might otherwise occur.

Cumulative

Fish and Aquatic Communities

In lentic and lotic systems under all alternatives, increased sedimentation, combined with other water uses on lands not administered by the BLM (e.g., irrigation or fluid mineral depletions), could result in decreased water flow downstream of reservoirs and reduced habitat complexity for fish and aquatic communities (e.g., through the reduced depth of scour pools and reservoirs).

Decreasing the percent of watershed disconnected by impoundments under Alternatives B and D would contribute to more seasonally available water along ephemeral and intermittent streams. They would restore flow, temperature, and sediment regimes to more closely resemble pre-impoundment conditions. This would help to establish seasonal scour pools, which may provide refuge for warm water fish and aquatic communities and may reduce stream temperatures by establishing woody streamside vegetation.

However, watershed connectivity would continue to affect habitat suitability and connectivity for lotic fish and other aquatic species for much of the planning area. This is because numerous impoundments occur on lands not administered by the BLM, and the BLM has little authority over how these water bodies would be managed. Large water impoundments on the Missouri River would continue to impede migration for pallid sturgeon and other aquatic species.

Under all alternatives, if water impoundments were to fail, large quantities of sediment and water would be released over a short period through the channels below the impoundment. This could change channel morphology and remove streamside vegetation. In addition, there would be an increased risk of interspecific competition and nonnative species interactions. This is because nonnative species contained in reservoirs would be released into the warm water aquatic priority habitats occupied by native aquatic species.

Climate models predict a long-term increase in temperature and precipitation in Montana (BLM 2010). Temperature increases, in combination with wildfire along riparian areas near cold water aquatic priority habitats, could increase stream temperatures under all alternatives. This is because a loss or reduction of streamside vegetation may increase direct solar radiation (Isaak et al. 2010; Mahlum et al. 2011). Increases in stream temperature could have varying effects on fish and aquatic communities. For rainbow trout, which are not native to the planning area, stream temperature increases are unlikely to result in substantial habitat changes, except small habitat gains at higher elevations as unsuitably cold areas become thermally suitable (Isaak et al. 2010).

For some cold-water species, temperature increases could exacerbate interactions between native and nonnative species through invasive hybridization, particularly for species in isolated lotic systems (Muhlfeld et al. 2014). Temperature change could also increase interspecific competition, and may displace native westslope cutthroat trout with nonnative species, such as rainbow trout. This would be due to the rainbow trout's higher upper temperature tolerance and greater growth capacity at warmer temperatures (Bear et al. 2007).

In addition to the indirect effects of warming temperatures within cold water aquatic habitats, wildfires may increase erosion and sedimentation in streams by decreasing infiltration rates and increasing overland flow. Post-fire erosion depends on several factors, including burn severity, post-fire rainfall intensity, time since burning, soil type, and vegetation recovery (Robichaud et al. 2009).

In warm water aquatic systems, climate variability and wildfires could affect sediment inputs, streamside vegetation, and temperature regimes through similar mechanisms, as described above, under all alternatives. However, the response of warm water fish and aquatic communities may differ from those of cold water aquatic communities, due to differing tolerances of sediment and temperature. In general, prairie streams naturally have warmer summer temperatures and more fine sediments than mountain streams, and the fish and aquatic communities associated with warm water aquatic priority habitats are more sediment and temperature tolerant than those species associated with cold water aquatic priority habitats (Bramblett et al. 2005).

Such activities as fluid mineral development, road use, and other construction can alter water quality through spills, leaks, or vehicular accidents. Where these occur near occupied fish and aquatic habitats, effects would be acute and could result in direct mortality, depending on the extent of the water quality alteration. These types of effects would be more likely to occur under Alternatives A, C, and D than Alternative B, due to the more extensive ROW restrictions under Alternative B.

The use of chemicals for weed treatments or fire suppression can also affect aquatic species and pollute their habitats. While these types of cumulative effects could occur under all alternatives, they are more likely to occur under Alternatives A and C. This is because these alternatives would emphasize fire suppression in more acres than under Alternatives B and D.

Additionally, water quality parameters may be altered based on naturally occurring geologic formations. Examples are those found on the streams in the pyrite-rich, hydrothermally altered, granite-porphyry intrusions of the Judith Mountains (Williams et al. 2015). Metal concentrations and pH along a stream or river corridor may vary, depending on the underlying geologic formations and dilution from surface water and groundwater inputs (Williams et al. 2015). As such, changes to surface water and groundwater inputs may influence water quality and habitat suitability for cold water aquatic species under all alternatives.

Wildlife and Habitat

Climate variability could affect soil conditions, vegetation distribution, and wildfire risk (BLM 2010; Bachelet et al. 2001). Such changes would alter habitat conditions, potentially creating conditions that could favor certain species of communities. Wildfire risk in Montana is predicted to increase due to a combination of the effects of climate variability on temperature, precipitation, and wind (BLM 2010). As such, the effects of wildfire on wildlife and habitat (as discussed in detail in **Appendix W**), are likely to occur at a higher frequency or a larger spatial extent under all alternatives. The response of individual species to increased wildfire is highly complex and would depend on a number of factors, such as vegetation type affected, fire severity, and timing of fire.

BLM management would have a limited effect on forest health and wildlife habitat outside its jurisdiction. On lands not administered by the BLM, ponderosa pine encroachment into historical meadows and aspen communities is likely to continue under all alternatives. Fuel accumulation and the spread of insect infestations are also likely to continue, although the extent of this trend is unknown. Montane forests and meadows serve as important foraging areas for avian communities (Forest Service 1980); therefore, loss of historical meadows could result in loss of foraging habitat for some species.

Many past, present, and reasonably foreseeable future actions contribute to cumulative effects on wildlife and habitat, including recreation, livestock grazing, and ROW and private land development. Effects from construction of facilities, roads, and trails, combined with private land development for residential, commercial, and recreational uses, would likely contribute to ongoing regional habitat loss, degradation, and fragmentation and disturbance to terrestrial wildlife and their habitats. Effects are likely to be most prevalent for species that require large landscapes for seasonal movements and dispersal, such as mule deer and elk, and for species confined to specific habitats or limited geographical features.

Fluid mineral development on both lands that the BLM administers and lands that it does not could result in wildlife habitat avoidance, increased movement rates, and probabilities of flight response (Wisdom et al. 2004; Rowland et al. 2004).

In the planning area, projected total acres of short-term disturbance range from 4,700 under Alternatives B, C, and D, to 4,800 under Alternative A. The projected long-term surface disturbance related to existing and new oil and gas wells could be less than 100 acres under all alternatives (**Table W-1, Appendix W**). Because the RFD scenario projects similar acreages for both short- and long-term surface disturbances associated with fluid mineral developments (access roads, flow lines, and well pads) under all alternatives, the cumulative effects would be similar across alternatives.

Temperature increases and precipitation changes from climate variability may also affect wildlife phenology⁴ in the planning area. For example, with mule deer, local weather patterns (e.g., snow depth and temperature) and plant phenology are the predominant factors driving migration (Monteith et al. 2011; Lendrum et al. 2013). Predicted changes in precipitation and temperature could have long-term effects on migratory patterns for mule deer and other migratory mammals in the planning area, including changes in the timing of their arrival at birthing areas.

Special Status Wildlife, Including Priority Species

Cumulative effects would be similar to those for general wildlife species. Greater sage-grouse would also be affected by range-wide management in PHMA and GHMA designed to improve habitat conditions and reduce disturbance on populations under all alternatives. Cooperative management among federal, state, and private entities to preserve greater sage-grouse would lead to reduced habitat fragmentation and improved conservation agreements to protect greater sage-grouse populations.

Continued use of the grizzly bear recovery plan until the NCDE grizzly bear conservation strategy is implemented would support grizzly bear conservation and recovery. Once implemented, the NCDE grizzly bear conservation strategy also would protect other special status species that occur in habitats in the PCAs and Zone I, particularly those that are effected by motorized travel, vegetation treatments, or food storage.

Similarly, the goals, objectives, standards, and guidelines found in the Final EIS for Northern Rockies Lynx Amendment (Forest Service 2007) would support the recovery of the Canada lynx and other montane forests and meadows special status wildlife species, particularly those found in the National Forest System lands in the planning area. This is because managed direction related to human uses (e.g., OSV recreation, developed recreation, minerals and energy, and forest roads) could also reduce human conflicts with other special status species that occupy lynx habitat.

⁴Seasonal timing

Sylvatic plague would likely continue to threaten black-tailed prairie dog populations; however, managing for Category 2 (Alternatives B and D) and Category 3 (Alternative C) prairie dog towns would provide habitat for natural dispersal following a plague outbreak.

The potential risk of contact between domestic sheep and big horn sheep would persist under all alternatives. However, this risk would be reduced by BLM management that prohibits sheep and goat allotments near bighorn sheep populations and State of Montana health monitoring and management (MFWP 2010). The cumulative risk of disease transmission would be least under Alternatives B and D. This is because these alternatives would manage for the largest buffers between domestic sheep and goats and wild bighorn sheep populations.

4.2.6 Wildfire Ecology and Management

Effects Common to All Alternatives

Under all alternatives, fire management activities would comply with state and federal air quality standards; these standards may affect the timing of prescribed burns.

Under all alternatives, management of the Square Butte VSA under the BLM policy for VSAs (BLM Manual 6330, BLM 2012a) could limit fire suppression and treatment activities. This has the potential for higher costs of management and the potential reduction in the ability to move toward more historical VCC.

Permitting mineral development could introduce ignition sources. However, under all alternatives, due to the lack of coal potential in the planning area, effects from coal development would be limited.

Under all alternatives, continuing to manage the Missouri Breaks Back Country Byway to enhance visitor experiences and evaluating future roads for potential as back country byways would support continued recreation in this resource and would present the risk of human-caused ignition along the roadway.

Direct and indirect effects could occur on the fire management program due to protective measures for greater sage-grouse habitat, as described in detail in the LFO Greater Sage-Grouse Proposed RMP Amendment (BLM 2015a). The acres of VCC per greater sage-grouse management category are displayed in **Table 4-28**, VCC by Greater Sage-Grouse Management Category (Acres).

**Table 4-28
VCC by Greater Sage-Grouse Management Category (Acres)**

VCC	PHMA	GHMA
1	7,500	35,300
2	96,200	27,500
3	127,900	48,900
Other	1,600	600
Total	233,200	112,300

Source: BLM GIS 2015a

In summary, restrictions placed on fire and fuels management in both PHMA and GHMA could affect the ability to efficiently manage fuels and could increase costs of vegetation management and fire suppression. Examples of these restrictions are seasonal closures, prohibition on treatments in known winter range, and restrictions on the use of fire to treat sagebrush in low precipitation zones. Suppression of wildfire to protect greater sage-grouse habitat would be emphasized, along with public safety and property, further increasing management time and costs.

Management actions that influence vegetation, including habitat objectives, restoration, and livestock grazing, could affect the fuel loading and related level of fire risk. Habitat parameters could limit the options for fuels treatment and could therefore increase costs of treatment. Effects may be greatest in areas currently in VCC 3 (127,900 acres in PHMA and 48,900 acres in GHMA). In the long term, the emphasis on native plants could contribute to healthy plant communities and restoration of historical VCC, with an associated lower risk of high-intensity wildfire.

Greater sage-grouse protection management actions that limit development would reduce the risk of human-caused ignition. For example, the level of development and human use in the area, and related risk of human-caused ignition, would be reduced by the following actions:

- Applying greater sage-grouse conservation measures to existing leases as COAs
- Managing PHMA and GHMA as ROW avoidance areas for high-voltage power lines
- Limiting route construction through ROW avoidance for PHMAs
- Restricting recreation as well as density and disturbance caps

Adaptive management strategy dictates that should specific “hard triggers” for greater sage-grouse habitat conditions be met, greater sage-grouse habitat needs would be reassessed to determine if priorities for fuels and fire management have changed. This adaptive management strategy may result in additional changes to fire management actions to increase management effectiveness.

Alternative A

Under Alternative A, most of the planning area is classified as fire management Category B (approximately 426,500 acres (see **Table 4-29**, Alternatives Comparison of VCC by Fire Management Category (Acres)). As discussed in **Appendix W**, due to the emphasis on suppression, management costs in this area would likely be high. The potential for a long-term change in VCC would be limited, which would not promote the movement of the 183,500 acres of VCC 3 and 175,300 acres of VCC 2 toward more historical conditions.

Table 4-29
Alternatives Comparison of VCC by Fire Management Category (Acres)

Fire Management Category	VCC	Alternative A	Alternative B	Alternative C	Alternative D
B	1	63,200	51,400	64,900	51,400
	2	175,300	115,000	198,500	115,100
	3	183,500	152,200	184,000	152,200
	Other	4,500	4,100	5,200	4,100
	Total	426,500	322,700	452,800	322,700
C	1	5,500	13,500	3,900	17,400
	2	52,200	83,400	29,000	112,400
	3	164,500	31,700	164,000	195,700
	Other	1,200	1,000	300	1,600
	Total	223,500	129,700	197,200	327,200
D	1	0	3,900	0	0
	2	0	29,000	0	0
	3	0	164,000	0	0
	Other	0	300	0	0
	Total	0	197,200	0	0

Source: BLM GIS 2015a

Note: The other category includes areas with bare land, agricultural land, sparsely vegetated land, and urban areas. In addition, data rounding results in minor variations in total acres between alternatives.

An additional 223,500 acres would be classified as Category C. Within this area, costs of suppression are likely lower and there would be more potential for change in VCC. This could promote change of the 164,500 acres of VCC 3 and 52,200 acres of VCC 2 toward more historical conditions. In general, permitting prescribed fire only under specific conditions according to fire burn plans would limit the use of this management tool.

Under Alternative A, actions that effect vegetation, including the use of mechanical treatments and fire, would continue to effect fuel loading and related time and costs for fire management, as discussed in **Appendix W**.

The lack of riparian management zones would permit timber harvest in riparian areas, which could reduce fuel loading and related fire intensity. No specific direction is provided dictating the use of prescribed fire or wildfire in grassland, ponderosa pine, or montane forest habitats; therefore, effects would likely vary on a site-specific basis.

Maintaining 40 percent forage allocation and 636,600 acres open to grazing, including 343,600 acres in VCC 3, would contribute to reduced fuel loading and its associated effect on fire intensity. Applying a minimum rest period from grazing following a major disturbance would result in site-specific increases in fuel loading.

Focusing on native seed restoration may help restore habitat toward more historical fire regimes in the long term, reducing time and costs for management, as discussed in **Appendix W**. Prohibiting domestic sheep grazing from overlapping bighorn sheep habitat could affect approximately 11,900 acres where livestock grazing currently occurs, based on habitat models. If restricting sheep grazing were to reduce the overall forage consumption, this could increase fine fuel loading and fire risk.

Under Alternative A, there would be no timber harvesting on 5,400 acres, including 1,000 acres in VCC 3. This restriction would increase fuel loading.

Limitations on treatment activities to protect sensitive resources can also affect fuel loading and related fire intensity. Vegetation treatments could be limited in sensitive species habitat if found to adversely affect a species. Effects would be variable throughout the planning area, but limitations are likely to be minimal. This is because most fire management activities should not affect species existence.

Likewise, site-specific limitations on treatment activities or suppression requirements may occur for cultural and paleontological resources. As discussed in **Appendix W**, lands under VRM Class I and Class II may have restrictions on vegetation treatments and types of suppression. This could affect the ability to perform vegetation treatments and their effectiveness and cost of treatments, as well as the ability and to move toward more historical VCC.

Under Alternative A, approximately 15,700 acres under VRM Class I (including 500 acres in VCC 3) and 104,900 acres (including 35,200 acres in VCC 3) under VRM Class II are most likely to be effected (see **Table 4-30**).

Under Alternative A, no lands would be managed to protect wilderness characteristics, so no restrictions would occur on fire management.

As discussed in **Appendix W**, resource uses that include development or human presence represent potential ignition sources and related fire risk. The potential for ignition would be highest in areas with the most fuel loading (typically VCC 3) that are also open to development. Under Alternative A, this represents 211,400 acres open to development of nonenergy soils leasable minerals, 334,300 acres open to fluid mineral leasing, and 211,300 acres open to mineral material use. (Note that current fluid mineral development in the planning area is minimal due to protest resolution; therefore, little current risk of ignition is present from this resource.)

Access for recreation can also lead to increased fire starts. The chance of human-caused ignition may increase in areas where recreation is concentrated, such as SRMAs and ERMAs. Under Alternative A, 1,100 acres are managed as ERMAs, including 900 acres in VCC 3 with highest fuel loading, and 29,770 acres in SRMAs including 19,700 acres in VCC 3.

An additional risk of fire starts is introduced by campers in the Judith River SRMA under Alternative A. Increasing access on routes can also increase the chance of human-caused ignition. The chance of ignition would be greatest on the 487,700 acres where OHV travel is limited to designated routes yearlong (222,700 acres of which are located in VCC 3, which may have increased fuel loading).

As discussed in **Appendix W**, allowing for development of ROWs could introduce additional sources of ignition due to increased human presence and equipment use. Risk of ignition would be reduced in areas with ROW exclusion and avoidance areas. The risk would remain highest in areas open to ROW application, particularly the 167,700 acres of VCC 3 where fuel loading may be higher.

Table 4-30
Alternatives Comparison of VCC by VRM Class (Acres)

VRM Class	VCC	Alternative A	Alternative B	Alternative C	Alternative D
I	1	900	900	200	900
	2	13,700	14,400	2,000	13,800
	3	500	900	400	500
	Other	500	600	100	500
	Total	15,600	16,800	2,700	15,700
II	1	34,200	43,600	700	13,000
	2	34,700	76,500	12,300	26,400
	3	35,200	207,900	400	85,400
	Other	800	1,400	400	600
	Total	104,900	329,400	13,800	125,400
III	1	8,700	11,700	32,900	47,000
	2	60,900	27,400	63,500	68,200
	3	122,900	52,600	195,300	119,000
	Other	700	600	1,200	1,200
	Total	193,200	92,300	292,900	235,400
IV	1	17,100	12,700	35,100	8,100
	2	80,700	109,500	150,000	119,400
	3	181,100	87,200	152,300	143,600
	Other	1,600	3,000	4,000	3,300
	Total	280,500	212,400	345,400	274,400

Source: BLM GIS 2015a

Note: The other category includes areas with bare land, agricultural land, sparsely vegetated land, and urban areas. In addition, the VRM designation classifications in the HRMP (approximately 56,700 acres) under Alternative A are assigned on a case-by-case basis and are not displayed in this table. Data rounding also results in minor variations in total acres between alternatives.

As discussed in **Appendix W**, special designation areas, such as ACECs, may restrict vegetation treatments or other fuels treatments, which can affect fuel loading and fire risk. Under Alternative A, 22,900 acres would be designated as ACECs, including 5,000 acres in VCC 3. In particular, the 2,700 acres of Acid Shale-Pine Forest ACEC, an area that is in need of treatment, would be subject to intensive fire suppression. In addition, managing Square Butte as fire management Category B under Alternative A would not allow for treatments or natural fire processes to improve VCC toward more historical conditions. WSRs may also result in indirect effects on fire management. Management for recreational segments as eligible for WSR classification under Alternative A may result in increased camping and potential fire risk.

Alternative B

Under Alternative B, fire management would be shifted from Category B and Category C to Category B (322,700 acres, 24 percent reduction from Alternative A), Category C (129,700 acres, 42 percent reduction from Alternative A), and Category D (197,200 acres, 100 percent change from Alternative A; see **Table 4-29**). This would reduce the costs and time for suppression.

There is more potential for change in VCC in Category D, which could promote change of the 164,000 acres of VCC 3 and 29,000 acres of VCC 2 toward more historical conditions. In addition, Alternative B would promote maintenance of land currently in VCC 1, due to the allowance for naturally occurring fire processes. Managing certain discrete areas in FMUs as fire management categories would allow for appropriate management for specific locations.

Management effecting the ability to perform vegetation treatments under Alternative B could affect fuel loading. Wildfire, prescribed fire, and mechanical methods could be permitted in grassland and ponderosa pine breaks and badlands habitats to achieve ecological conditions. This could result in some short-term costs of management but

could support long-term improvement in vegetation conditions with lowered fire intensity. In montane forest habitat, use of prescribed fire would be limited under Alternative B. By relying on wildfire, the ability to improve vegetation conditions to reduce fire risk may be limited.

As discussed in **Appendix W**, livestock grazing may reduce fine fuels and the related fire risk. Changing the allocation level of forage for livestock to around 20 percent (down from 40 percent under Alternative A) and reducing areas available to grazing to 621,200 acres open to grazing (2 percent less than Alternative A) could increase fuel loading; however, acres available to grazing in VCC 3, which generally have the highest fuel loads, would remain the same as under Alternative A. Shifting the forage allocation from livestock grazing to watershed could increase fine fuels throughout the planning area.

Additional site-specific fuel loading and related fire risks could occur as a result of closing allotments not meeting Standards for Rangeland Health (BLM 1997) and not permitting grazing on acquired lands. In addition, as discussed under Alternative A, applying a minimum rest period would result in site-specific increases in fuel loading and fire intensity.

Under Alternative B, new sheep and goat allotments would be prohibited in approximately 210,300 acres where livestock grazing currently occurs. If the restriction on sheep grazing were to reduce the overall forage consumption, this could increase fine fuel loading and fire risk, as compared with Alternative A. In addition, specifically limiting commercial timber harvest in riparian management zones could increase fuel loading and fire intensity, as compared with Alternative A. Restricting forest product sales could also increase fuel loading. Under Alternative B, no timber harvest would be allowed on 211,700 acres, including 150,300 acres in VCC 3 (150 times more than under Alternative A).

Limitations on treatment activities for the protection of sensitive resources can also affect fuel loading and related fire intensity. Under Alternative B, requiring sensitive species surveys prior to surface disturbance and designing site-specific measures to protect species could result in limits on fire use or calls for suppression for particular species or locations. This would limit the ability to use fire as a management tool, effect fuel loading, and increase management costs on a site-specific basis.

As discussed under Alternative A, treatment activities and suppression requirements may be limited for cultural and paleontological resources. Nominating additional areas for the National Register of Historic Places (NRHP) under Alternative B may increase future levels of restrictions for some sites. Under Alternative B, approximately 16,800 acres would be managed as VRM Class I, 7 percent more than under Alternative A. In addition, 329,400 acres under Class II are also likely to be affected by VRM restrictions on treatments (see **Table 4-30**). This would include 207,900 acres in VCC 3, almost five times more than under Alternative A.

As discussed in **Appendix W**, resource uses represent potential ignition sources and related increases in fire risk. The potential for ignition would be highest in areas with the most fuel loading (typically VCC 3), which are also open to development. Under Alternative B, this represents 84,300 acres open to development of nonenergy leasable minerals (60 percent decrease from Alternative A), 186,300 acres open to fluid mineral leasing (44 percent decrease from Alternative A), and 84,200 acres open to mineral material (60 percent decrease from Alternative A).

Expanding lease stipulations for fluid minerals (**Appendix L**) would also result in additional limitations on development. However, due to the current limitations on fluid mineral development pending protest resolution, fluid mineral development restrictions would not reduce the risk of ignition, as compared with current conditions.

As discussed under *Nature of Type of Effects*, the development of ROW corridors could represent a risk of human-caused ignition. This risk would be reduced in areas where development was restricted, including ROW exclusion and avoidance areas, and would remain highest in areas open to ROW application. This would be the case particularly in the 8,000 acres of VCC 3 where fuel loading may be higher (95 percent less than Alternative A).

The chance of human-caused ignition may be increased in areas where recreation is concentrated, such as SRMAs and ERMAs. Under Alternative B no areas would be managed as SRMAs (as compared with 29,770 acres under Alternative A), but 228,800 acres would be managed as ERMAs. This would include 173,700 acres in VCC 3, with

higher fuel loading (almost 200 times that in Alternative A). No RMAs would contain specific management for camping, thereby minimizing the risk from campfires.

The chance of ignition would be greatest on the 413,500 acres where OHV travel is limited to designated routes yearlong. Approximately 174,700 of these acres (22 percent fewer than under Alternative A) are located in VCC 3, which may have increased fuel loading.

As discussed in **Appendix W**, special designation areas, including ACECS may restrict the BLM's ability to perform vegetation treatments or other fuels treatments. This in turn can affect fuel loading and fire risk. An increase in areas managed as special designation under Alternative B could result in increased risks, as compared with Alternative A. Specifically, under Alternative B, 32,000 acres would be designated as ACECs, including 7,600 acres in VCC 3 with higher fuel loading (48 percent more than Alternative A). In particular, managing Square Butte as fire management Category C under Alternative B and all action alternatives would support the use of treatments or natural fire processes to improve VCC toward more historical conditions. In contrast, managing the Acid Shale-Pine Forest ACEC as Category B would not support the ability to move toward more historical VCC.

Management for WSRs may also result in indirect effects on fire management; management for recreational segments as suitable for WSR classification may result in increased camping and potential fire start risk.

Under Alternative B approximately 202,400 acres would be managed to protect their wilderness characteristics, including 146,800 acres in VCC 3 and 46,500 acres in VCC 2 areas, as compared with no acres under Alternative A. As discussed in **Appendix W**, limitations on suppression and vegetation treatments in these areas may affect time and costs for permitted treatments and effect the ability to manage for improved VCC.

Alternative C

Under Alternative C, most of the planning area is classified as fire management Category B (approximately 452,800 acres, a 6 percent increase over Alternative A; see **Table 4-29**). As discussed under Alternative A, costs of suppression in this area would likely be high. The potential change in VCC would be limited, which would not promote movement of the 184,000 acres of VCC 3 and 198,500 acres of VCC 2 toward more historical conditions.

An additional 197,300 acres would be classified as Category C (12 percent reduction from Alternative A). Within this area, costs of suppression would likely be lower, and there is some potential for change in VCC. This could promote change of the 164,000 acres of VCC 3 and 29,000 acres of VCC 2 toward more historical conditions.

Under Alternative C, no riparian management zones would be established, and timber harvest would be permitted, limiting fuel loading, as discussed under Alternative A. As under Alternative A, no specific management direction for the use of wildfire or prescribed fire is provided for grassland habitats; therefore, site-specific effects would be variable.

In ponderosa pine breaks and badlands habitat, reduced fuels would be emphasized, reducing fire risk. Within montane forest habitats, prescribed fire would be emphasized to restore historical composition, resulting in a move toward historical fire regimes.

As discussed in **Appendix W**, livestock grazing may reduce fine fuels and related fire risk. Effects under Alternative C would be similar to those under Alternative A. Maintaining acres open to grazing and maintaining or increasing forage allocated to livestock grazing would reduce fine fuels. A potential increase in forage allocated for livestock grazing could further reduce fine fuels in grassland habitats, resulting in a potential decrease in fire intensity. In addition, the lack of a specific rest period following disturbance would reduce the likelihood of site-specific increases in fuel loading following disturbance. Management for bighorn sheep would be the same as that discussed under Alternative A.

Fewer restrictions on forest product sales could reduce fuel loading. Under Alternative C, no timber harvest would occur on 3,500 acres, including 800 acres in VCC 3 (30 percent less than under Alternative A).

Effects from restrictions for sensitive resources would be decreased under Alternative C compared with Alternative A, but would still vary on a site-specific basis. Under Alternative C, approximately 2,700 acres under VRM Class I (including 200 acres in VCC 3) and 14,100 acres under VRM Class II (including 400 acres in VCC 3) are most likely to be effected by VRM restrictions on treatments (see **Table 4-30**). This represents a decrease in both acres in VRM Class I (87 percent) and VRM Class II (87 percent); therefore, overall effects of VCC designation on costs of treatment and ability to shift VCC would be reduced, as compared with Alternative A.

As discussed in **Appendix W**, resource uses represent potential ignition sources and increased fire risk. The potential for ignition would be highest in areas with the most fuel loading (typically VCC 3), which are also open to development. Under Alternative C, this represents 211,400 acres open to development of nonenergy leasable minerals (same as Alternative A), 334,100 acres open to fluid mineral leasing (less than 1 percent change from Alternative A), and 211,200 acres open to mineral material (less than 1 percent change from Alternative A).

An increase in areas with lease stipulations for fluid minerals (**Appendix L**) would also place limitations on development and related ignition risk. Due to the current limitations on fluid mineral development pending protest resolution under Alternative A, fluid mineral development management under Alternative C could increase the potential for development and related ignition risk. However, the level of development and related risks would continue to be constrained by the low level of fluid mineral potential for most of the planning area.

The risk of human-caused ignition would be reduced in ROW exclusion and avoidance areas where development is restricted. The risk would remain highest in areas open to ROW application, particularly the 41,800 acres of VCC 3 where fuel loading may be higher (74 percent less than Alternative A). Under Alternative C, ROW avoidance areas would be increased in favor of ROW exclusion areas, resulting in some increased potential for ignition in avoidance areas.

The chance of human-caused ignition may increase in areas where recreation is concentrated, such as SRMAs and ERMAs. Under Alternative C, 22,950 acres are managed as SRMAs, including 16,800 acres in VCC 3, with highest fuel loading (15 percent reduction from Alternative A) and 210,700 acres in ERMAs including 160,200 acres in VCC 3 (177 times that in Alternative A). As a result, the potential risk of ignition from recreation would likely be increased over Alternative A.

An additional risk of fire starts is introduced by campers in Judith Mountains, Lowry Bridge, and Snowy Mountains SRMAs under Alternative C. The chance of human-caused ignition would be greatest on the 500,600 acres where OHV travel is limited to designated routes yearlong. Approximately 222,700 of these acres (the same as under Alternative A) are located in VCC 3, which may have increased fuel loading.

As discussed in **Appendix W**, special designation areas, including ACECS, may restrict vegetation treatments or other fuels treatments, which can in turn effect fuel loading and fire risk. A reduction in special designation areas under Alternative C would decrease these risks, as compared with Alternative A, because no areas would be designated as ACECs.

All WSR river segments would be considered not suitable for inclusion in the NWSRS and would be released from consideration; therefore, no effects on fire management would occur for this special designation. Under Alternative C, as under Alternative A, no areas would be managed to protect wilderness characteristics, so no effects would occur from this special designation.

Alternative D

Under Alternative D, acres classified as Category B would be the same as discussed under Alternative B (see also **Table 4-29**). The areas in this category would have the highest suppression costs and lowest potential for shift in VCC. Under Alternative D, the remainder of the planning area (327,200 acres) would be categorized as Category C. Within this area, costs of suppression are likely lower, and there is more potential for change in VCC; this could promote change of the 195,700 acres of VCC 3 and 112,400 acres of VCC 2 toward more historical conditions.

Vegetation management activities under Alternative D may impose some restrictions on treatment but would provide flexibility to reduce fuel loading and related fire risk. Under Alternative D, commercial timber harvest

would be permitted to some extent in riparian management zones, allowing for the harvest to meet restoration or maintenance objectives and limiting the potential for the build-up of fuels and related fire intensity effects in riparian areas.

Alternative D would permit the use of wildfire, prescribed fire, and mechanical methods in grassland and ponderosa pine habitats to achieve ecological conditions and reduce unwanted ignitions. This could result in some short-term costs but long-term improvement in vegetation conditions with lowered fire intensity, as discussed under Alternative B.

Within montane forest habitats, use of prescribed fire would be emphasized, resulting in a move toward historical fire regimes, as described under Alternative C. Increasing areas available to grazing to 636,600 acres (2 percent more than under Alternative B) could result in increased fuel loading; however, acres available to grazing in VCC 3, which generally have the highest fuel loads, would remain the same as under Alternative B. If not allocated to grazing, acquired lands could lead to increased fuels.

Maintaining forage allocation at approximately 40 percent for livestock would help maintain current fuel loading, as discussed under Alternative A. Allowing for site-specific variation in allocation level to meet Standards for Rangeland Health (BLM 1997) may improve vegetation conditions in the long term, with the potential to reduce fire intensity. Similarly, allowing for some flexibility in rest periods following disturbance would reduce the risk of site-specific fuel loading following disturbance.

New sheep or goat allotments would be prohibited in approximately 72,500 acres where livestock currently graze. If the restriction on sheep grazing were to reduce the overall forage consumption, this could increase fine fuel loading and fire risk, when compared with Alternative A. Restrictions on forest product sales could result in increased fuel loading. Under Alternative D, no timber harvest would occur on 119,600 acres, including 84,500 acres in VCC 3 (84 times that in Alternative A).

Effects from restrictions for sensitive resources would be decreased in Alternative D, as compared with Alternative A. Site-specific limitations on treatment activities or suppression requirements may occur for cultural and paleontological resources. Nominations of additional areas for NRHP may increase future levels of restrictions for some sites.

Under Alternative D, approximately 15,900 acres under VRM Class I (including 900 acres in VCC 3) and 125,300 acres under Class II (including 85,400 acres in VCC 3) are most likely to be effected (see **Table 4-30**). This represents approximately the same acreage in VRM Class I and a 21 percent increase in VRM Class II acres. As a result, effects of restrictions on treatment from VRM classes may be slightly increased, as compared with Alternative A.

As discussed in **Appendix W**, resource uses represent potential ignition sources and related increase in fire risk. The potential for ignition would be highest in areas with the most fuel loading (typically VCC 3), which are also open to development. Under Alternative D, this represents 131,600 acres open to development of nonenergy leasable minerals (37 percent reduction from Alternative A), 332,300 acres open to fluid mineral leasing (similar to Alternative A), and 131,300 acres open to mineral material (37 percent reduction from Alternative A).

A substantial increase in acres with lease stipulations for fluid minerals (**Appendix L**) would also place limitations on development and related ignition risks. Due to the current limitations on fluid mineral development pending protest resolution, fluid mineral development management under Alternative D could represent an increased potential for development and related ignition risks. However, the level of development and related risks would continue to be constrained by the low level of fluid mineral potential for most of the planning area.

The risk of ignition would be reduced in ROW exclusion and avoidance areas and would remain highest in areas open to ROW application. This would be the case particularly in the 90,000 acres of VCC 3, where fuel loading may be higher (46 percent less than under Alternative A).

The chance of human-caused ignition may be increased in areas where recreation is concentrated, such as SRMAs and ERMAs. Under Alternative D, 4,470 acres are managed as ERMAs, including 3,100 acres in VCC 3 (23 percent

reduction from Alternative A) and 23,080 acres in SRMAs, including 15,800 acres in VCC 3 (more than twice that under Alternative A). As a result, the potential risk of ignition from recreation would likely be increased over Alternative A.

An additional risk of fire starts would be introduced by recreationists in the Judith Mountains and Lowry Bridge SRMAs under Alternative D. The chance of human-caused ignition would be greatest on the 487,700 acres (the same as under Alternative A) where OHV travel would be limited to designated routes yearlong (lands with wilderness characteristics would be managed as OHV limited area). Approximately 222,700 of these acres (the same as under Alternative A) would be located in VCC 3.

As discussed in **Appendix W**, special designation areas, including ACECs may restrict the ability to treat vegetation. Under Alternative D, 23,300 acres would be designated as ACECs, including 3,600 acres in VCC 3 (28 percent less than Alternative A). In particular, managing Square Butte ACEC as fire management Category C would support the use of treatments or natural fire processes to improve VCC toward more historical conditions. In contrast, managing the Acid Shale-Pine Forest ACEC as fire management Category B would allow for treatments or use of fire to improve VCC only on a limited basis, when not in conflict with ACEC management objectives.

Under Alternative D approximately 100,368 acres would be managed to protect their wilderness characteristics, including 66,700 acres in VRM Class III and 32,100 acres in VRM Class II areas (as compared with no acres under Alternative A). As discussed in **Appendix W**, limitations on suppression and vegetation treatments in these areas may affect time and costs for permitted treatments and effect the ability to manage for improved VCC. All WSR segments would be considered not suitable for inclusion in the NWSRS and would be released from consideration; therefore, no effects on fire management would occur for this special designation.

Cumulative

Past, present, and reasonably foreseeable future actions and conditions in the cumulative effect analysis area that have affected, and would likely continue to affect, wildfire management are as follows:

- Projects for vegetation management, which may affect fuel loading, VCC, and fire severity
- Projects that effect the ability to respond to wildfires, effecting cost and effectiveness of suppression activities
- Projects that would increase ROW authorizations and energy and mineral development, which effect the chance of human-caused ignitions
- Projects that would increase access to land and consequently increase the risk of human-caused ignitions

Wildfires in the LFO have been frequent in the past; from 2004 to 2014, there have been 264 wildfires documented on BLM-administered lands or lands where BLM assisted partners in the LFO. Reported during that time were 38,221 acres of human-caused fires and 88,467 acres of naturally occurring wildfires.

Wildfires are expected to increase due to recurring and increasingly severe drought conditions that are caused by climate variability. Drought may also affect forest health, which consequently makes forests more vulnerable to wildfire. Additionally, attacks by insects, such as the mountain pine beetle, may further damage forest health; this has been enabled by stress on forests caused by drought. This could affect wildfire management through increased personnel requirements for fire suppression activities and increased costs to the wildfire management program.

Under Alternative B, which is the most restrictive alternative, this could present challenges. The management actions under Alternative B would inhibit responses to, and preventative treatments and may make it difficult to meet the growing need for this flexibility in the future. Conversely, Alternatives A, C, and D would permit higher levels of treatment and may contribute to reduced severity of fire and decreased costs and time for fire suppression.

Under all alternatives, fuels treatments in the planning area, including past hazardous fuels reduction on 23,802 acres and conifer removal on approximately 3,300 acres, would likely continue and could increase. These activities

could decrease the intensity and occurrence of wildfires. Treatments could also return some of the vegetation communities to healthier states, which would result in an indirect decrease in risk of wildfire.

The fire management category applied on BLM-administered lands could also affect cumulative contributions to long-term shifts in VCC and potential for related changes in fire intensity and severity. Managing most of the decision area as Category B under Alternative A and at an increased level under Alternative C would limit the long-term ability to use natural processes to return to historical VCC in the planning area. In contrast, managing for a greater percentage of the decision area as Categories C under Alternative D and as Category C and D under Alternative B would likely increase the cumulative contribution to a long-term VCC shift.

Livestock grazing in the planning area would continue under all alternatives on private and public lands. Grazing on private lands is expected to remain stable or to decrease slightly; however, as Conservation Reserve Program lands become available and if livestock prices are stable, grazing may increase slightly. Continued grazing would support the reduction of fine fuels in areas with grazing. The reduction in areas available to grazing and forage allocated to grazing on BLM-administered lands under Alternative B could reduce the contribution of grazing to fine fuels reduction in the cumulative effects analysis area. Under all other alternatives, contributions to fine fuels reduction from livestock grazing on BLM-administered lands would be similar to current conditions.

Land uses that may introduce new sources of ignition and increase the risk of human-caused ignition would continue in the planning area. ROWs and the associated development may increase the risk of human-caused ignitions due to vehicular travel to and from the site, construction, maintenance, and operation of the facilities. The average of ROW actions between 2006 and 2015 was approximately 17 per year (see **Table W-2, Appendix W**). The development allowed under these authorizations would result in surface disturbance. This would generally contribute to the modification of the composition and structure of vegetation communities in the vicinity of developed areas, which could then be more likely to fuel high-intensity fires. ROW development could continue under all alternatives; however, the contribution to cumulative effects would be lowest under Alternative B, which places more restrictions on development. ROW development would be highest under Alternative C, where most of the planning area would be available for ROW authorization.

Minerals development in the planning area would continue to represent a low-level threat of increased ignition. Interest in developing locatable and nonenergy leasable minerals is likely to remain low under all alternatives for much of the LFO. Oil and gas leasing would be restricted under Alternative A, due to protest resolution. Under the other alternatives, particularly Alternative C, which imposes fewer restrictions, some level of development could occur. This would increase cumulative levels of risk for fire starts, but low fluid mineral potential is likely to minimize the acres disturbed (as shown in **Table W-1, Appendix W**), scale of development, and related risk of ignition.

Renewable energy development on private lands and the potential for additional development on BLM-administered lands could add to risks of ignition, particularly under Alternative C. Contributions to cumulative effects would be similar under all other alternatives.

Recreation and travel are anticipated to increase in the cumulative effects analysis area over the life of the plan. Under all alternatives, recreation represents a potential for risk of human-caused ignition. Cumulative effects would be highest under Alternative C, which supports the greatest level of motorized recreation. Conversely, the contribution to cumulative effects would be the least under Alternative B, due to the increased level of restrictions on travel, and would increase slightly under Alternative D, due to a moderate level of restrictions.

4.2.7 Cultural and Heritage Resources

Effects Common to All Alternatives

Under all alternatives, continuing to adhere to the existing laws, such as the NHPA, to EOs, such as EO 13007, and to cultural resource policies (e.g., BLM manuals and handbooks) would protect significant resources. Additionally, continued consultation and cooperation with the SHPO and Native American tribes would allow information on cultural properties and cultural landscapes to continue to be compiled, allowing better future management and protections of these sensitive areas.

Cultural resource use categories and values, and compliance actions would continue under all alternatives. New protective measures based on cultural resource use categories and requirements in the legislation to protect cultural resources are fully considered in all alternatives. Likewise, additional measures addressing protection of Native American resources and traditional uses from adverse effects are considered under Alternatives B, C, and D.

Many cultural resources are evaluated only by their surface manifestations, and resources may be lost through project implementation. Adverse effects would continue, especially those on unidentified resources, resulting from ongoing unevaluated or unsupervised activities, natural processes, and unanticipated events, such as wildfire.

Actions under all alternatives that protect springs and wetland riparian areas from livestock grazing would help protect water features and sources that may be culturally important to tribes. Actions that improve rangeland health could reduce the potential for effects from direct disturbance, erosion, and wildfire.

All alternatives would provide for the following:

- Retain and acquire lands that contain significant cultural resources and culturally sensitive areas
- Maintain access to resources
- Reduce incompatible uses
- Under applicable alternatives, minimize disturbance when authorizing ROWs

The potential acquisition of new land would provide long-term federal consideration under the NHPA for any cultural resources included in the transaction. This could enhance currently managed resources by consolidating holdings and potentially protecting the setting of cultural resources.

Land tenure adjustments and new transportation facilities that allow for better access to public lands could facilitate cultural uses but could also lead to vandalism or unauthorized collection of cultural resources. Exchange or disposal of lands to nonfederal entities would permanently remove federal protections for any significant cultural resources present; this would be an adverse effect under the NHPA. Exchanges, disposals, and subsequent landscape changes could also result in effects on the setting of cultural resources.

Stipulations for fluid minerals leasing (**Appendix L**) would restrict surface-disturbing activities, which would reduce the likelihood of disturbance, where applicable. The application of BMPs and mitigation measures (**Appendix F**) for surface-disturbing activities would likely reduce effects on cultural resources associated with authorized land uses or activities such as road, pipeline, or power line construction; mineral development; range improvements; and recreational activities. BMPs and mitigation would reduce or eliminate potential adverse effects on cultural resources.

Alternative A

Soil protection measures for authorized land uses or activities would limit erosion resulting from ground-disturbing activities and actions on steep slopes (see **Appendix F**). Many cultural resources are susceptible to erosion damage, including modifying spatial relationships of artifacts and destroying features and stratified deposits. The information loss is relevant to the site function, dates of occupation, subsistence, and past environments, all of which are important to understanding past culture. These measures to protect soils could preserve the integrity of cultural deposits and prevent damage from natural processes.

Actions to protect watersheds and municipal source waters through surface use restrictions and erosion controls would provide incidental protections from effects due to surface disturbance and erosion. Some water sources and features may be important to Native Americans. Actions that protect and maintain these water features and native plant and animal natural resources would help preserve these tribal values and traditional resources.

Actions to modify or remove water control structures, develop wells, and modify water features could risk disturbing cultural resources and traditional uses and values. The causes would be ground-disturbing activities, livestock trampling, changes in access, visibility, and setting of water features, and changes to the water features themselves.

Vegetation management measures addressing land health, plant diversity, natural processes restoration, desired plant communities, forest health, effects reduction on rangeland during drought, and weed elimination would largely be compatible with cultural resource management goals and preservation.

Many of the measures would reduce the potential for erosion of cultural sites, would maintain and improve soil health, would maintain or restore the historic setting, and would protect plant resources that may be important to Native American communities.

However, mechanical, biological, and chemical treatments could affect cultural resources and restrict access to resources for cultural purposes during treatment. Ground-disturbing mechanical vegetation treatments could modify the spatial relationships of artifacts and site features and could break artifacts. Chemical treatments could alter the chemistry of soils and artifact residues and affect the reliability of dating surface features and artifact residue analysis. Use of fire as a treatment could affect flammable cultural resource artifacts and features, cause spalling and staining of rock (either as a surface for rock art or as part of a feature or structure), and distort the temporal and functional analysis of artifacts (Tratebas et al. 2004; Williams and Corfield 2002; Knapp 2006).

Protecting vegetation communities (which can have special significance in Native American cultures) would also protect cultural resources. Continued consultation and cooperation with the SHPO and Native American tribes would allow continued compilation of information on traditional cultural properties, sacred sites, and cultural landscapes, allowing better future management and protections of these sensitive areas.

There are measures to protect special status species, including greater sage-grouse, and measures to protect other fish, wildlife, and plants. These are protective designations and restrictions on surface-disturbing activities and vehicle use that would also protect cultural resources from effects due to surface disturbance and erosion, effects on setting and access leading to vandalism, inadvertent damage, and unauthorized collection of cultural resources. Protective measures may inhibit Native American cultural uses in some areas, such as restricting access to traditional use areas, traditional resources, or sensitive sites.

Wildfire could result in direct disturbance or loss of cultural resources through the destruction or modification of structures, features, artifacts, cultural use areas, and culturally modified trees (Tratebas et al. 2004; Greer and Greer 2001; Buenger 2003).

Organic materials are especially vulnerable to heat damage. Fire management would involve ground-disturbing activities that could also directly affect cultural resources by altering the spatial relationships in archaeological sites. Also, fire retardant chemicals and heat could affect the accuracy of paleo-botanical or radiocarbon data obtained from cultural resources.

Removing vegetation increases the visibility of cultural resources and exposes previously undiscovered resources. Sites exposed by fire or prepared for fire avoidance in prescribed burns are more susceptible to unauthorized collection, vandalism, and subsequent erosion.

The risk of adverse effects on cultural resources is greatest from unplanned fire since the locations of cultural resources are less likely to be known and avoided. Effects from prescribed fire would be similar to those of wildfire, but prescribed fire is an undertaking subject to project-level analysis and the Section 106 process.

Cultural resources have been allocated into one of six categories according to their nature and relative preservation value. Each category has a corresponding management action and desired outcome, as follows:

- In the scientific use category, appropriate research would be permitted and the desired outcome would be to preserve the resource until research can be conducted or data can be gathered.
- Under the conservation for future use category, protective measures and designation is the corresponding management action, and the desired outcome is to preserve the resource until the conditions for use are met.
- The management action for cultural resources allocated to the traditional use category would be tribal consultation and determination of limitations; the desired outcome would be long-term preservation.

- The management action for resources allocated to the public use category would be to determine permitted use, and the desired outcome would be long-term preservation and on-site interpretation.
- In the experimental use category, the corresponding management action would be to determine the nature of the experiment and the desired outcome would be to protect the resource until it is used.
- Lastly, for resources placed in the discharge from management category, the management action would be to remove protective measures, and the desired outcome would be no use after recordation, and the resource would not be preserved.

Measures to protect cultural and paleontological resources and NHTs include protective designations and restrictions on surface and vehicle use from effects due to surface disturbance and erosion, effects on setting and access leading to vandalism, inadvertent damage, and unauthorized collection of cultural resources.

Protective measures for cultural resources may inhibit Native American cultural uses in some areas, such as restricting access to traditional use areas, traditional resources, or sensitive sites. Additionally, protective measures may reduce public interaction with cultural and paleontological resources and NHTs. While this would protect the resources, such measures would not promote public awareness, resource education, or stewardship.

Conversely, excavations, educational programs, and on-site interpretation could all lead to greater information about cultural resources and could foster a sense of stewardship in the public through exposure to these resources, but they could damage the cultural resources themselves. For example, excavations have direct destructive effects on cultural and paleontological resources; the very nature of excavation is to remove in situ artifacts and fossils, while destroying intact depositions. The trade-off and mitigation for these effects is to record the information in minute detail for future researchers to see, interpret, retain collected artifacts and fossils, and further understand the data collected during excavation.

In a similar manner, on-site educational programs and interpretation could encourage vandalism and theft through increased knowledge of resource locations and could lead to fewer protections of resources. However, these same programs could also encourage education and stewardship.

Cultural resources and cultural landscapes can contribute to the visual character and may be considered in determining VRM classifications; inversely, actions allowed by the BLM under the individual VRM classes could affect the natural scenic qualities of cultural landscapes and sites.

Effects would be directly and indirectly reduced where designations limit surface-disturbing activities in the more sensitive VRM class areas. For example, VRM Class I and Class II designations indirectly protect cultural resources through limiting the level of landscape change resulting in preserving the visual setting. This can be a contributor to the significance of the property or the traditional use. On the other hand, VRM Classes III and Class IV allow more changes and visual contrast on the landscape. Usually, this is as a result of new industrial developments, such as oil and gas projects, transmission lines, and land use authorizations. This could lead to destruction, damage, and discovery of cultural resources, as well as intrusions on the setting, resulting in degradation to a site's setting integrity.

Use of the visual resource contrast rating system during project planning could reduce the effect of visual intrusions on the scenic qualities of cultural landscapes and sites. Visual intrusion on the setting of cultural resources must be considered in the Section 106 process and tribal consultation, regardless of VRM designation.

Recreational trends indicate that the public is increasingly interested in using BLM-administered lands for recreational uses. This could have direct, indirect, and cumulative effects on cultural resources, such as intentional vandalism or unauthorized collection.

Recreation can affect cultural resources and sensitive Native American resources through direct disturbance, soil compaction, altered surface water drainage, erosion, intrusions to setting, and unauthorized collection or vandalism (Nyaupane et al. 2006; Pinter and Kwas 2005).

The potential for effects on cultural resources increases when there is an increase in population, when there is a change in recreation that alters the visual or audible character of the setting, or when recreation is concentrated

in sensitive areas. The effect of repeated uses or visits over time could also increase the intensity of effects due to natural processes. Repeated visits to sites can create social trails, directing more people to sites that may not be recorded or sites that have not been allocated to public use. Increased access to more remote areas can lead to effects on undisturbed resources. Continuing and enhancing interpretation and public education can vest the public in resource protection and respect for Native Americans and cultural values.

The effects of recreation would vary, depending on the level of surface disturbance they would cause and the increased level of access they could enable. Increased access could damage resources through vandalism, unlawful collection, and surface disturbance. Some recreation, such as kayaking, rafting, and canoeing, would have no effects on cultural resources. Others, such as horseback riding and OHV use, would have an effect and could damage cultural resources through surface disturbance. Camping would also likely have an effect because camping locations represent areas of access to water, shade, and comfort. Places that visitors presently find desirable for camping are often places that people have chosen to camp historically and prehistorically. Hiking and backpacking would have a lesser effect, but they may contribute to social trailing, which could damage cultural resources through surface disturbance.

Areas designated as ERMA and SRMA increase the intensity of permitted use of these areas and the risk for direct, indirect, and inadvertent damage to cultural and Native American resources from camping, visitor use, recreation, vandalism, firewood gathering, and other activities. An increase in human presence can also intrude on settings that may be important for cultural resources or Native American uses. On the other hand, restrictions on surface use to preserve recreational settings may provide incidental protection for cultural resources. In addition, by concentrating use in ERMA and SRMA, adjacent areas also may be protected.

Livestock grazing is associated with ongoing effects on or near the ground surface. Improper grazing and associated trampling reduces vegetation cover and disturbs the soil, which accelerates erosion and weathering. The modification, displacement, and loss of artifacts, features, and middens results in the loss of valuable cultural resource information regarding site function, date of use, subsistence, past environments, and other research questions.

Trampling and grazing can also affect Native American use areas and culturally important plants. Effects on cultural resources occur more frequently where livestock concentrate, such as at permanent and intermittent water sources. The construction or maintenance of range improvements such as springs, reservoirs, fences, corrals, and livestock trails have the potential to affect cultural resources, especially if these areas have not been previously inventoried.

File searches are conducted at the time of permit renewal, with a recommendation for inventories and site evaluations in areas with a high potential for cultural resources where livestock congregate; if conflicts exist, mitigation measures are proposed.

Range improvements are subject to project-level analysis and the Section 106 process, and protections and mitigations would be applied at project design and implementation phases. In all alternatives, cultural resources in areas unavailable for livestock grazing are directly protected.

Restricting vehicle use to designated trails reduces the risk of disturbing cultural resources located off trails. This also helps protect the integrity and setting of sensitive Native American resources from degrading the integrity and setting of sensitive cultural resources, disturbing cultural sites, and looting or vandalizing sites intentionally or unintentionally. The closure of areas to multiple methods of travel provides the greatest protection for cultural resources as long as administrative access is maintained to permit Native American access for identified cultural uses.

Direct effects are identified through inventory, and adverse effects are addressed by redesigning or mitigating roads and trails. Ongoing indirect effects on cultural resources from use of designated trails are less likely to be detected or monitored, and enforcing restrictions is difficult. Unauthorized travel would probably continue, and the potential risk of unauthorized collection or vandalism due to creation of unauthorized access would likely continue.

Motorized travel would have greater effects on cultural resources than nonmotorized travel, as it enables visitors to cover more ground, which increases access and, consequently, increases the risk of vandalism. Therefore, alternatives with more acres available for motorized and OHV travel could have greater effects on cultural resources than nonmotorized travel.

In general, certain development can disturb large tracts of land containing many cultural resources, resulting in damage or destruction of the resource or the loss of scientific information. This would be the case for development involving fluid minerals, coal, nonenergy solid leasable minerals, locatable minerals, mineral materials, transportation systems, transmission lines, communication sites, renewable energy resources, and other land use authorizations. Development can affect the setting of cultural resources over a great distance. Management in some areas reduces the potential for effects on cultural resources from discretionary actions, as in the following examples:

- Areas unavailable for coal leasing
- Areas closed to oil and gas leasing
- Areas with major constraints (such as NSO stipulations on oil and gas leases)
- Areas with moderate constraints (such as additional restrictive stipulations on leases)
- Areas allocated for withdrawal from mineral entry
- Exclusion and avoidance areas for ROWs and other realty actions

Due to the existing protest resolution, applicable to the mineral estate decision area, the entire decision area is deferred from fluid mineral leasing under Alternative A. This deferral has nearly the same effect as closing the entire mineral estate decision area, which eliminates potential effects from future fluid mineral development. Some leasing would still be available in areas without important wildlife habitat. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 456 acres; long-term disturbance effects could affect approximately 88 acres (**Table W-1, Appendix W**).

On the other hand, many cultural resources are discovered during required survey inventories at the permitting stage. Whenever development is prohibited, there is less likelihood for new discoveries and for adding to the scientific record. Additionally, when land use activities occur, such as mineral, energy, or ROW actions, there are several laws (e.g., NHPA and Archaeological Resources Protection Act of 1979 [ARPA]), regulations (e.g., 36 CFR 800), and BLM policies in place that require the BLM to protect resources or to mitigate effects to preserve the resource and its scientific information.

For lands and realty actions, siting land use authorizations along existing corridors or in previously disturbed areas would reduce the likelihood for disturbing cultural resources but would not eliminate them.

In areas available for forestry and woodland products, direct effects of harvesting and transporting trees are surface disturbance from road building to transport equipment and timber products and skidding cut trees across the landscape. Additionally, cut areas would leave visible scarring and changes in the landscape viewshed, which changes the natural scenic qualities of cultural landscapes and sites. However, as many of the areas are on steeper slopes, there is very little likelihood for intact cultural deposits to be discovered and result in these types of effects.

Protections afforded by the management measures for special designations would provide additional indirect protections for cultural resources. Management measures include surface use and ground disturbance restrictions; prohibitions on motorized, OHV, and mechanized travel; VRM classifications; and other restrictions on incompatible activities.

Designation may help preserve and enhance culturally important natural resources, but in some instances restrictions could impede Native American access and uses. Designations may attract more recreationists and the potential for inadvertent effects on cultural resources from recreation or intentional vandalism or unauthorized collection.

Increased use of the Internet to disseminate site location and encourage visitation to sites that are unrecorded or that have not been allocated to public use can expose cultural resources to effects. Where cultural resources are identified as an ORV for WSR segments, there would be additional protections for these resources when the segment is managed as eligible for inclusion in the NWSRS.

Protections afforded by the management measures for WSAs would protect cultural resources. Management measures include surface use and ground disturbance restrictions, motorized travel prohibition, VRM Class I management, and other restrictions on incompatible activities. While WSA designations help preserve and enhance culturally important natural resources, there could be effects on Native American access due to restrictions that could impede their access to, and uses of, traditional resources and sites. Such restrictions also limit the ability of the BLM to excavate and rehabilitate historic properties.

Identification of management actions to maintain and protect wilderness characteristics can provide protections similar, but less restrictive, than those described above for WSAs. Differences would include access for motorized vehicles, and there can be VRM classifications that are less restrictive in areas managed to protect wilderness characteristics. However, Alternative A does not specifically identify management actions for the preservation of wilderness characteristics; because of this, cultural resources would not be afforded the protections noted previously. Every ACEC management plan would have unique protections for the resources that the area was designated for. For those areas that contain cultural and paleontological resources, an ACEC management that restricts access or limits ground disturbance would protect those resources. Additionally, any reduction of access to ACECs could decrease contact by visitors who could intentionally or accidentally damage resources and sites by collecting or vandalizing surface artifacts or illegally digging into sites. On the other hand, if an ACEC plan prioritizes management of resources other than cultural resources (e.g., stream restoration in a historic mining district), there is the possibility for adverse effects on cultural resources by damaging or destroying the cultural materials or setting.

Actions to manage and protect cave resources do not directly protect cultural resources. If caves were managed to enhance education and scientific value it would promote public awareness and stewardship, resulting in greater information released, and would foster a sense of stewardship through exposure to the information. On the other hand, the increased public awareness could lead to increased vandalism and theft of found resources. However, the caves that are also protected by ACEC designation provide resource protections by limiting the types of activities that may occur, thereby preserving any known or buried cultural resources.

Alternative B

Effects under Alternative B are the same as those described under Alternative A, except for the descriptions noted below.

Construction activities to create impoundments would result in effects such as those described above for Alternative A under surface-disturbing activities. Frequency of disturbance is limited to once or up to three times (initial construction activities, interim reclamation, and final reclamation) for construction activities. It can be of limited duration (usually a few days to a couple of weeks) and limited to the access route into the impoundment and the immediate area around the impoundment. The magnitude of disturbance can be major if it destroys or extensively damages a site and results in a complete loss of scientific information. However, cultural resource compliance actions would continue and would reduce the magnitude of effects.

VRM categories shift under Alternative B, resulting in more acres managed as VRM Class I and Class II than under Alternative A. This results in more areas given greater protections to cultural resources where visual setting is a contributor to the significance of the property or the traditional use.

Alternative B includes areas to be managed to protect wilderness characteristics as opposed to Alternative A. As noted under Alternative A, managing lands to protect wilderness characteristics has similar effects on those described for WSAs. Differences would be administrative access for motorized vehicles and VRM classification that is less restrictive in areas managed to protect wilderness characteristics. For Alternative B, management measures include surface use and ground disturbance restrictions, prohibitions on motorized travel, and other restrictions on incompatible activities. While the lands managed to protect wilderness characteristics help

preserve and enhance culturally important natural resources, there could be effects on Native American access due to restrictions that could impede Native American access to, and uses of, traditional resources and sites. Such restrictions could also limit the ability of the BLM to excavate or rehabilitate historic properties.

Alternative B includes more areas to be closed to fluid minerals, nonenergy leasable minerals, and mineral materials than under Alternative A. Alternative B closes almost three times the acreage to fluid minerals than Alternative A. This would result in more areas being protected from the extensive surface disturbance that can be associated with these activities. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 330 acres; long-term disturbance effects could affect approximately 72 acres (**Table W-1, Appendix W**).

Alternative B closes almost 14 times the acreage to motorized use than the combined motorized and OHV closures under Alternative A, greatly reducing the risk of disturbing off-trail cultural resources. This also would help protect sensitive Native American resources from degrading the integrity and setting of sensitive cultural resources, disturbing cultural sites, whether intentionally or unintentionally, and looting or vandalizing sites.

Effects of land and realty actions are the same as those described above; however, Alternative B has more than 18 times the acreage allocated as exclusion than Alternative A. This greatly reduces the risk of disturbing cultural resources and the other effects from land use authorizations and ROW actions.

Alternative B has more than 45 times more area closed to forest product sales and harvest, which are also areas with protections from other actions that could cause effects on cultural resources. The closure and other protections in these areas would eliminate the types of effects of forestry sales and harvesting described under Alternative A. However, because many of the areas are on steeper slopes, there is very little likelihood for intact cultural deposits to be discovered, thereby negating any perceived protection.

Alternative C

Effects under Alternative C are the same as those described under Alternative A, except for the descriptions noted below.

Effects from activities to create impoundments would be the same as those described under Alternative B.

VRM categories shift under Alternative C, resulting in more acres managed as VRM Class III and Class IV than under Alternative A. This results in more areas given fewer protections to maintain the visual integrity of the landscape for cultural resources, where visual setting contributes to the significance of the property or the traditional use.

Alternative C would not manage lands for the protection of wilderness characteristics, so effects would be the same as under Alternative A.

Alternative C has slightly fewer acres open to fluid mineral leasing than under Alternative A; however, as Alternative A fluid mineral leasing has been deferred, the potential for effects is higher under Alternative C. This is because the areas allocated as open for leasing would allow future development if they are leased. Alternative C represents an increase in the potential for future development over a larger area than Alternative A, which could result in damage, destruction, or discovery of cultural resources. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 384 acres; long-term disturbance effects could affect approximately 79 acres (**Table W-1, Appendix W**).

Even though over 1 million acres would be open to leasing, the RFD indicates a low rate of anticipated development, which could mean that there would be very limited or no actual construction, drilling, or production activity. If this were the case, then there would be a potential only for cultural resource effects in these limited development areas. As there are several laws that require the BLM to protect and address effects on cultural resources (e.g., NHPA and ARPA), any effects would be mitigated at the time of permit approval. This would reduce the damage or loss of scientific information.

For other mineral and energy planning decisions, Alternative C is the same as Alternative A; therefore, the effects would be the same as Alternative A.

Effects from lands and realty actions would be similar as those described under Alternative A. There would be 13,000 more acres designated as ROW exclusion areas and 33,200 more acres designated as ROW avoidance, reducing the potential for cultural resource effects. The ROW open areas would be increased by 302,900 acres. While this does decrease the likelihood of affecting historic properties, it also decreases the need for cultural resource inventory and the opportunities for identifying cultural resources. As noted previously, there are several laws that require the BLM to protect and address effects on cultural resources (e.g., NHPA and ARPA); any effects would be mitigated at the time of permit approval, which would reduce the damage or loss of scientific information in those areas still designated open for ROW application.

Effects from forestry sales and harvesting would be the same as those described under Alternative A.

Alternative D

Effects under Alternative D are the same as those described under Alternative A, except as noted below.

Effects from activities to create impoundments would be the same as those described under Alternative B.

As noted under Alternative A, effects would be directly and indirectly reduced where designations limit surface-disturbing activities in the more sensitive VRM class areas, such as VRM Class I and Class II. Under Alternative D, there are more acres managed as VRM Class II and Class III than under Alternative A but fewer acres under Class IV. While acreages change, the results of the protections or lack thereof are largely the same; VRM Class II helps to maintain the visual integrity of the landscape for cultural resources where visual setting is a contributor to the significance of the property or the traditional use. However, development activities could still occur, and if cultural resources were found, there is still the possibility for discovering new resources or the damage or destruction of resources and the loss of scientific information.

A VRM Class III allocation would allow more change to occur on the landscape, which would increase the possibility for loss of the landscape's visual integrity. In some instances, a VRM Class I or Class II allocation can work against the cultural integrity of a landscape. For example, if the landscape were historically an open woodland or meadow but now is overgrown with timber, the protective nature of VRM Class I would continue to contribute to moving away from the site's historical integrity.

Alternative D includes management actions on 100,400 acres to protect their wilderness characteristics, which would have the same types of effects as those described under Alternative B. While there are 102,036 fewer acres managed to protect wilderness characteristics than under Alternative B, it is inaccurate to directly correlate fewer acres to fewer protections for resources that do not have specific management actions to protect wilderness characteristics. As noted under Alternative A, many cultural resources are discovered during required survey inventories at the permitting stage. Whenever development is precluded or prohibited, there is less likelihood for new discoveries and adding to the scientific record. Additionally, when land use activities occur, such as mineral, energy, or ROW actions, there are several laws (e.g., NHPA and ARPA), regulations (e.g., 36 CFR 800), and BLM policies in place that require the BLM to protect resources or to mitigate effects to preserve the resource and its scientific information.

Alternative D has slightly fewer acres open to fluid mineral leasing than under Alternative A; however, as fluid mineral leasing has been deferred under Alternative A, the potential for effects is higher under Alternative D. This is because the areas allocated open for leasing would allow future development if they are leased. Alternative D represents an increase in the potential for future development over a larger area than Alternative A; this could result in damage, destruction, or discovery of cultural resources. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 366 acres; long-term disturbance effects could affect approximately 77 acres (**Table W-1, Appendix W**).

Even though over 1 million acres would be open to leasing, the RFD indicates a low rate of anticipated development, which could mean that there would be very limited or no actual construction, drilling, or production activity. If this were the case, then there would be the potential only for cultural resource effects in these limited

development areas. As there are several laws that require the BLM to protect and address effects on cultural resources (e.g., NHPA and ARPA), any effects would be mitigated at the time of permit approval, which would reduce the damage or loss of scientific information.

Effects from lands and realty actions would be similar as those described under Alternative A. There would be 2,300 more acres designated as ROW exclusion areas and 67,900 more acres designated as ROW avoidance, reducing the potential for cultural resource effects. The ROW open areas would be reduced by 70,200 acres. While this does decrease the likelihood of affecting historic properties, it also decreases the need for cultural resource inventory and the opportunities for identifying cultural resources. As noted previously, there are several laws that require the BLM to protect and address effects on cultural resources (e.g., NHPA and ARPA); any effects would be mitigated at the time of permit approval, which would reduce the damage or loss of scientific information in those areas still designated open for ROW application.

The types of effects from forestry sales and harvesting would be the same as those described under Alternative A. While more areas are closed to forestry sales and harvesting, the effects could be less prevalent. However, as many of the areas are on steeper slopes, there is very little likelihood for intact cultural deposits to be discovered, negating any perceived protections.

Cumulative

The types of effects on cultural resources that have occurred in the past are the destruction of cultural resources, loss of integrity due to physical or other disturbances, loss of setting, degradation from natural processes, such as erosion and weathering, incremental disturbance from use or access, and effects from vandalism and unauthorized collection.

Current and future trends in the cumulative analysis area are ongoing grazing and associated infrastructure, increase in mineral development, lands and realty actions, recreational demands, invasive species, erosion, wildfire, drought, and climate variability. These would continue to affect cultural resources and cultural landscapes through loss or disturbance of unprotected resources, changes in setting, pressure from incremental use, loss of access for Native Americans to resources, and theft or vandalism of cultural resources.

Cultural resources next to areas of growth and development would be most susceptible to future effects. Development near private or state lands increases the risk of effects on cultural resources. The effects on cultural resources on adjacent private lands would be greater than on federal lands since they would not be subject to the same requirements or protections.

The construction of buildings, roads, and associated structures increases ground disturbance, causing effects on cultural resources and their settings. In general, the more people and development in an area, the greater the potential for disturbance and increased cumulative effects. Enforcement of measures designed to protect cultural resources and the natural resources and places used by Native Americans would become more difficult as use increases.

Designating routes for OHV travel can protect cultural resources located off the routes, but restrictions are difficult to enforce, especially as population and recreation grows and other areas are closed.

Increased use of the Global Positioning System ([GPS]; geocaching) and OHVs can facilitate vandalism and unauthorized collecting. Increased use of the Internet to disseminate site location and encourage visitation to sites that are unrecorded or have not been allocated to public use would continue to expose cultural resources to effects.

Actions related to mineral development, lands and realty actions, recreation, grazing, vegetation treatment, and wildfire have had past effects and are expected to continue to affect cultural resources. Increased frequency of wildfire due to drought or climate variability may lead to additional direct effects on, and loss of, cultural resources.

Many cultural resources are evaluated only by their surface manifestations, and these are lost through project implementation. Agency actions using federal funds or needing a federal permit require cultural resource review, but some effects would be unavoidable. Measures are in place to identify threats to resources and to prioritize

management actions, but some effects on known or unknown cultural resources can go unnoticed and may not be mitigated. These effects would result from natural processes, wildfire, grazing, dispersed recreation, and vandalism. Mitigation could prevent other desirable management options and future uses. Development or actions on lands that are not protected by federal or other cultural resource statutes and regulatory protections could lead to loss of these resources and the regional heritage and knowledge that they contain.

Direct and indirect effects on cultural resources from climate variability may occur from increased wildfire size, frequency and intensity; flooding and erosion; and changes in habitat distribution and water availability. Wildfire could result in direct disturbance or loss of cultural resources by destroying or modifying historic structures, rock art, site features, artifacts, cultural use areas, and culturally modified trees. Flooding and erosion would likewise affect the physical integrity of structures and archaeological sites. Changes in habitat distribution and water availability could affect Native American traditional cultural uses.

Decisions in this RMP may result in effects on cultural resources that, when combined with other past, present, and reasonably foreseeable actions, could contribute cumulative effects on cultural resources. However, cultural resource protection, and compliance with the NHPA and other cultural resource mandates are integrated into BLM planning with many other programs. Effects from federal undertakings are indicated by the potential for surface and ground disturbance, access leading to vandalism or overuse, actions that increase the potential for erosion, maintaining access for appropriate cultural resource uses, actions that restrict or allow incompatible uses, and actions that preserve or diminish integrity of setting. The potential for effects vary by the management proposed under each alternative.

As nonrenewable resources, most effects on cultural resources are permanent or long term, although some short-term effects to setting or access could occur. Effects on cultural resources are assessed on a site-specific basis and adverse effects are resolved for federal undertakings, minimizing the potential for contributions to cumulative effects under all alternatives. The continued documentation of new cultural resources from undertakings and permitted actions that would require inventory for compliance would result in additional information to expand and explain the area's cultural history. However, some effects would be unavoidable and mitigation could preclude other desirable management options and future uses.

4.2.8 Paleontological Resources **Effects Common to All Alternatives**

Under all alternatives, continuing to adhere to the existing laws, such as the Paleontological Resources Preservation Act and BLM paleontological resource policies (e.g., BLM manuals and handbooks) would protect paleontological resources. Additionally, continued scientific study by qualified researchers would allow information on paleontological resources to still be compiled, resulting in better future management of, and protections for, these sensitive resources.

Paleontological resources would continue to be fully considered in management decisions. Actions that could affect paleontological resources would be assessed, which would help determine the necessary mitigation steps to be taken. The assessment involves the determination of the potential fossil yield category (PFYC) rank of the rock units involved, compilation of known paleontological resources in the area, and consideration of potential effects based on the nature of the action. In PFYC Classes 3 to 5 the assessment almost always requires an on-the-ground evaluation by a professional paleontologist.

Based on the information developed in the assessment, a mitigation plan would be developed to protect paleontological resources. Measures might include resource avoidance, pre-disturbance salvage of resources, professional monitoring during construction, and stipulations to stop work if resources are discovered. Other fluid minerals leasing stipulations could be designed to protect paleontological resources from effects due to oil and gas surface-disturbing activities and help preserve opportunities for scientific, educational, and recreational uses of these resources.

The application of BMPs and mitigation measures (**Appendix F**) for surface-disturbing activities would likely reduce effects on paleontological resources associated with authorized land uses or activities. Examples are mineral development, range improvements, recreation, and road, pipeline, and power line construction. BMPs and mitigation would reduce or eliminate potential adverse effects on paleontological resources. Stipulations for

fluid minerals leasing (**Appendix L**) would restrict surface-disturbing activities, which would reduce the likelihood of disturbance, where applicable.

Alternative A

Soil protection measures would limit erosion from ground-disturbing activities and actions on steep slopes. Paleontological localities are susceptible to erosion damage as noted above, which can result in losing scientific information relevant to past environments and species. Measures to protect soils could preserve the integrity of paleontological deposits and prevent damage from natural processes.

Measures for interpretation and environmental education and the use of paleontological resources as interpretive sites may enhance appreciation and understanding of the fragile and finite nature of these resources; however, these uses can also lead to effects from access and use, such as exacerbated erosion from travel, vandalism, and unauthorized collection.

Managing special status species, fish and wildlife, soils and water quality, WSAs, and cultural resources would restrict surface-disturbing activities to some degree; therefore, this could protect paleontological resources. The types of effects are discussed in **Appendix W** above.

Paleontological resources exposed on the surface are usually found on steep slopes or rock formations that do not support significant amounts of vegetation. However, fire management activities related to unplanned ignitions can involve ground-disturbing activities at depths or in areas that can directly affect paleontological resources and outstanding geologic features. These actions include constructing fire lines and using heavy equipment. High severity fire can also damage surface fossils, including cracking, spalling, and oxidizing. Fire can result in effects through erosion and the increased visibility of paleontological resources.

Conversely, fire can also remove vegetation and expose previously undiscovered resources, allowing for their study and protection; however, locations exposed by fire can be susceptible to damage by subsequent erosion, vandalism, and unauthorized collecting.

While all lands outside of the Rocky Mountain Front are open to fluid minerals leasing under Alternative A, the current deferral of fluid minerals leasing reduces potential effects on paleontological resources in that area. However, where fluid minerals could be developed, paleontological resources would be fully assessed and mitigated for, which could help identify new resources and protect existing resources from effects (see the discussion above). On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 456 acres; long-term disturbance effects could affect approximately 88 acres (**Table W-1, Appendix W**).

Recreation activities can physically alter exposed or shallow paleontological resources, leading to damage from erosion and unauthorized collection and vandalism. Areas managed as SRMAs and ERMAs, particularly for trail-based recreation (as opposed to river-based recreation), concentrate recreation and increase the risk for direct, indirect, and inadvertent damage to paleontological resources and outstanding geologic features from camping, visitor use, recreation, vandalism, firewood gathering, and other activities. However, because these risks occur in a concentrated area, the BLM is better able to manage recreation to minimize the potential for damage. Areas not managed as RMAs are subject to less intensive, unstructured recreational management and effects on paleontological resources and they are more difficult to anticipate, monitor, and mitigate.

Motorized travel can result in serious effects on paleontological resources, such as degrading the integrity of resources or exacerbating erosion. Routes also provide access to areas that could yield new paleontological discoveries but can also lead to vandalism and unauthorized collection of fossils.

Restricting vehicle use to existing or designated routes reduces the risk of disturbing resources located off trails and helps protect the localities' integrity and setting. The closure of routes to multiple methods of travel provides the greatest protection, including reduced opportunities for vandalism and unauthorized collection of fossils. Direct effects would be identified through inventory, and adverse effects would be addressed through avoidance by redesigning or mitigating roads and trails. Ongoing indirect effects from use of designated routes are less likely to be detected or monitored, and enforcing restrictions is difficult.

Any paleontological resources in areas made unavailable for land use authorizations would be protected from possible surface-disturbing activities. In the remaining area where ROWs and land use authorizations could be permitted, full assessment and mitigation measures would be developed and implemented. This would help identify new resources and protect existing resources from effects (see the discussion above).

Special designation areas, including ACECs and WSRs, are afforded special management measures designed to protect a variety of resource values, including paleontological values. Management measures vary but generally include surface use restrictions, ground disturbance restrictions, motorized and OHV travel prohibitions, stringent VRM classifications, annual monitoring, and other restrictions on development and resource use. Paleontological resources in these areas would be preserved in situ or would be collected only through an approved paleontological resources use permit. New discoveries from development and deep excavations would be less likely in these areas, but permits for scientific uses (collection, excavation, and curation) would be considered if compatible with the resource values that the designation is protecting.

Alternative B

Effects under Alternative B are the same as those described under Alternative A except for the descriptions noted below.

Alternative B includes areas to be managed to protect wilderness characteristics. Managing lands to protect their wilderness characteristics has effects similar to those described for WSAs above. Management measures include surface use and ground disturbance restrictions, prohibitions on motorized uses, and other restrictions on incompatible activities. Such restrictions could also limit the ability of the BLM to excavate paleontological resources.

Alternative B includes more areas to be closed to fluid minerals, nonenergy leasable minerals, and mineral materials than Alternative A. This would result in more areas being protected from the surface disturbance that can be associated with these activities. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 330 acres; long-term disturbance effects could affect approximately 72 acres (**Table W-1, Appendix W**).

Alternative B closes almost 14 times the acreage to motorized use than the combined motorized and OHV closures under Alternative A. This greatly reduces the risk of disturbing paleontological resources off trails from looting or vandalism, whether intentional or unintentional.

Effects of land and realty actions are the same as those described above; however, Alternative B has more than 18 times the acreage allocated as exclusion areas as Alternative A, greatly reducing the risk of disturbing paleontological resources and the other effects from land use authorizations and ROW actions.

Alternative C

Effects under Alternative C are the same as those under Alternative A, except for the descriptions noted below.

There is no action under Alternative C to manage lands for the protection of wilderness characteristics, so effects would be the same as under Alternative A.

Alternative C has slightly fewer acres open to fluid mineral leasing than under Alternative A; however, as Alternative A fluid mineral leasing has been deferred, the potential for effects is higher under Alternative C. This is because the areas allocated as open for leasing would allow future development, which is not currently happening under Alternative A. In other words, Alternative C represents an increase in the potential for future development over a larger area than Alternative A, which could result in damage, destruction, or discovery of paleontological resources.

Even though over 1 million acres would be open to leasing, the RFD indicates a low rate of anticipated development, which could mean that there would be very limited or no actual construction, drilling, or production activity. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 384 acres; long-term disturbance effects could affect approximately 79 acres (**Table W-1, Appendix W**). If this were the case, then there would be only limited potential for paleontological

resource effects in these development areas, and no potential if the areas were to fall within PFYC 1, 2, or 3. As there are laws and policies that require the BLM to protect and address effects on paleontological resources, the BLM would require surveys, inventories, and mitigation measures at the permit approval. This would reduce the damage or loss of scientific information.

Effects from lands and realty actions would be similar to those described under Alternative A. There would be 124,100 more acres closed to ROW development, reducing the potential for paleontological resource effects. As there are more areas open for ROW or avoidance areas, it is possible that more sites would be discovered during permitting activities. However, as noted previously, there are several laws that require the BLM to inventory for, protect, and address effects on paleontological resources; any effects would be mitigated at the time of permit approval, which would reduce the damage or loss of scientific information.

Alternative D

Effects under Alternative D are the same as those described under Alternative A, except for the descriptions noted below.

Alternative D includes areas to be managed to protect wilderness characteristics, which would have the same types of effects as those described under Alternative B and **Appendix W**. There are 101,900 more acres managed to protect their wilderness characteristics than under Alternative A; nevertheless, it is inaccurate to directly correlate more acres to more protections for paleontological resources that do not have the wilderness characteristic allocation.

As noted under Alternative A, many paleontological resources are discovered during required survey inventories at the permitting stage. Whenever development or activities are precluded or prohibited, there is less likelihood for new discoveries or for adding to the scientific record or the ability to excavate resources. Additionally, when land use activities occur, such as mineral, energy, or ROW actions, there are several laws, regulations, and BLM policies in place that require the BLM to protect resources or to mitigate effects in order to preserve the resource and its scientific information.

Alternative D has slightly fewer acres open to fluid mineral leasing than under Alternative A; however, because fluid mineral leasing has been deferred under Alternative A, the potential for effects is higher under Alternative D. This is because the areas allocated open for leasing would allow future development if they were leased. In other words, Alternative D represents an increase in the potential for future development over a larger area than Alternative A. This could result in damage, destruction, or discovery of paleontological resources.

Even though over 1 million acres would be open to leasing, the RFD indicates a low rate of anticipated development, which could mean that there would be very limited or no actual construction, drilling, or production activity. On BLM-administered lands, the short-term disturbance associated with access roads, flow lines, and well pads could affect approximately 366 acres; long-term disturbance effects could affect approximately 77 acres (**Table W-1, Appendix W**). If this were the case, then there would be only a potential for paleontological resource effects in these limited development areas. As there are several laws that require the BLM to protect and address effects on paleontological resources, any effects would be mitigated at the time of permit approval; this would reduce the damage or loss of scientific information.

Effects from lands and realty actions would be similar as those described under Alternative A. There would be 70,200 more acres closed to ROW development, reducing the potential for paleontological resource effects. As there are more areas open for ROW or avoidance areas, it is possible that more localities would be discovered during permitting activities. However, as noted previously, there are several laws that require the BLM to inventory for, protect, and address effects on paleontological resources; any effects would be mitigated at the time of permit approval, which would reduce the damage or loss of scientific information.

Cumulative

Effects on paleontological resources that have occurred in the past include destruction or damage of resources due to construction, recreation, theft, and vandalism and the effects of natural processes without recovery, scientific study, or interpretation.

An increasing regional population and recreation demand could lead to greater damage to the resources through unauthorized removal, vandalism, incremental damage of surface resources, and subsequent erosion. This could result in the unmitigated loss of scientific information and could reduce the educational and interpretative potential of the resource. Adhering to the appropriate assessment and mitigation process would reduce most effects to an insignificant level.

4.2.9 Visual Resources

Comparative Effect Summary Tables

Table 4-31 through Table 4-40 provide a summary of quantitative effects on visual resources by alternative.

Table 4-31
Acreage Summary of VRI Class by VRM Class

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV	Total
A	I	2,700	13,000	0	0	15,700
	II	0	65,000	9,100	30,900	105,000
	III	0	38,200	80,300	74,800	193,300
	IV	0	20,300	53,900	206,300	280,500
	Unassigned	0	35,600	16,000	5,100	56,700
B	I	2,700	14,200	0	0	16,900
	II	0	125,700	127,600	76,100	329,400
	III	0	24,400	15,300	52,700	92,400
	IV	0	7,800	16,300	188,300	212,400
	Unassigned	0	0	0	0	0
C	I	2,700	0	0	0	2,700
	II	0	14,000	0	0	14,000
	III	0	130,400	126,700	35,800	292,900
	IV	0	27,700	32,400	281,300	341,400
	Unassigned	0	0	0	0	0
D	I	2,700	13,200	0	0	15,900
	II	0	54,300	69,300	1,700	125,300
	III	0	94,600	78,100	62,900	235,600
	IV	0	10,100	11,900	252,500	274,500
	Unassigned	0	0	0	0	0

Sources: BLM GIS 2015a

Table 4-32
Acres Open to Nonenergy Solid Minerals Leasing by VRI Class

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	0	700	0	200
	II	0	62,500	8,900	25,800
	III	0	32,000	71,100	24,900
	IV	0	18,400	41,900	48,400
	Unassigned	0	28,300	11,900	5,000
B	I	0	400	0	0
	II	0	71,900	24,700	15,800
	III	0	21,700	9,600	23,300
	IV	0	4,500	8,100	38,500
	Unassigned	0	0	0	0
C	I	0	0	0	0
	II	0	400	0	0
	III	0	118,100	109,900	23,000
	IV	0	22,800	23,800	80,800
	Unassigned	0	0	0	0

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
D	I	0	0	0	0
	II	0	16,200	100	100
	III	0	85,400	64,800	47,300
	IV	0	6,800	6,300	55,000
	Unassigned	0	0	0	0

Source: BLM GIS 2015a

**Table 4-33
Acres Open to Fluid Minerals Leasing by VRI Class**

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	0	0	0	0
	II	0	63,100	8,900	30,300
	III	0	35,300	76,900	71,400
	IV	0	19,800	51,400	201,800
	Unassigned	0	28,300	11,900	5,000
B	I	0	0	0	0
	II	0	73,100	25,800	23,800
	III	0	22,200	14,100	50,100
	IV	0	7,100	14,800	179,300
	Unassigned	0	0	0	0
C	I	0	0	0	0
	II	0	400	0	0
	III	0	120,400	118,300	35,200
	IV	0	25,700	30,800	273,300
	Unassigned	0	0	0	0
D	I	0	0	0	0
	II	0	45,600	63,500	1,600
	III	0	90,400	75,000	61,800
	IV	0	9,400	10,400	241,400
	Unassigned	0	0	0	0

Source: BLM GIS 2015a

**Table 4-34
Acres Open to Locatable Mineral Entry by VRI Class**

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	1,900	0	0	0
	II	0	64,800	9,100	30,900
	III	0	38,000	80,100	74,800
	IV	0	20,300	53,900	206,300
	Unassigned	0	29,400	13,300	5,100
B	I	1,900	800	0	0
	II	0	121,300	125,400	76,100
	III	0	22,800	14,800	52,700
	IV	0	7,700	16,300	188,300
	Unassigned	0	0	0	0
C	I	1,900	0	0	0
	II	0	900	0	0
	III	0	124,100	124,200	35,800
	IV	0	27,500	32,200	281,200
	Unassigned	0	0	0	0
D	I	1,900	0	0	0
	II	0	48,800	66,800	1,700
	III	0	93,700	77,700	62,900
	IV	0	10,100	11,900	252,400
	Unassigned	0	0	0	0

Source: BLM GIS 2015a

Table 4-35
Acres Open to Mineral Materials Disposal by VRI Class

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	0	0	0	0
	II	0	62,500	8,900	25,800
	III	0	32,000	71,100	24,900
	IV	0	18,400	41,900	48,400
	Unassigned	0	34,500	14,300	5,000
B	I	0	400	0	0
	II	0	76,000	26,600	15,800
	III	0	23,300	10,100	23,300
	IV	0	4,600	8,100	38,500
	Unassigned	0	0	0	0
C	I	0	0	0	0
	II	0	13,600	0	0
	III	0	126,500	120,700	35,200
	IV	0	25,600	30,600	273,300
	Unassigned	0	0	0	0
D	I	0	200	0	0
	II	0	21,600	2,300	100
	III	0	86,000	64,900	47,300
	IV	0	6,800	6,300	55,000
	Unassigned	0	0	0	0

Source: BLM GIS 2015a

Table 4-36
Acres Open to Livestock Grazing by VRI Class

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	1,400	11,600	0	200
	II	0	59,500	9,100	30,900
	III	0	38,200	80,300	74,800
	IV	0	20,300	53,900	206,300
	Unassigned	0	29,500	15,600	5,100
B	I	1,400	11,800	0	0
	II	0	115,400	126,000	75,900
	III	0	18,200	14,800	51,900
	IV	0	6,800	12,400	186,200
	Unclassified	0	0	0	0
C	I	1,400	0	0	0
	II	0	12,600	0	0
	III	0	118,900	126,700	35,800
	IV	0	27,600	32,100	281,300
	Unclassified	0	0	0	0
D	I	1,400	11,800	0	0
	II	0	53,500	69,300	1,700
	III	0	83,900	77,700	62,900
	IV	0	10,100	11,900	252,500
	Unclassified	0	0	0	0

Source: BLM GIS 2015a

Table 4-37
Acres Limited to Designated Routes by VRI Class

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	0	0	0	0
	II	0	65,000	9,100	30,900
	III	0	8,700	24,600	66,300
	IV	0	10,600	27,300	188,400
	Unassigned	0	35,600	16,000	5,100
B	I	0	1,200	0	0
	II	0	78,400	19,600	22,100
	III	0	23,800	10,900	45,100
	IV	0	7,800	16,300	188,300
	Unassigned	0	0	0	0
C	I	0	0	0	0
	II	0	14,000	0	0
	III	0	91,300	44,500	16,900
	IV	0	27,700	32,400	273,800
	Unassigned	0	0	0	0
D	I	0	200	0	0
	II	0	23,700	14,500	600
	III	0	86,100	50,500	60,000
	IV	0	10,100	11,900	230,100
	Unassigned	0	0	0	0

Source: BLM GIS 2015a

Table 4-38
Acres Open to ROWs with Standard Restrictions by VRI Class

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	0	0	0	100
	II	0	34,300	8,200	10,400
	III	0	31,100	65,600	11,800
	IV	0	14,500	40,800	16,000
	Unassigned	0	23,800	9,200	4,700
B	I	0	0	0	0
	II	0	5,800	4,000	3,800
	III	0	2,800	2,300	4,100
	IV	0	1,000	1,900	5,200
	Unassigned	0	0	0	0
C	I	0	0	0	0
	II	0	14,000	0	0
	III	0	94,100	106,800	19,300
	IV	0	21,000	23,800	23,900
	Unassigned	0	0	0	0
D	I	0	200	0	0
	II	0	5,600	100	200
	III	0	71,300	56,000	16,300
	IV	0	4,800	7,100	25,100
	Unassigned	0	0	0	0

Source: BLM GIS 2015a

Table 4-39
Acres Open to Wind ROWs with Standard Restrictions by VRI Class

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	0	13,000	0	100
	II	0	34,300	8,200	10,400
	III	0	31,100	65,600	11,800
	IV	0	14,500	40,800	16,000
	Unassigned	0	31,200	15,700	4,700
B	I	0	0	0	0
	II	0	7,500	5,500	4,500
	III	0	14,700	3,300	6,100
	IV	0	1,900	4,200	6,900
	Unassigned	0	0	0	0
C	I	0	0	0	0
	II	0	100	0	0
	III	0	46,500	2,200	2,700
	IV	0	20,600	21,900	23,900
	Unassigned	0	0	0	0
D	I	0	0	0	0
	II	0	1,700	0	200
	III	0	46,900	53,900	16,300
	IV	0	4,200	4,800	25,100
	Unassigned	0	0	0	0

Source: BLM GIS 2015a

Table 4-40
Acres Open to Forest Product Sales or Harvest by VRI Class

Alternative	VRM Class	VRI Class I	VRI Class II	VRI Class III	VRI Class IV
A	I	0	13,000	0	0
	II	0	65,000	9,100	30,900
	III	0	38,200	80,300	74,300
	IV	0	20,300	53,900	204,200
	Unassigned	0	35,600	16,000	5,100
B	I	0	0	0	0
	II	0	84,500	28,600	24,200
	III	0	24,400	15,300	52,700
	IV	0	7,800	16,300	185,700
	Unassigned	0	0	0	0
C	I	0	0	0	0
	II	0	14,000	0	0
	III	0	130,400	126,700	35,800
	IV	0	27,700	32,400	281,300
	Unassigned	0	0	0	0
D	I	0	200	0	0
	II	0	21,400	2,500	200
	III	0	94,600	78,100	62,900
	IV	0	10,100	11,900	249,800
	Unassigned	0	0	0	0

Source: BLM GIS 2015a

Effects Common to All Alternatives

The BLM would continue to apply management prescriptions to the Square Butte WSA according to BLM policy. Managing the WSA according to the nonimpairment standard would essentially preclude activities and development that would alter visual resources in the WSA. The effects on visual resources from managing WSAs would continue, as described in **Appendix W**, above.

The application of BMPs and mitigation measures (**Appendix F**) for surface-disturbing activities would likely reduce effects on visual resources associated with authorized land uses or activities such as road, pipeline, or power line construction; mineral development; range improvements; and recreational activities. BMPs and mitigation would reduce or eliminate the removal or alteration of vegetation communities, which are components of the visual setting.

Requiring a reclamation plan (**Appendix G**) for all surface-disturbing activities across all alternatives would stabilize disturbed areas in the short term and stabilize the landscape setting in the long term.

Alternative A

Fire management Category B is for areas where wildfires are not desired because of current conditions; Categories C and D are for areas where wildfire is desired. There would continue to be 426,500 acres in Category B and 223,600 acres in Category C; there would be no acres in Category D. The effects on visual resources from preventing and suppressing fire, as well as using fire to shape vegetation condition, composition, and distribution would continue, as described in **Appendix W**.

Lands in the planning area were placed into one of four VRI classes. Classes I and II have the highest scenic qualities, Class III represents a moderate value, and Class IV is of least value. The BLM would continue to manage visual resources according to the VRM classes described in the AMS (BLM 2018).

Also, there would continue to be 56,700 acres without a VRM class designation, which can threaten the integrity of visual resources. This represents approximately 9 percent of BLM-administered surface lands. This is most noteworthy for the 35,600 acres of VRI Class II lands (5 percent of BLM-administered surface lands) and 16,000 acres of VRI Class III lands (2 percent of BLM-administered surface lands). The effects on visual resources from having lands that lack a VRM class would continue.

Under Alternative A, the BLM would not identify management actions to protect wilderness characteristics. This is most noteworthy for areas containing lands with wilderness characteristics (**Appendix M**). These lands could be affected by surface disturbances or development due to a lack of actions that limit land use authorizations, transportation, or minerals development. The resulting effects from these actions in areas with wilderness characteristics would continue.

The BLM would continue to manage areas open to leasing for nonenergy solid minerals, fluid minerals, locatable mineral entry, and mineral materials on federal mineral estate. There are 1,196,800 acres of federal mineral estate. While most lands outside of the Rocky Mountain Front are open to fluid minerals leasing under Alternative A, the current deferral of fluid minerals leasing reduces potential effects in that area. The effects on visual resources from managing areas open to minerals leasing would continue, as described in **Appendix W**.

The BLM would continue to manage livestock grazing on 636,600 acres. This represents approximately 97 percent of BLM-administered surface lands. The effects on visual resources from managing areas open to livestock grazing would continue, as described in **Appendix W**.

The BLM would continue to manage 487,700 acres as limited year-round to existing routes. This represents approximately 75 percent of BLM-administered surface lands. The effects on visual resources from motor vehicles would continue, as described in **Appendix W**.

ROW avoidance and exclusion areas can be established for a variety of resources and resource uses, such as water resources, vegetation communities, special status species, cultural and heritage resources, lands with wilderness characteristics, lands and realty, renewable energy, ACECs, national trails, WSRs, and WSAs. The effects on visual resources from ROW development would continue, as described in **Appendix W**.

Most forested BLM-administered lands in the planning area are in isolated parcels with limited access. The effects on visual resources from managing forested acres would continue, as described in **Appendix W**.

The BLM would manage 27 stream segments as eligible for inclusion in the NWSRS. The effects on visual resources from managing segments as eligible for inclusion in the NWSRS would continue, as described in **Appendix W**.

Alternative B

There would be 322,900 acres in Category B and 327,200 acres in Categories C and D. Alternative B is the only alternative with acres in Category D. This is because it has the most areas where wildfire is desired, and there are few or no constraints for its use. Compared with Alternative A, Alternative B would decrease the number of acres in Category B by 103,600 acres (16 percent of BLM-administered surface lands) and increase the number of acres where wildfire is desired by 197,300 acres (30 percent of BLM-administered surface lands). Compared with Alternative A, visual resources would be influenced more by the effects of fire under Alternative B.

For visual resources management, there would be 139,900 VRI Class II acres that would be managed as VRM Class I or Class II and 142,900 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class II and Class III lands for an additional 60,700 acres (10 percent of BLM-administered surface lands) and 73,700 acres (11 percent of BLM-administered surface lands), respectively. This is because there would be more VRM Class I, Class II, or Class III acres.

Also, there would be 32,200 VRI Class II acres that would be managed as VRM Class III or Class IV and 16,300 VRI Class III acres that would be managed as VRM Class IV. Compared with Alternative A, this would maintain the quality of VRI Class II and III lands for an additional 26,300 acres (4 percent of BLM-administered surface lands) and 37,600 acres (5 percent of BLM-administered surface lands), respectively. This is because there would be fewer VRM III or Class IV acres.

Furthermore, compared with Alternative A, all BLM-administered lands would be assigned a VRM class designation, which can maintain the integrity of visual resources.

The BLM would manage to maintain and protect 202,400 acres of lands with wilderness characteristics, which would be managed as VRM Class II under Alternative B in order to retain those characteristics. This represents 31 percent of BLM-administered surface lands, compared with no lands administered under Alternative A. These lands would experience fewer effects from surface disturbances or development due to actions that limit land use authorizations, transportation, or minerals development.

For lands open to nonenergy solid mineral leasing, there would be 72,300 VRI Class II acres that would be managed as VRM Class I or Class II. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class II lands for an additional 9,000 acres (1 percent of federal mineral estate). This is because there would be more VRM Class I or Class II acres. For lands open to nonenergy solid mineral leasing, there would be 26,200 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, development would threaten the quality of visual resources for VRI Class III lands for an additional 45,700 acres (3 percent of federal mineral estate). This is because there would be fewer VRM Class II or Class III acres.

For lands open to fluid mineral leasing, the effects on visual resources would be similar to effects from lands open to nonenergy solid mineral leasing, except for negligible differences in acreages.

For lands open to locatable mineral entry, there would be 122,100 VRI Class II acres that would be managed as VRM Class I or Class II and 140,200 VRI Class III acres that would be managed as VRM Class II or III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class II and Class III lands for an additional 56,600 acres (9 percent of BLM-administered surface lands) and 51,000 acres (8 percent of BLM-administered surface lands), respectively. This is because there would be more VRM Class I, Class II, or Class III acres.

Compared with Alternative A, Alternative B would increase the area proposed for withdrawal from locatable mineral entry from 0 acres to 198,400 acres. If 183,400 additional acres are withdrawn, then there would be fewer opportunities for development to alter visual resources.

For lands open to mineral material disposal, the effects on visual resources would be similar to effects from lands open to nonenergy solid mineral leasing, except for negligible differences in acreages.

For lands open to livestock grazing, there would be 129,300 VRI Class II acres that would be managed as VRM Class I or Class II and 140,800 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class II and Class III lands for an additional 56,800 acres (9 percent of BLM-administered surface lands) and 51,500 acres (8 percent of BLM-administered surface lands), respectively. This is because there would be more VRM Class I, Class II, or Class III acres.

For lands limited to designated routes, there would be 79,600 VRI Class II acres that would be managed as VRM Class I or Class II. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class II lands for an additional 14,600 acres (2 percent of BLM-administered surface lands). This is because there would be more VRM Class I or Class II acres. For lands limited to designated routes, there would be 31,600 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class III lands for an additional 19,300 acres (2 percent of BLM-administered surface lands). This is because there would be fewer VRM Class II or Class III acres.

For lands open to ROWs with standard restrictions, there would be 5,800 VRI Class II acres that would be managed as VRM Class II and 3,800 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II and Class III lands for an additional 28,500 acres (4 percent of BLM-administered surface lands) and 70,000 acres (10 percent of BLM-administered surface lands), respectively. This is because there would be fewer VRM Class II or Class III acres.

For lands open to wind ROWs with standard restrictions, the effects on visual resources would be similar to effects from lands open to ROWs with standard restrictions.

For lands open to timber harvest, there would be 84,500 VRI Class II acres that would be managed as VRM Class II. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class II lands for an additional 19,500 acres (2 percent of BLM-administered surface lands). This is because there would be more VRM Class II acres. For lands open to timber harvest, there would be 43,900 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class III lands for an additional 45,500 acres (6 percent of BLM-administered surface lands). This is because there would be fewer VRM Class II or Class III acres.

For Alternative B, there are no VRI Class I lands that are open to timber harvest, thereby limiting surface disturbances on these lands.

For WSRs, the BLM would determine that the same 27 stream segments discussed under Alternative A are suitable for inclusion in the NWSRS. The effects on visual resources would be the same as the effects under Alternative A.

Alternative C

There would be 452,800 acres in Category B and 197,300 acres in Category C. There would be no acres in Category D. Compared with Alternative A, Alternative C would increase the number of acres in Category B by 129,900 acres (4 percent of BLM-administered surface lands) and would decrease the number of acres where wildfire is desired by 26,300 acres (4 percent of BLM-administered surface lands). Compared with Alternative A, visual resources would be slightly influenced more by the effects of fire suppression under Alternative C.

For visual resources management, there would be 14,100 VRI Class II acres that would be managed as VRM Class I or Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 63,900 acres (9 percent of BLM-administered surface lands). This is because there would be fewer VRM Class I or Class II acres.

For visual resources management, there would be 130,400 VRI Class III acres that would be managed as VRM Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 92,200 acres (14 percent of BLM-administered surface lands). This is because there would be more VRM Class III acres.

Also, there would be 158,100 VRI Class II acres that would be managed as VRM Class III or Class IV. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 99,600 acres (15 percent of BLM-administered surface lands). This is because there would be more VRM Class III or IV acres, and there would be 32,400 VRI Class III acres that would be managed as VRM Class IV. Compared with Alternative A, this would maintain the quality of VRI Class III lands for an additional 21,500 acres (3 percent of BLM-administered surface lands). This is because there would be fewer VRM Class IV acres.

Furthermore, compared with Alternative A, all BLM-administered lands would be assigned a VRM class designation, which can maintain the integrity of visual resources.

The effects on visual resources from managing lands for the protection of wilderness characteristics would be the same as Alternative A.

For lands open to nonenergy solid mineral leasing, there would be 400 VRI Class II acres that would be managed as VRM Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 62,900 acres (5 percent of federal mineral estate). This is because there would be fewer VRM Class II acres. For lands open to nonenergy solid mineral leasing, there would be 109,900 VRI Class III acres that would be managed as VRM Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 29,900 acres (2 percent of federal mineral estate). This is because there would be more VRM Class III acres.

For lands open to fluid mineral leasing, locatable mineral entry, and mineral material disposal, the effects on visual resources would be similar to effects from lands open to nonenergy solid mineral leasing, except for negligible differences in acreages.

Compared with Alternative A, Alternative B would increase the area proposed for withdrawal from locatable mineral entry, from 0 acres to 198,400 acres. If 198,400 additional acres are withdrawn, then there would be fewer opportunities for development to alter visual resources.

For lands open to livestock grazing, there would be 12,600 VRI Class II acres that would be managed as VRM Class I or Class II. Compared with Alternative A, this would not maintain the quality of visual resources if surface-disturbing development occurred for VRI Class II lands for an additional 59,900 acres (9 percent of BLM-administered surface lands). This is because there would be fewer VRM Class I or Class II acres. For lands open to livestock grazing, there would be 126,800 VRI Class III acres that would be managed as VRM Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 46,400 acres (7 percent of BLM-administered surface lands). This is because there would be more VRM Class III acres.

Furthermore, 12,600 acres of VRI Class I lands (or 1 percent of BLM-administered surface lands) would be managed as VRM Class II lands, thereby requiring less stringent management of visual resources.

For lands limited to designated routes, there would be 1,000 VRI Class II acres that would be managed as VRM Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 64,000 acres (9 percent of BLM-administered surface lands). This is because there would be fewer VRM Class II acres. For lands limited to designated routes, there would be 44,500 VRI Class III acres that would be managed as VRM Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 19,900 acres (3 percent of BLM-administered surface lands). This is because there would be more VRM Class III acres.

For lands open to ROWs with standard restrictions, there would be 200 VRI Class II acres that would be managed as VRM Class II and 6,900 VRI Class III acres that would be managed as VRM Class III. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II and Class III lands for an additional 34,100 acres (5 percent of BLM-administered surface lands) and 58,700 acres (9 percent of BLM-administered surface lands), respectively. This is because there would be fewer VRM Class II or Class III acres.

For lands open to wind ROWs with standard restrictions, the effects on visual resources would be similar to effects from lands open to ROWs with standard restrictions, with exceptions. For Alternative C, there are no VRI Class I lands that are open wind ROWs with standard restrictions, thereby limiting surface disturbances on these lands.

For lands open to timber harvest, there would be 13,200 VRI Class II acres that would be managed as VRM Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 51,800 acres (8 percent of BLM-administered surface lands). This is because there would be fewer VRM Class II acres. For lands open to timber harvest, there would be 126,700 VRI Class III acres that would be managed as VRM Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 37,300 acres (5 percent of BLM-administered surface lands). This is because there would be more VRM Class III acres.

For Alternative C, no acres of VRI Class I are managed as VRM Class I or II, which could result in more changes to the visual setting.

The BLM would determine that all 27 eligible stream segments discussed under Alternative A are not suitable for inclusion in the NWSRS. This would release them from interim management protections. The protection afforded visual resources would no longer be present.

Alternative D

The effects on visual resources from fire management categories would be the same as Alternative B.

For visual resources management, there would be 67,500 VRI Class II acres that would be managed as VRM Class I or Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 9,000 acres (1 percent of BLM-administered surface lands). This is because there would be fewer VRM Class I or Class II acres.

For visual resources management, there would be 147,400 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 58,000 acres (9 percent of BLM-administered surface lands). This is because there would be more VRM Class II or Class III acres.

Also, there would be 104,700 VRI Class II acres that would be managed as VRM Class III or Class IV. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 46,200 acres (7 percent of BLM-administered surface lands). This is because there would be more VRM Class III or Class IV acres. There would be 11,900 VRI Class III acres that would be managed as VRM Class IV. Compared with Alternative A, this would maintain the quality of VRI Class III lands for an additional 42,000 acres (6 percent of BLM-administered surface lands). This is because there would be fewer VRM Class IV acres.

Furthermore, compared with Alternative A, all BLM-administered lands would be assigned a VRM class designation, which can maintain the integrity of visual resources.

The BLM would manage 100,410 acres of lands to protect their wilderness characteristics, which would be managed as VRM Class II. This represents 15 percent of BLM-administered surface lands, compared with no lands administered under Alternative A. These lands would experience fewer effects from surface disturbances or development due to actions that limit land use authorizations, transportation, or minerals development.

For lands open to nonenergy solid mineral leasing, there would be 16,200 VRI Class II acres that would be managed as VRM Class II and 64,900 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on for VRI Class II and Class III lands for an additional 46,400 acres (3 percent of federal mineral estate) and 15,300 acres (1 percent of federal mineral estate), respectively. This is because there would be fewer VRM Class II or Class III acres.

For lands open to fluid mineral leasing, there would be 45,600 VRI Class II acres that would be managed as VRM Class I or Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 17,500 acres (1 percent of federal mineral estate), because there would be fewer VRM Class I or Class II acres. For lands open to fluid mineral leasing, there would be 138,500 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 52,700 acres (4 percent of federal mineral estate). This is because there would be more VRM Class II or Class III acres.

For lands open to locatable mineral entry, there would be 50,700 VRI Class II acres that would be managed as VRM Class I or Class II and 144,500 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this not would maintain the quality of visual resources for VRI Class II and Class III lands for an additional 16,700 acres (3 percent of BLM-administered surface lands) and 89,200 acres (13 percent of BLM-administered surface lands), respectively. This is because there would be fewer VRM Class I, Class II, or Class III acres.

Compared with Alternative A, Alternative D would increase the area proposed for withdrawal from locatable mineral entry from 0 acres to 5,400 acres. If 5,400 additional acres were withdrawn, then there would be fewer opportunities for development to alter visual resources.

For lands open to mineral material disposal, the effects on visual resources would be similar to effects from lands open to nonenergy solid mineral leasing, except for negligible differences in acreages.

For lands open to livestock grazing, there would be 66,700 VRI Class II acres that would be managed as VRM Class I or Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 5,800 acres (less than 1 percent of BLM-administered surface lands). This is because there would be fewer VRM Class I or Class II acres. For lands open to livestock grazing, there would be 147,000 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 57,700 acres (9 percent of BLM-administered surface lands). This is because there would be more VRM Class II or Class III acres.

For lands limited to designated routes, there would be 23,900 VRI Class II acres that would be managed as VRM Class I and Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 41,100 acres (6 percent of BLM-administered surface lands). This is because there would be fewer VRM Class I or Class II acres. For lands limited to designated routes, there would be 65,000 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 31,300 acres (4 percent of BLM-administered surface lands). This is because there would be more VRM Class II or Class III acres.

For lands open to ROWs with standard restrictions, there would be 5,800 VRI Class II acres that would be managed as VRM Class I or Class II and 56,100 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II and Class III lands for an additional 28,500 acres (4 percent of BLM-administered surface lands) and 17,600 acres (2 percent of BLM-administered surface lands), respectively. This is because there would be fewer VRM Class I, Class II, or Class III acres.

For lands open to wind ROWs with standard restrictions, there would be 1,700 VRI Class II acres that would be managed as VRM Class I or Class II. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II lands for an additional 47,400 acres (7 percent of BLM-administered surface lands). This is because there would be fewer VRM Class I or Class II acres. For lands open to wind ROWs with standard restrictions, there would be 53,900 VRI Class III acres that would be managed as VRM Class II or Class III. Compared with Alternative A, this would maintain the quality of visual resources for VRI Class III lands for an additional 19,900 acres (3 percent of BLM-administered surface lands). This is because there would be more VRM Class II or Class III acres.

For lands open to timber harvest, there would be 21,600 VRI Class II acres that would be managed as VRM Class I or Class II and 80,600 acres of VRM Class II and VRM Class III that would be managed as VRM Class II or Class III. Compared with Alternative A, this would not maintain the quality of visual resources if development were to disturb the surface on VRI Class II and Class III lands for an additional 56,400 acres (1 percent of BLM-administered surface lands) and 8,800 acres (1 percent of BLM-administered surface lands), respectively. This is because there would be fewer VRM Class I, Class II, or Class III acres. Also, For Alternative D, there are no VRI Class I lands that are open to timber harvest, thereby limiting surface disturbances on these lands.

For WSRs, the effects on visual resources would be the same as the effects under Alternative C.

Cumulative

The planning area was used to analyze cumulative effects on visual resources. Past, present, and reasonably foreseeable future actions and conditions in this area that have affected, and would likely continue to affect, visual resources are energy and minerals development, land use authorizations and access, livestock grazing, recreation, vegetation management, and forestry.

Energy development, which depends on a variety of external factors, could have widespread and long-term effects on visual resources. Although sites are required to be reclaimed, some visual effects remain, such as well caps. Urbanization is expected to continue to result in residential and commercial development expanding incrementally closer to BLM-administered lands. Continued urban growth and development of lands in the vicinity could also increase demand for energy resources, building materials, utilities, and minerals, all of which could spur development that would affect visual resources. These topics generally involve surface disturbances: the construction of roads, infrastructure, and facilities or the use of nighttime lights, all of which affect visual resources, as described in **Appendix W**.

Additionally, the present VRM classifications throughout the planning area do not adequately reflect the visual quality of the region, and mitigation standards and design alternatives are not in the existing RMP. Approximately 11 percent of BLM-administered surface lands lack VRM class objectives for managing visual resources. This can threaten the integrity of visual resources, as described in **Appendix W**.

Under the current plan, 52 percent of the decision area is either being managed as VRM Class IV or is not designated, and would likely default to a VRM Class IV level management. Also, 30 percent is managed as VRM Class III. Within this combined 82 percent, 511,800 acres (86 percent of the decision area) contain natural landscape character that remains visually intact from cultural modifications (i.e., a cultural modification score of zero). These allowances could lead to 511,800 more acres of scenic quality to trend toward a decline in value. Cumulative effects would be similar for Alternatives B, C, and D, but the location and intensity of effects may vary. Alternative A would not change management actions, but it would still contribute to cumulative effects, most notably because of the lack of VRM class management objectives for 11 percent of BLM-administered surface lands. Alternatives B, C, and D would address this by assigning all BLM-administered lands to a VRM class.

Of the action alternatives, Alternative C would have the most incremental cumulative effects. This is because of the lower number of acres of VRM Class I and Class II lands, ROW exclusion lands, wind energy exclusion, lands closed to minerals, and ACECs. Also, Alternative C would have the most acres managed as VRM Class IV, which would have the greatest potential for incremental cumulative effects from cultural modifications. Alternative B would have the fewest incremental cumulative effects. This is because of the greater number of acres of VRM Class I and Class II lands, ROW exclusion lands, wind energy exclusion, lands closed to minerals, and ACECs.

All of these would limit opportunities for actions to have cumulative effects that degrade visual resources on BLM-administered lands. However, ROW exclusion areas and other closures could cause ROWs to be constructed on adjacent lands not administered by the BLM, where mitigation or stipulations would not be required to minimize effects on visual resources. This would affect visual resources associated with the overall viewshed that is made up of various land ownerships

4.2.10 Lands with Wilderness Characteristics

Effects Common to All Alternatives

All alternatives would include vegetation treatments designed to enhance vegetation health and habitat diversity consistent with desired conditions for vegetation and wildlife habitat. Effects on naturalness and solitude include unnatural manipulations of the environment in the short term. This would be due to an increase in human presence and vehicle traffic and improving the overall apparent naturalness of an area in the long term.

Any activity that could be permitted would need to meet VRM Class I or Class II objectives, which would restrict the types of large-scale activities that would diminish wilderness characteristics. The areas would also be closed to OHV travel, which would limit the number of people in the area, maintaining outstanding opportunities for solitude and primitive and unconfined recreation. Topography also limits access to the areas. This overlapping management and topography limitation would protect wilderness characteristics in these areas, and there would be no noticeable difference between the alternatives.

The application of stipulations for fluid minerals leasing (**Appendix L**), and BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would likely reduce surface-disturbing effects on wilderness characteristics such as road, pipeline, or power line construction; mineral development; range improvements; and recreational activities. Fluid minerals stipulations, BMPs, and mitigation measures would reduce or eliminate the removal or alteration of vegetation communities, and could protect naturalness.

Requiring a reclamation plan (**Appendix G**) for all surface-disturbing activities across all alternatives would stabilize disturbed areas in the short term and stabilize landscapes in the long term, and could protect the areas' naturalness characteristics.

Alternative A

Under Alternative A, the BLM would not specifically manage lands to protect wilderness characteristics. Management actions to protect other resources and special designation areas would offer some protection of wilderness characteristics. Nevertheless, surface-disturbing activities, such as forestry and casual use (e.g., recreation) could alter the natural setting and reduce opportunities for solitude or primitive recreation for all lands with wilderness characteristics units. Management under Alternative A has led to current conditions that include wilderness characteristics in the planning area. This would likely persist in many of these areas under Alternative A; however, degradation of wilderness characteristics in at least some areas that currently possess wilderness characteristics would be likely under this alternative.

All areas inventoried for lands with wilderness characteristics are open to livestock grazing (200,400 acres) under Alternative A. Fences, springs, and stock ponds that need to be maintained would affect the apparent naturalness and opportunities for solitude and primitive recreation. This would be due to structures and access routes facilitating these human developments used for livestock grazing. These types of development would be site specific, though, and would not likely affect a unit as a whole.

After any major disturbance (mechanical manipulation of the range) a minimum rest period from livestock grazing of two growing seasons would be required. This rest period would allow the apparent naturalness of these areas to also recover.

The BLM manages 13,000 acres of lands consistent with wilderness characteristics as closed to OHV travel. This would protect wilderness characteristics in those areas by decreasing sights and sounds of other people, which would increase opportunities for solitude. OHV travel in the remaining lands with wilderness characteristics units is limited to existing routes (70,500 acres). Effects of this OHV use could reduce the natural appearance and opportunities for solitude in the vicinity of these routes and trails. Cross-country mechanized travel is allowed in

all lands with wilderness characteristics. This can affect opportunities for solitude, but not to the same extent as motorized access. This is because there are generally fewer mechanized users, and mechanized vehicles produce less noise. Also, mechanized users typically cover less distance, so the area of their influence on opportunities for solitude would be smaller.

In addition to managing 13,000 acres of lands consistent with wilderness characteristics as VRM Class I, 6,200 acres are managed according to VRM Class II objectives, which would contribute to the protection of the wilderness characteristics. Under VRM Class II objectives, the level of change to the landscape should be low; management activities may be seen but should not attract the attention of the casual observer. The remaining lands (183,200 acres) managed for the protection of wilderness characteristics would be managed as VRM Class III or Class IV, which would allow for a greater change in the landscape. This would allow a higher range of disturbances that effect the overall apparent naturalness of the area.

The BLM would manage 100 acres of ERMA's that overlap with lands in the areas inventoried for wilderness characteristics. Specific ERMA management objectives would determine the effect on apparent naturalness and outstanding opportunities for solitude and primitive types of recreation. For example, ERMA's with such recreation as horseback riding or hiking would enhance opportunities for primitive recreation; conversely, ERMA's with OHV use would detract from naturalness and the ability to find solitude due to noise, soil compaction or vegetation trampling that can occur from this type of use. Also, OHV users typically cover greater distances, so the area of their influence on opportunities for solitude would be larger.

Approximately 151,300 acres of lands managed for the protection of wilderness characteristics are open for mineral material disposal and nonenergy solid mineral leasing. Outside of the Rocky Mountain Front, some lands with wilderness characteristics are open to locatable mineral entry, though 15,100 acres are recommended for withdrawal. The degree of effect would depend on the type and intensity of development. However, any surface-disturbing activities would reduce the apparent naturalness and any outstanding opportunities for solitude or primitive and unconfined recreation. While all lands with wilderness characteristics outside of the Rocky Mountain Front are open to fluid minerals leasing, the current deferral of fluid minerals leasing reduces potential effects.

The BLM would continue to manage 155,100 acres of lands consistent with wilderness characteristics as open to wind energy development. If the lands were developed, apparent naturalness and opportunities for solitude and primitive recreation would be affected from increased human occupancy and surface disturbance during construction. The size of the facilities is such that they would be omnipresent and would likely effect most of a unit.

Outside of the Rocky Mountain Front, other types of ROWs could be permitted on 129,300 acres of lands with wilderness characteristics. Depending on the extent of the ROWs, an area could cease to meet the size criteria if a ROW were to bisect the unit and neither resulting unit was 5,000 acres. The potential for effects on the 60,400 acres of lands with wilderness characteristics that are managed as avoidance areas for ROWs is reduced because development would be avoided in those areas. If ROW development were to occur, wilderness characteristics would be affected from increased vegetation clearing and access roads and an increase in human presence, including additional machinery and noise.

Management actions such as fire suppression, fuels treatments, and rehabilitation would be implemented under Alternative A. Most of the areas inventoried for lands with wilderness characteristics would be in Fire Category C (171,000 acres). In lands with wilderness characteristics, these tactics and treatments can leave the ground surface scarred and devoid of vegetation in the short term, thereby directly changing the naturalness of the landscape and thus wilderness characteristics. These tactics and treatments can degrade outstanding opportunities for primitive and unconfined types of recreation and opportunities for solitude in the short term. Indirect effects over the long term could improve the naturalness once desired vegetation becomes established and matures to natural conditions.

Approximately 8,900 acres of eligible WSR study segments and 13,000 acres of ACECs/ONAs overlap lands with wilderness characteristics in the Rocky Mountain Front area. These protective measures would include complementary management objectives, where lands with wilderness characteristics would be managed to

protect them. These measures could also offer some indirect protection of wilderness characteristics for units managed primarily for other resource considerations.

Alternative B

Under Alternative B, the BLM would manage 31 inventoried units covering 202,400 acres to protect their wilderness characteristics.

Nearly all of the lands managed to protect wilderness characteristics would be available for livestock grazing (200,700 acres). The types of effects are the same as those described under Alternative A; however, the forage allocated to livestock would be reduced by half (20 percent of forage available for livestock). Fewer cattle would reduce potential effects on apparent naturalness from over browsing and weed proliferation.

After any major disturbance (including fire) a minimum rest period from livestock grazing of two growing seasons would be required. This would allow the apparent naturalness of these areas to also recover during this time. Effects would be the same as under Alternative A.

Vegetation treatments and prescribed fire would be allowed under Alternative B but only to maintain or improve naturalness over the long term. Short-term effects would occur due to the noticeable unnatural manipulation of the environment. Alternative B would implement adaptive management strategies to address specific climate vulnerabilities. This would allow for more vegetation management flexibility. Considering changes in climate when proposing restoration would support resilient vegetation in areas undergoing restoration and that would support naturalness.

The BLM would manage all lands with wilderness characteristics as closed to motorized and mechanized travel, including administrative and permitted motorized use. Effects from restricting these activities would protect the natural appearance and opportunities for solitude or primitive and unconfined recreation. This restriction would provide more protection from motorized and mechanized travel than Alternative A.

Outside of the 13,000 acres of lands with wilderness characteristics managed as VRM Class I, all other lands with wilderness characteristics would be managed as VRM Class II. Under these objectives, the level of change to the landscape should be low; management activities may be seen but should not attract the attention of the casual observer. Managing according to VRM Class I and Class II objectives would allow for greater retention of the existing naturalness, with minimal changes to the landscape.

The BLM would manage 168,400 acres of ERMA that overlap lands with wilderness characteristics. Specific ERMA management objectives would determine the effect on apparent naturalness and outstanding opportunities for solitude and primitive types of recreation. Effects would be similar to those described under Alternative A, but to a greater degree. This is due to more acres being managed as ERMA that overlap lands in the areas inventoried for wilderness characteristics.

Under this alternative, all lands with wilderness characteristics would be closed to fluid mineral leasing and geophysical exploration. Also, these areas would be closed to mineral material disposal and nonenergy solid mineral leasing. These management actions would reduce more surface disturbance than Alternative A and would provide the most protection of lands with wilderness characteristics. Effects from closing areas to mineral leasing would be similar to Alternative A, but to a greater degree due to more area being closed.

Outside of the Rocky Mountain Front area, all lands with wilderness characteristics would be recommended for withdrawal from locatable mineral entry. If withdrawn, wilderness characteristics would be preserved because surface disturbance associated with locatable mineral development would be prevented. Until the lands were withdrawn, effects would include surface disturbance that would diminish the area's natural characteristic.

Any new roads authorized for access to the development area could eliminate wilderness characteristics of the entire unit if the roads were to bisect the unit so that it would no longer be considered a roadless area of adequate size. In addition, regular access to the lease area or mine site by developers would reduce the opportunities for solitude.

This alternative would manage lands with wilderness characteristics as exclusion areas for all types of ROWs, including renewable energy. This would reduce more surface disturbance than all other alternatives and would provide the most protection of lands with wilderness characteristics. Effects from excluding areas to ROW development would be similar to Alternative A, but to a greater degree due to more area being managed as ROW exclusion to renewable energy projects.

Management actions such as fire suppression, fuels treatments, and rehabilitation would be implemented under Alternative B. Most of the areas to be managed for the protection of wilderness characteristics would be in Fire Category D (158,100 acres). Tactics and treatments implemented in these FMUs can leave the ground surface scarred and devoid of vegetation in the short term, thereby directly changing the naturalness of the landscape and thus its wilderness characteristics. These tactics and treatments can degrade outstanding opportunities for primitive and unconfined types of recreation and opportunities for solitude in the short term. Indirect effects over the long term could improve the naturalness once desired vegetation becomes established and matures to natural conditions.

Approximately 8,900 acres of eligible WSR study segments and 13,000 acres of ACECs would overlap lands with wilderness characteristics in the Rocky Mountain Front area. These protective measures would include complementary management objectives, where lands with wilderness characteristics would be managed to protect them. These measures could also offer some indirect protection of wilderness characteristics for units managed primarily for other resource considerations. Effects would be similar to Alternative A but to a lesser degree due to less indirect effects due to fewer acres of ACECs overlapping lands with wilderness characteristics.

Alternative C

Under Alternative C, the BLM would identify lands with wilderness characteristics but would not manage these lands to protect wilderness characteristics; instead, management would emphasize other multiple uses as priority. Effects would be similar to Alternative A, but to a greater degree due to more areas allowing overall surface disturbances under management actions.

Effects of livestock grazing would be the same as described under Alternative A. Alternative C would not require a minimum rest period from livestock grazing following disturbances in priority vegetation areas. This lack of a rest period would affect the apparent naturalness and opportunities for solitude of these areas due to reduced vegetation.

Under Alternative C, the 13,000 acres of lands with wilderness characteristics in the Rocky Mountain Front area would be managed as VRM Class II. An additional 163,500 acres (81 percent) would be managed as VRM Class III and 25,900 acres (13 percent) would be managed as VRM Class IV. The VRM Class III and Class IV objectives would allow for a greater change in the landscape. Effects from the Class III and Class IV designations would be similar to Alternative A but greater in degree due to more acres being managed under these classes.

The BLM would manage 168,500 acres of ERMA that overlap with lands with wilderness characteristics. Specific ERMA management objectives would determine the effect on apparent naturalness and outstanding opportunities for solitude and primitive types of recreation. Effects would be similar to those described under Alternative A but to a greater degree than any other alternative due to the most acres being managed as ERMA.

Under Alternative C, the same acres of lands with wilderness characteristics would be open to mineral material disposal and nonenergy solid minerals leasing as under Alternative A (approximately 151,300 acres). The degree of effect would depend on the type and intensity of development. Outside of the Rocky Mountain Front, all lands with wilderness characteristics would be open to fluid minerals leasing. The degree of effect would depend on the type and intensity of development. Of the areas open, 40,600 acres would be subject to fluid minerals NSO stipulations, which would prohibit surface occupancy and surface disturbance. This would protect the wilderness characteristics in these areas.

Approximately 6,000 acres of lands with wilderness characteristics would be open to wind energy development. If the lands were developed, apparent naturalness and opportunities for solitude and primitive recreation would likely be eliminated from increased human occupancy and surface disturbance during construction. Due to their

size, the facilities would be omnipresent and likely would affect most of a unit. However, these are not potential wind development areas, so it is likely that other areas would be developed first.

Approximately 43,800 acres would be managed as exclusion areas for wind, precluding development and preserving wilderness characteristics. Finally, 152,600 acres would be an avoidance area for wind energy development. If the lands were developed, effects would be the same as described for the 6,000 acres of areas open to wind energy development. Effects would be similar to Alternative A but less in degree because more acres would be managed specifically as ROW exclusion or avoidance for wind development.

Outside of the Rocky Mountain Front, other types of ROWs could be permitted on 6,300 acres of lands with wilderness characteristics open to ROW development. Depending on the extent of the ROWs, an area could cease to meet the size criteria if a ROW were to bisect the unit and neither resulting unit was at least 5,000 acres. The potential for effects on the 183,400 acres of lands with wilderness characteristics that are managed as avoidance areas for ROWs is reduced because development would be avoided in those areas. If ROW development were to occur, wilderness characteristics would vary in effects from increased human occupancy and surface disturbance during construction, depending on the type of development occurring.

Management actions, such as fire suppression, fuels treatments, and rehabilitation, would be implemented under Alternative C. Most of the areas inventoried for lands with wilderness characteristics would be in Fire Category C (158,100 acres). Tactics and treatments implemented in these FMUs can leave the ground surface scarred and devoid of vegetation in the short term, thereby directly changing the naturalness of the landscape and thus its wilderness characteristics. These tactics and treatments can degrade outstanding opportunities for primitive and unconfined types of recreation and opportunities for solitude in the short term. Indirect effects over the long term could improve the naturalness, once desired vegetation becomes established and matures to natural conditions. As under Alternative B, adaptive management strategies for climate variability under Alternative C would result in more management flexibility to maintain or restore vegetation to support naturalness.

No areas would be designated as ACECs; therefore, there would be no special management for the protection of the relevant and important values of the potential ACECs, which could limit surface-disturbing activities and indirectly benefit soil resources.

Alternative D

Under Alternative D, the BLM would manage nine inventoried units, totaling 100,410 acres, to protect wilderness characteristics. This is 51 percent fewer acres than would be managed under Alternative B; however, this is 100,410 acres more than Alternative A would manage to protect wilderness characteristics. The remaining 102,000 acres that were inventoried would not be managed to protect wilderness characteristics. This includes 13,000 acres in the Rocky Mountain Front area.

In areas managed to protect wilderness characteristics, ROWs would only be granted where mitigation could be applied to protect wilderness characteristics. OHV travel and mechanized travel would also be limited to designated routes. Allowing OHV travel could increase human presence and noise in the area, effecting opportunities for solitude and also opportunities for primitive and unconfined recreation.

Effects of livestock grazing would be similar to those described under Alternative C. Fences, stock trails, springs, and stock ponds that need to be maintained would affect the apparent naturalness and opportunities for solitude and primitive recreation. This would be due to structures and access routes facilitating these human developments used for livestock grazing. These types of development would be site specific, though, and would not likely affect a unit as a whole.

This alternative would defer or exclude livestock grazing on disturbed areas; rest periods of less than two growing seasons would be allowed, determined through site-specific analysis. Effects would be similar to Alternative A.

The BLM would manage all lands not managed to protect wilderness characteristics as limited to designated routes for OHV travel. Effects would be similar to Alternative A, but to a slightly greater degree yearlong due to more acres being managed as limited and slightly fewer acres managed as limited seasonally. Managing OHV travel use could reduce the natural appearance and opportunities for solitude in the vicinity of these routes and trails.

Lands not managed to protect wilderness characteristics would primarily be managed as VRM Class III (44,300 acres) or VRM Class IV (44,200 acres). Only 600 acres would be managed as VRM Class II. Effects would be similar to Alternative A, but the degree of potential effect would be less because more acres would be managed as VRM Class II and fewer acres would be managed as VRM Class III or Class IV.

The BLM would manage 400 acres of ERMAs that overlap with lands not managed to protect wilderness characteristics. Specific ERMA management objectives would determine the effect on apparent naturalness and outstanding opportunities for solitude and primitive types of recreation. Effects would be similar to Alternative A.

Of the lands not managed to protect wilderness characteristics outside of the Rocky Mountain Front, approximately 41,700 acres (40 percent) would be closed to mineral material disposal and nonenergy solid mineral leasing. Effects would be the same as under Alternative A; however, coupled with those lands managed to protect wilderness characteristics, more lands with wilderness characteristics would be closed to mineral material disposal and nonenergy solid minerals leasing, so more acres would be protected, compared with Alternative A.

The 57,900 acres open to mineral material disposal and nonenergy solid mineral leasing would be subject to effects on naturalness and solitude from surface disturbance. This would diminish the area's natural characteristic. Any new roads authorized for access to the development area could eliminate wilderness characteristics of the entire unit if the road were to bisect the unit so that it would no longer be considered a roadless area of adequate size. In addition, regular access to the lease area or mine site by developers would reduce the opportunities for solitude.

Outside of the Rocky Mountain Front, nearly all lands not managed to protect wilderness characteristics would be open to fluid minerals leasing. The degree of effect would depend on the type and intensity of development. Of the areas open, 34,700 acres would be subject to fluid minerals NSO stipulations, which would prohibit surface occupancy and surface disturbance. This would protect the wilderness characteristics in these areas.

Outside of the Rocky Mountain Front, 13,700 acres of lands not managed to protect wilderness characteristics would be recommended for withdrawal from locatable mineral entry. If withdrawn, wilderness characteristics would be preserved because surface disturbance associated with locatable mineral development would be prevented. Until withdrawn, effects would depend on the type and intensity of development, but any surface-disturbing activities would reduce the apparent naturalness and any outstanding opportunities for solitude or primitive and unconfined recreation.

Approximately 44,200 acres of lands not managed for wilderness managed to protect wilderness characteristics outside of the Rocky Mountain Front would be open to wind energy development. If the lands were developed, apparent naturalness and opportunities for solitude and primitive recreation would be affected from increased human occupancy and surface disturbance during construction of facilities. Due to their size, the facilities would be omnipresent and likely would affect most of a unit. However, these are not potential wind development areas, so it is likely that other areas would be developed first.

Approximately 42,600 acres would be managed as exclusion areas for wind, precluding development and preserving wilderness characteristics. Finally, 15,300 acres would be an avoidance area for wind energy development. If the lands were developed, effects would be the same as described for the 44,200 acres of areas open to wind energy development. Effects would be similar to Alternative A but less in degree. This is because more acres would be managed specifically as closed or as exclusion for wind development, when coupled with lands managed to protect wilderness characteristics.

Outside of the Rocky Mountain Front, other types of ROWs could be permitted on 44,200 acres of lands with wilderness characteristics open to ROW development. Depending on the extent of the ROWs, an area could cease to meet the size criteria if a ROW were to bisect the unit and neither resulting unit was 5,000 acres. The potential for effects on the 44,700 acres of lands not managed to protect wilderness characteristics that would be avoidance areas for ROWs is reduced. This is because development would be avoided in those areas. If ROW development were to occur, wilderness characteristics would be affected, as previously described.

Management actions such as fire suppression, fuels treatments, and rehabilitation would be implemented under Alternative D. The areas to be managed for the protection of wilderness characteristics would be in Fire Category C (100,400 acres). Tactics and treatments implemented in these FMUs can leave the ground surface scarred and devoid of vegetation in the short term, thereby directly changing the naturalness of the landscape and thus its wilderness characteristics. These tactics and treatments can degrade outstanding opportunities for primitive and unconfined types of recreation and opportunities for solitude in the short term. Indirect effects over the long term could improve the naturalness, once desired vegetation becomes established and matures to natural conditions. As with Alternative B, adaptive management strategies for climate variability under Alternative C would result in more management flexibility to maintain or restore vegetation to support naturalness.

Cumulative

The cumulative effect analysis area used to assess effects on lands with wilderness characteristics is the planning area. Past and present actions that have affected and would affect wilderness characteristics are mineral exploration and development, recreation, livestock grazing, vehicle travel, and wildfire and prescribed fire. In general, these actions have cumulative effects on wilderness characteristics by disturbing the surface and contributing to fragmentation and effects on naturalness.

Areas that currently meet the wilderness characteristics criterion but are managed for development or protection of other resource values could be affected to the point where they no longer meet the criterion for wilderness characteristics. This would result in a net loss of opportunities for solitude and opportunities for primitive and unconfined recreation.

Past and present actions have led to the presence of wilderness characteristics on 202,400 acres in the decision area. In the isolated, roadless units and their surrounding areas, present and reasonably foreseeable future actions are not expected to degrade the wilderness characteristics.

Other units are susceptible to effects that would degrade or eliminate wilderness characteristics, particularly under Alternative C, where no lands with wilderness characteristics would be managed for their protection. Effects would depend on the amount of minerals, renewable energy, vegetation treatments, and ROW development in lands being managed to protect wilderness characteristics.

4.2.11 Cave and Karst Resources

Alternative A

Under Alternative A, the Tate-Poetter Cave would continue to be managed in the Collar Gulch ACEC and the Judith Mountains SRMA. Crystal Cave would be managed in the Judith Mountains SRMA and partially in the Judith Mountains Scenic ACEC. Management to preserve ACEC values would reduce the potential for caves to lose special resource integrity or biological communities. However, the Judith Mountains SRMA is managed for picnicking, scenic viewing, hiking, driving, and caving opportunities. Managing the SRMA may increase visitor use, which may increase the potential for theft or vandalism of caves.

Alternative A would manage 2,700 acres as closed to motorized travel, 13,000 acres as closed to OHV travel, 487,700 acres as limited to designated routes year-round, and 147,800 acres limited to designated routes seasonally. Areas closed to motorized or OHV use would reduce the potential for accidental discoveries and the potential for damage to cave resources.

While all lands with wilderness characteristics outside of the Rocky Mountain Front are open to fluid minerals leasing, the current deferral of fluid minerals leasing reduces potential effects on caves and karsts. Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO. Oil and gas development in the decision area would continue to be limited to leases not requiring special wildlife stipulations. Because of this, the potential for effects on karsts from fluid mineral development would continue to be low. Alternative A would not manage any additional acres as closed to fluid mineral leasing but would manage 58,300 acres as NSO and 281,700 acres as CSU. Areas managed as CSU are slopes over 30 percent and within 100 feet of highways. However, these fluid minerals stipulations would not prevent the potential discovery of unknown karst resources during fluid mineral exploration and development.

Alternative B

Alternative B would develop a cave management plan for the Crystal and Tate-Poetter Caves. A cave management plan would provide a comprehensive guide to provide for maximum resource protection. This could better protect the bat habitat in the Tate-Poetter Cave and could provide additional or enhance recreational values for the Crystal Cave.

Under Alternative B the Tate-Poetter Cave and its significant resources would be added to the relevant and important values for the Collar Gulch ACEC; Crystal Cave would be managed completely under the Judith Mountains ACEC to further protect significant cave values. Alternative B would also result in coordination with the State of Montana and Forest Service to increase accessibility of Crystal Cave and Lick Creek Cave. Increased accessibility may result in damage to the caves and their resources through theft or vandalism.

Alternative B would manage 290,000 acres as closed to motorized travel, zero acres as closed to OHV travel, 413,500 acres as limited to designated routes year-round, and 28,700 acres limited to designated routes seasonally. Alternative B would manage the largest acreage as closed to motorized use, which would reduce the potential for accidental cave discoveries and subsequently the potential for damage to their resources.

Alternative B would also close 200,600 more acres to fluid mineral leasing, compared with Alternative A. Additionally, 744,000 acres would be managed as NSO, and 241,400 acres would be managed as CSU. Under Alternative B, an NSO stipulation for fluid mineral leasing would apply within 0.25 mile of bat hibernacula, which would prevent fluid mineral effects on these resources. Lands managed as closed to fluid mineral leasing would prevent actions that could release pollutants capable of contaminating aquifers during drilling or groundwater recharge. Also, actions would not occur that could alter drainage patterns, or affect karst resources. However, unlike Alternative A, fluid mineral leasing would not be deferred under Alternative B due to special stipulations to protect important wildlife values. This may result in increased potential for cave effects and karst dewatering due to leasing being allowed in new areas.

Unknown caves and karsts would be protected from potential dewatering and contamination from fluid mineral exploration and development in the areas closed to leasing. Areas with fluid minerals CSU and NSO stipulations are not likely to protect unknown karst resources; this is because directional drilling in these areas may still be allowed.

Under Alternative B, special status species management would work with grottos to minimize winter disturbances in all caves known to have bats. Additionally, caves and other structures used by bats would be managed for public access, following the Montana WNS response strategy, currently in development. This strategy would include an emergency closure provision for all caves or structures used by bats if WNS were found within 100 miles. If a cave were to be closed, then its associated biological resources would be preserved, and the introduction of visual or audible elements and loss of integrity would be prevented.

Alternative C

As under Alternative B, Alternative C would provide management plans for the Tate-Poetter and Crystal Caves, which may increase protections of their respective resources over Alternative A.

Alternative C would manage the Tate-Poetter Cave the same as Alternative A. Alternative C would remove any ACEC protection from Crystal Cave, and the BLM would coordinate with the State of Montana and the Forest Service to increase access to Crystal Cave and Lick Creek Cave. Removal of the protections offered from ACEC values and increased visitor use to these areas may result in damage to the caves.

Effects from OHV use would be similar to Alternative A except 2,700 acres would be closed to motorized travel and only 500,600 acres would be limited to existing routes year-round.

Alternative C would close 800 more acres to fluid mineral leasing, compared with Alternative A. Unknown caves and karsts would be protected from potential dewatering and contamination from fluid mineral exploration and development in the areas closed to leasing. As under Alternative B, Alternative C would apply an NSO stipulation for fluid mineral leasing within 0.25 mile of bat hibernacula, which would prevent fluid mineral effects on these resources. Like Alternative B, under Alternative C, fluid mineral leasing would not be deferred due to important

wildlife values. Therefore, new fluid mineral leasing would be more likely to occur in new areas, which may affect caves and karsts, as described in **Appendix W**.

Additionally, Alternative C would manage 411,700 acres as NSO and 113,200 acres as CSU. Areas with fluid minerals CSU and NSO stipulations are not likely to protect unknown karsts; this is because directional drilling may still be allowed.

Alternative D

As under Alternative B, Alternative D would provide for cave management plans for the Tate-Poetter and Crystal Caves, which may increase protections of their respective resources over Alternative A.

Alternative D would manage the Tate-Poetter Cave to protect significant values and would modify the Collar Gulch ACEC to recognize the significant cave resources under ACEC management. ACEC management would include closure to mineral material disposal and nonenergy solid mineral leasing and a proposal for withdrawal from locatable mineral entry. Alternative D would manage the Crystal Cave as Alternative C would; it would remove any ACEC protections from the Crystal Cave, and the BLM would coordinate with the State of Montana and the Forest Service to increase access to the Crystal Cave and Lick Creek Cave. Removing the protections offered from ACEC values and increased visitor use to these areas may result in damage to the caves.

Alternative D would manage 2,700 acres as closed to motorized travel, 0 acres as closed to OHV travel, 487,700 acres as limited to designated routes year-round (lands with wilderness characteristics would be managed as OHV limited area), and 147,800 acres limited to designated routes seasonally. Areas closed are in designated ACECs and the Square Butte WSA. Areas closed to motorized or OHV use would reduce the potential accidental discoveries of caves and the potential for damage to them.

Alternative D would close 6,400 more acres to fluid mineral leasing, compared with Alternative A. Unknown caves and karsts would be protected from potential dewatering and contamination from fluid mineral exploration and development in the areas closed to leasing. Additionally, 472,000 acres would be managed as NSO and 632,900 acres would be managed as CSU. Areas with fluid minerals CSU and NSO stipulations are not likely to protect unknown karsts because directional drilling may still be allowed. As under Alternative B, Alternative D would apply an NSO stipulation for fluid mineral leasing within 0.25 mile of bat hibernacula, which would prevent fluid mineral effects on these resources. Like Alternative B, fluid mineral leasing would not be deferred due to important wildlife values. Therefore, new fluid mineral leasing would be more likely to occur in new areas, which may affect caves and karsts, as described in **Appendix W**.

Like Alternative B, caves and other structures used by bats would be managed for public access, following the Montana WNS response strategy, which is in development. If a cave were to be closed, then the cave's associated biological community would be preserved, and the introduction of visual or audible elements and loss of integrity would be prevented.

Cumulative

Vehicle-based recreation has grown and is expected to continue to grow over the life of the RMP. Travel off designated or existing routes as well as the creation of administrative trails has occurred and would likely continue to occur in the decision area. This may result in additional discoveries of caves and karsts that have not been identified or documented in accordance with the FCRPA.

Continued fluid mineral development may affect unknown karst features through accidental discovery, dewatering, and contamination. In the planning area, projected total acres of short-term disturbance associated with all new drilled wells and existing active wells range from 4,700 under Alternatives B, C, and D, to 4,800 under Alternative A. The projected long-term surface disturbance could be less than 100 acres under all alternatives (**Table W-1, Appendix W**). Because the RFD scenario projects similar acreages for both short- and long-term surface disturbances associated with fluid mineral developments (access roads, flow lines, and well pads) under all alternatives, the cumulative effects would be similar across alternatives. However, the required stipulations to protect the important resource values may inadvertently protect unknown karsts.

4.3 RESOURCE USES

4.3.1 Minerals and Energy Resources

Effects Common to All Alternatives

Oil and Gas Leasables

Under all alternatives, federal mineral estate in the Square Butte WSA would be closed to fluid mineral leasing. This is less than 1 percent of the mineral estate decision area. The effects of closing this area would be the type described in **Appendix W**. Because this area would be closed under all alternatives, the acres of federal mineral estate in it are considered to have no oil and gas development potential.

Closing approximately 9 percent of the mineral estate decision area to fluid mineral leasing under all alternatives, in accordance with withdrawal orders, would have the same effects as described in **Appendix W**. Because these areas would be closed under all alternatives and, therefore, unable to be developed, the acres of federal mineral estate in them are considered to have no oil and gas development potential.

Nonenergy Solid Leasable Minerals

Closing the WSAs (less than 1 percent of the mineral estate decision area) to nonenergy solid mineral leasing under all alternatives would not affect nonenergy solid leasables. This is because there are no acquired minerals in the WSA (see *Methods of Analysis*).

Closing approximately 9 percent of the LFO RMP mineral estate decision area to nonenergy solid mineral leasing under all alternatives, in accordance with withdrawal orders, would not affect nonenergy solid leasables. This is because there are no acquired minerals in the withdrawal areas (see *Methods of Analysis*).

Locatable Minerals

Under all alternatives, approximately 4 percent of the decision area would be withdrawn from locatable mineral entry. Effects of this withdrawal would be the same as those described in **Appendix W**.

Mineral Materials

There are no effects on mineral materials that are common to all alternatives.

Alternative A

Oil and Gas Leasables

Due to the existing protest resolution applicable to the mineral estate decision area, most of the decision area is deferred from fluid mineral leasing under Alternative A. This deferral applies to all nominated parcels that would require special stipulations to protect important wildlife values.

While nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO, total oil and gas leasing and development in the decision area would continue to be limited to leases not requiring special wildlife stipulations. The RFD scenario predicts that 68 new wells would be drilled on federal mineral estate in the decision area under this alternative (**Table W-1, Appendix W**). Of these new drilled wells, approximately 50 are expected to produce in the long term based on past dry-hole ratios. However, when the deferral is taken into account, the number of new wells projected to be drilled is likely closer to or even lower than the 47 wells projected under Alternative B.

Land use authorizations under Alternative A would continue to have no effect on oil and gas leasables. This is because the entire mineral estate decision area is deferred from fluid mineral leasing. Therefore, there is no need to transport oil and gas to processing facilities and markets using ROWs.

Nonenergy Solid Leasable Minerals

Managing approximately 24 percent of the mineral estate decision area as administratively closed to nonenergy solid mineral leasing would continue to limit the area available for leasing; therefore, the total amount of development in the decision area would be limited, as described in **Appendix W**. The closed areas include 71 percent of the acquired lands in the mineral estate decision area. As described under *Methods of Analysis*, these lands are those that would be affected by closures to nonenergy solid mineral leasing. However, because these lands are still considered to have low development potential, effects would be limited.

Under Alternative A, 2 percent of the decision area would continue to be managed as ROW exclusion areas. Another 58 percent would continue to be managed as ROW avoidance areas. Management in these areas would continue to limit available means to transport minerals to processing facilities and markets, as described in **Appendix W**.

However, need for ROWs would not exist on the 82 percent of the acquired lands in the mineral estate decision area that would be closed to nonenergy solid mineral leasing. Because acquired lands are the only ones with nonenergy solid leasable potential in the mineral estate decision area, because expected development of those areas is low, and because 82 percent of these areas would not have a need for ROWs, effects of ROW exclusion and avoidance areas on levels of nonenergy solid leasable development under Alternative A would be limited.

Locatable Minerals

Effects from withdrawals would be the same as described under *Effects Common to All Alternatives*.

Mineral Materials

Managing approximately 25 percent of the mineral estate decision as closed to mineral material disposal would continue the pit relocation effects in those areas, as described in **Appendix W**. Because the entire mineral estate decision area is expected to have the potential for mineral material occurrence, the level of effects on mineral materials is proportional to the number of acres closed.

Under Alternative A, 2 percent of the decision area would continue to be managed as ROW exclusion areas. Another 58 percent would continue to be managed as ROW avoidance areas. Management in these areas would continue to limit or exclude mineral material development, as described in **Appendix W**.

Alternative B

Oil and Gas Leasables

Closing approximately 17 percent of the mineral estate decision area to fluid mineral leasing under Alternative B would limit oil and gas development, as described in **Appendix W**. However, because 83 percent of the decision area would be open to fluid mineral leasing, effects of closures would be reduced compared with Alternative A. Management under Alternative B would close one-sixth the acres compared with Alternative A. A breakdown of the acres closed, open, and subject to stipulations by level of oil and gas development potential in the decision area is shown in **Table 4-41**, Oil and Gas Leasables, Alternative B¹.

**Table 4-41
Oil and Gas Leasables, Alternative B¹**

Constraint	Moderate Potential (Acres)	Low Potential (Acres)	Very Low Potential (Acres)	Negligible/Unavailable (Acres)
Closed to fluid mineral development ²	200	14,100	63,000	123,100
Open subject to NSO stipulations	14,200	120,300	326,500	279,700
Open subject to CSU stipulations	500	14,700	95,400	128,600
Open subject to standard terms and conditions	1,300	44,900	40,100	32,100

Source: BLM GIS 2015a

¹Acres subject to fluid minerals NSO and CSU stipulations may overlap. Therefore, acreages do not add up to the mineral estate decision area.

²Acres do not include acres withdrawn or in the Square Butte WSA (see *Effects Common to All Alternatives*).

As shown in **Table 4-41**, approximately 89 percent of the moderate potential acres in the mineral estate decision area would be subject to fluid minerals NSO stipulations. This would restrict development and could render some resources inaccessible, as described in **Appendix W**.

While 58,300 acres are subject to fluid minerals NSO stipulations under Alternative A, application of these stipulations would be limited. This is because the amount of leasing would be limited under Alternative A, due to the deferral. Therefore, the effects of NSO stipulations would increase under Alternative B. The remaining 10

percent of moderate potential acres in the decision area not closed or subject to NSO stipulations would be open subject to standard terms and conditions.

In addition to the constraints shown in **Table 4-41** fluid minerals TL stipulations would restrict oil and gas development, as described in **Appendix W**, wherever they were applied. However, overall effects of restrictions on oil and gas leasables would still decrease under Alternative B, compared with Alternative A, due to the effects of the deferral under Alternative A. More oil and gas leasing and development is expected under Alternative B. The RFD scenario predicts that 47 new wells would be drilled on federal mineral estate in the decision area under this alternative (**Table W-1, Appendix W**). Of these new drilled wells, approximately 35 are expected to produce in the long term based on past dry-hole ratios. This is similar to or more than the amount of development likely to occur under Alternative A.

Under Alternative B, 43 percent of the decision area would be managed as ROW exclusion areas. Another 52 percent would be managed as ROW avoidance areas. Management in these areas would limit available means to transport oil and gas to processing facilities and markets, as described in **Appendix W**.

Effects would increase compared with Alternative A because oil and gas development would be occurring in the decision area under Alternative B. Also, there would be a demand for ROWs to transport oil and gas products. However, no such demand for ROWs would exist on the 89 percent of the moderate potential acres in the mineral estate decision area that would be subject to fluid minerals NSO stipulations. This is because no surface facilities would be allowed in these areas.

Because moderate potential areas are the ones most likely to be developed in the mineral estate decision area, and because 89 percent of these areas would not have a demand for surface facilities, effects of ROW exclusion and avoidance areas on levels of oil and gas development under Alternative B would be limited.

Nonenergy Solid Leasable Minerals

Managing approximately 37 percent of the mineral estate decision area as closed to nonenergy solid mineral leasing under Alternative B would limit the total amount of development in the decision area, as described in **Appendix W**.

As described under *Methods of Analysis*, acquired lands are those that would be affected by closures to nonenergy solid mineral leasing. The closed areas would include 82 percent of the acquired lands in the mineral estate decision area. This represents a 15 percent increase in closed acres on acquired lands, compared with Alternative A. However, because these lands are still considered to have low development potential, effects would be limited.

Under Alternative B, 43 percent of the decision area would be managed as ROW exclusion areas. Another 52 percent would be managed as ROW avoidance areas. Management in these areas would limit available means to transport minerals to processing facilities and markets, as described in **Appendix W**. Effects would increase, compared with Alternative A, because 58 percent more acres would be managed as ROW avoidance or exclusion under Alternative B.

Eighty-two percent of the acquired lands in the mineral estate decision area would be closed to nonenergy solid mineral leasing. Acquired lands are the only lands with nonenergy solid leasable potential in the mineral estate decision area. Additionally, the potential for nonenergy solid leasable development is low. Because of these factors, effects of ROW exclusion and avoidance areas on the levels of nonenergy solid leasable development under Alternative B would be limited.

Locatable Minerals

Effects from withdrawals would be the same as described under *Effects Common to All Alternatives*.

Mineral Materials

Managing approximately 39 percent of the mineral estate decision as closed to mineral material disposal under Alternative B would result in the pit relocation effects in those areas, as described in **Appendix W**. However, effects would increase, compared with Alternative A, because 56 percent more acres would be closed under Alternative B.

Under Alternative B, 43 percent of the decision area would be managed as ROW exclusion areas. Another 52 percent would be managed as ROW avoidance areas. Management in these areas would limit mineral material development, as described in **Appendix W**. Effects would increase, compared with Alternative A, because 58 percent more acres would be managed as ROW avoidance or exclusion under Alternative B. Effects would not occur where ROW avoidance or exclusion areas overlapped with areas that were closed to mineral material disposal (e.g., certain ACECs and lands managed to protect wilderness characteristics). Therefore, the acreage managed as ROW exclusion or avoidance is not proportional to the effects on mineral materials.

Alternative C

Oil and Gas Leasables

Over 99 percent of the mineral estate decision area would be open to fluid mineral leasing under Alternative C, which would nearly eliminate effects of closures compared with the deferral under Alternative A. A breakdown of the acres closed, open, and subject to stipulations by level of oil and gas development potential in the decision area is shown in **Table 4-42**, Oil and Gas Leasables, Alternative C¹.

Table 4-42
Oil and Gas Leasables, Alternative C¹

Constraint	Moderate Potential (Acres)	Low Potential (Acres)	Very Low Potential (Acres)	Negligible/Unavailable (Acres)
Closed to fluid mineral development ²	0	0	0	0
Open subject to NSO stipulations	11,800	83,500	144,100	169,900
Open subject to CSU stipulations	500	18,200	22,500	70,200
Open subject to standard terms and conditions	3,800	92,700	285,700	253,000

Source: BLM GIS 2015a

¹Acreages subject to fluid minerals NSO and CSU stipulations may overlap. Therefore, acreages do not add up to the mineral estate decision area.

²Acreages do not include acres withdrawn or in the Square Butte WSA (see *Effects Common to All Alternatives*).

As shown in **Table 4-42**, approximately 73 percent of the moderate potential acres in the mineral estate decision area would be subject to fluid minerals NSO stipulations. These stipulations would restrict development and could render some resources inaccessible, as described in **Appendix W**. While 58,300 acres are subject to NSO stipulations under Alternative A, application of these stipulations would be limited. This is because the amount of leasing would be limited under Alternative A due to the deferral. Therefore, the effects of NSO stipulations would increase under Alternative C.

The remaining 26 percent of moderate potential acres in the decision area not subject to fluid minerals NSO stipulations would be open, subject to standard terms and conditions. In addition to the constraints shown in **Table 4-42**, TL stipulations would restrict oil and gas development wherever they were applied, as described in **Appendix W**. However, overall effects of restrictions on oil and gas leasables would still decrease under Alternative C, compared with Alternative A, due to the deferral under Alternative A. More oil and gas leasing and development is expected under Alternative C. The RFD scenario predicts that 56 new wells would be drilled on federal mineral estate in the decision area under Alternative C (**Table W-1**, **Appendix W**). Of these new drilled wells, approximately 41 are expected to produce in the long term based on past dry-hole ratios. This is more development than projected under Alternative A.

Under Alternative C, approximately 2 percent of the decision area would be managed as ROW exclusion areas. Another 77 percent would be managed as ROW avoidance areas. Management in these areas would limit available means to transport oil and gas to processing facilities and markets, as described in **Appendix W**. Effects would increase, compared with Alternative A, because oil and gas development would be in the decision area under Alternative C; also, there would be increased applications and requests for ROWs to transport oil and gas products.

Seventy-three percent of the moderate potential acres in the mineral estate decision area that would be subject to fluid minerals NSO stipulations. This is because no surface facilities would be allowed in these areas.

Moderate potential areas are the ones most likely to be developed in the mineral estate decision area; 73 percent of these areas would not have a need for surface facilities. Because of this, effects of ROW exclusion and avoidance areas on levels of oil and gas development under Alternative C would be limited.

Nonenergy Solid Leasable Minerals

Effects on nonenergy solid leasable minerals under Alternative C would be the same as those under Alternative A.

Under Alternative C, approximately 2 percent of the decision area would be managed as ROW exclusion areas. Another 77 percent would be managed as ROW avoidance areas. Management in these areas would limit available means to transport minerals to processing facilities and markets, as described in **Appendix W**. Effects would increase, compared with Alternative A, because 32 percent more acres would be managed as ROW avoidance or exclusion under Alternative C.

Seventy-one percent of the acquired lands in the mineral estate decision area that would be closed to nonenergy solid mineral leasing. Acquired lands are the only ones with nonenergy solid leasable potential in the mineral estate decision area; also, 71 percent of these areas would not have a need for ROWs. Additionally, the potential for nonenergy leasable mineral development on these lands is low. Because of these factors, effects of ROW exclusion and avoidance areas on levels of nonenergy solid leasable development under Alternative C would be limited.

Locatable Minerals

Effects from withdrawals would be the same as described under *Effects Common to All Alternatives*.

Mineral Materials

Managing approximately 25 percent of the mineral estate decision area as closed to mineral material disposal under Alternative C would result in the pit relocation effects in those areas, as described in **Appendix W**. However, slightly more acres would be closed under Alternative C than under Alternative A. Compared with Alternative A, the increase is less than 1 percent; therefore, effects would be essentially the same as those described under Alternative A.

Under Alternative C, approximately 2 percent of the decision area would be managed as ROW exclusion areas. Another 77 percent would be managed as ROW avoidance areas. Management in these areas would limit mineral material development, as described in **Appendix W**. Effects would increase, compared with Alternative A, because 32 percent more acres would be managed as ROW avoidance or exclusion under Alternative C. Effects would not occur where ROW avoidance or exclusion areas overlap with areas that were closed to mineral material disposal (e.g., Square Butte WSA); therefore, the acreage managed as ROW exclusion or avoidance is not proportional to the effects on mineral materials.

Alternative D

Over 99 percent of the mineral estate decision area would be open to fluid mineral leasing under Alternative D, which would nearly eliminate effects of closures, compared with the deferral under Alternative A. A breakdown of the acres closed, open, and subject to stipulations by level of oil and gas development potential in the decision area is shown in Table 4-43, Oil and Gas Leasables, Alternative D.

As shown in Table 4-43, approximately 62 percent of the moderate potential acres in the mineral estate decision area would be subject to fluid minerals NSO stipulations. These stipulations would restrict development and could render some resources inaccessible, as described in **Appendix W**. The effects of these stipulations would increase under Alternative D compared to deferred leasing under Alternative A. In addition, approximately 22 percent of moderate potential acres in the mineral estate decision area would be subject to fluid minerals CSU stipulations. Approximately 15 percent of the mineral estate decision area would be open, subject to standard terms and conditions, under Alternative D.

Table 4-43
Oil and Gas Leasables, Alternative D¹

Constraint	Moderate Potential (Acres)	Low Potential (Acres)	Very Low Potential (Acres)	Negligible/ Unavailable (Acres)
Closed to fluid mineral development ²	100	800	4,500	900
Open subject to NSO stipulations	11,800	78,400	156,100	223,200
Open subject to CSU stipulations	4,500	67,200	255,500	303,100
Open subject to standard terms and conditions	2,600	71,800	111,700	82,900

Source: BLM GIS 2015a

¹Acres subject to fluid minerals NSO and CSU stipulations may overlap. Therefore, acreages do not add up to the mineral estate decision area.

²Acres do not include acres withdrawn or in the Square Butte WSA (see *Effects Common to All Alternatives*).

In addition to the constraints shown in Table 4-43, TL stipulations would restrict development wherever they were applied, as described in **Appendix W**. However, overall effects of restrictions on oil and gas leasables would still decrease under Alternative D, compared with Alternative A, due to the effects of the deferral under Alternative A. More oil and gas leasing and development is expected under Alternative D. The RFD scenario predicts that 53 new wells would be drilled on federal mineral estate in the decision area under Alternative D (**Table W-1, Appendix W**). Of these new drilled wells, approximately 39 are expected to produce in the long term based on past dry-hole ratios. This is more development than projected under Alternative A.

Under Alternative D, approximately 3 percent of the decision area would be managed as ROW exclusion areas. Another 69 percent would be managed as ROW avoidance areas. Management in these areas would limit available means to transport oil and gas to processing facilities and markets, as described in **Appendix W**. Effects would increase, compared with Alternative A. This is because oil and gas development would be occurring in the decision area under Alternative D, and there would be increased applications and requests for ROWs to transport oil and gas products.

Seventy-four percent of the moderate potential acres in the mineral estate decision area that would be subject to fluid minerals NSO stipulations. This is because no surface facilities would be allowed in these areas. Because of this, effects of ROW exclusion and avoidance areas on levels of oil and gas development under Alternative D would be limited.

Nonenergy Solid Leasable Minerals

Managing 32 percent of the mineral estate decision area as closed to nonenergy solid mineral leasing under Alternative D would limit the total amount of development in the decision area, as described in **Appendix W**.

As described under *Methods of Analysis*, acquired lands are those that would be affected by closures to nonenergy solid mineral leasing. The closed areas would include 73 percent of the acquired lands in the mineral estate decision area. This represents a 3 percent increase in closed acres on acquired lands compared with Alternative A. However, because these lands are still considered to have low development potential, effects would be limited.

Under Alternative D, approximately 3 percent of the decision area would be managed as ROW exclusion areas. Another 74 percent would be managed as ROW avoidance areas. Management in these areas would limit available means to transport minerals to processing facilities and markets, as described in **Appendix W**. Effects would increase, compared with Alternative A, because 18 percent more acres would be managed as ROW avoidance or exclusion under Alternative D.

Seventy-three percent of the acquired lands in the mineral estate decision area that would be closed to nonenergy solid mineral leasing. Acquired lands are the only ones with nonenergy solid leasable potential in the mineral estate decision area, and 73 percent of these areas would not have a need for ROWs. Additionally, the potential for

nonenergy leasable mineral development on these lands is low. Because of these factors, effects of ROW exclusion and avoidance areas on levels of nonenergy solid leasable development under Alternative D would be limited.

Locatable Minerals

Effects from withdrawals would be the same as described under *Effects Common to All Alternatives*.

Mineral Materials

Managing approximately 34 percent of the mineral estate decision as closed to mineral material disposal under Alternative D would result in the pit relocation effects in those areas, as described in **Appendix W**. However, effects would increase, compared with Alternative A, because 35 percent more acres would be closed under Alternative D.

Under Alternative D, approximately 3 percent of the decision area would be managed as ROW exclusion areas. Another 74 percent would be managed as ROW avoidance areas. Management in these areas would continue to limit or exclude mineral materials, as described in **Appendix W**. Effects would increase, compared with Alternative A, because 18 percent more acres would be managed as ROW avoidance or exclusion under Alternative D. Effects would not occur where ROW avoidance or exclusion areas overlap with areas that were closed to mineral material disposal (e.g., certain ACECs and lands managed to protect wilderness characteristics). Therefore, the acreage managed as ROW exclusion or avoidance is not proportional to the effects on mineral materials.

Cumulative

The cumulative effects analysis area for minerals and energy is the RMP planning area, regardless of mineral ownership.

Past, present, and reasonably foreseeable future actions and conditions in the cumulative effect analysis area that have affected, and would likely continue to affect, minerals and energy are existing and planned mineral development projects outside of the decision area.

The management actions proposed under this RMP would cumulatively effect mineral development in the planning area through surface use restrictions, such as closures, withdrawals, and fluid minerals NSO, CSU, and TL stipulations. These ultimately could decrease the level of mineral development in the planning area during the planning period.

Closures, withdrawals, and surface use restrictions, such as fluid minerals NSO stipulations, could also cause a developer to move to nearby private or state land to access federal fluid minerals, if the adjacent minerals were available and recoverable with no such restrictions. In that situation, the federal mineral estate could become depleted. The BLM would need to address this drainage issue.

For locatable and nonenergy solid leasable minerals, withdrawals or closures would likely reduce the total level of locatable mineral development in the planning area. This is because locatable and nonenergy solid leasable minerals cannot be accessed from nearby parcels the way fluid minerals can. For mineral materials, closures may not reduce the total amount of mineral material development in the planning area. Rather, mineral material developers may shift to areas without such restrictions in order to satisfy local demand.

Oil and Gas Leasables

Under Alternative A, approximately 9 percent of the planning area, regardless of mineral ownership (including the entire mineral estate decision area), would remain withdrawn, closed, or deferred from fluid mineral leasing. This alternative would have the most cumulative effects on oil and gas leasables out of all the alternatives. The effects of this management would be the type described in **Appendix W**.

The RFD scenario predicts that 651 new wells would be drilled in the planning area, regardless of mineral ownership, under Alternative A (**Table W-1, Appendix W**). However, when the deferral is taken into account, the number of new wells projected to be drilled is likely closer to or even lower than the 630 wells projected under Alternative B. Of these new drilled wells, approximately 485 are expected to produce in the long term based on past dry-hole ratios.

Under Alternative B, approximately 2 percent of the planning area would be withdrawn or closed, and another 6 percent would be subject to fluid minerals NSO stipulations. The decrease in areas withdrawn, closed, deferred, or subject to major constraints, compared with Alternative A, represents 1 percent of the planning area. However, effects would be further reduced where NSO stipulations applied instead of closures, since the federal minerals in areas subject to NSO stipulations could still be developed under favorable ownership and geologic conditions.

The RFD scenario predicts that 630 new wells would be drilled in the planning area, regardless of mineral ownership, under Alternative B (**Table W-1, Appendix W**). This is similar to or more than the amount of development likely to occur under Alternative A. Of these new drilled wells, approximately 470 are expected to produce in the long term based on past dry-hole ratios.

Effects would be similarly reduced under Alternatives C and D, with Alternative C having the fewest cumulative effects on oil and gas leasables in the planning area. Under Alternative C, approximately 1 percent of the planning area would be withdrawn or closed, and another 3 percent would be subject to fluid minerals NSO stipulations. The decrease in areas withdrawn, closed, deferred, or subject to major constraints, compared with Alternative A, represents 5 percent of the planning area.

The RFD scenario predicts that 639 new wells would be drilled in the planning area, regardless of mineral ownership, under Alternative C (**Table W-1, Appendix W**). While, this is more than the amount of development likely to occur under Alternative A, it is only a 1 percent increase in projected development across the planning area, compared with Alternative A. Of these new drilled wells, approximately 477 are expected to produce in the long term based on past dry-hole ratios.

Under Alternative D, approximately 1 percent of the planning area would be withdrawn or closed, and another 4 percent would be subject to fluid minerals NSO stipulations. The decrease in areas withdrawn, closed, or subject to major constraints, compared with Alternative A, represents 4 percent of the planning area.

The RFD scenario predicts that 636 new wells would be developed in the planning area, regardless of mineral ownership, under Alternative D (**Table W-1, Appendix W**). While, this is more than the amount of development likely to occur under Alternative A, it is only a 1 percent increase in projected development across the planning area, compared with Alternative A. Of the 236 new drilled wells, approximately 474 are expected to produce in the long term based on past dry-hole ratios. When the leasing deferral is considered, the number of wells projected to be developed under Alternative A is likely closer to or even lower than the number of wells projected under any of the action alternatives.

Nonenergy Solid Leasable and Locatable Minerals

The only nonenergy solid leasable minerals in the planning area are hard rock minerals beneath acquired lands. These minerals are locatable when found beneath public domain lands. Because the same types of minerals would be affected by nonenergy solid leasable and locatable mineral management, the cumulative effects of these actions are discussed together.

Under Alternatives A, C, and D, approximately 2 percent of the planning area would be withdrawn, proposed for withdrawal, or closed to nonenergy solid mineral leasing. Effects of these withdrawals and closures are the type described in **Appendix W**. Under Alternative B, approximately 3 percent of the planning area would be withdrawn, proposed for withdrawal, or closed to nonenergy solid mineral leasing. The increase in areas subject to this management, compared with the other alternatives, represents 1 percent of the planning area.

Mineral Materials

Under Alternatives A and C, approximately 2 percent of the planning area would continue to be closed to mineral materials disposal. Effects of this closure are the type described in **Appendix W**. These alternatives would have the least cumulative effects on mineral materials out of all the alternatives. Under Alternative B, approximately 4 percent of the planning area would be closed to mineral materials disposal. Alternative B would have the most cumulative effects on mineral materials of all the alternatives. The increase in areas closed, compared with Alternative A, represents 2 percent of the planning area. Under Alternative D, approximately 3 percent of the

planning area would be closed to mineral materials disposal. The increase in areas closed, compared with Alternative A, represents 1 percent of the planning area.

4.3.2 Livestock Grazing

Effects Common to All Alternatives

Across all alternatives, effects from coal management on livestock grazing would be minimal due to the lack of coal development in the planning area. Under all alternatives, management of the Square Butte WSA under the BLM policy for WSAs (BLM Manual 6330, BLM 2012a) would permit grazing as authorized at the time of the WSA designation. Management for wilderness designation could limit construction or maintenance of range improvements, with potential effects on the ability to effectively distribute livestock. Administrative access for range management would generally be retained for permittees and lessees, regardless of travel management designations under all alternatives. Specific travel restrictions could, however, be placed on a permit/lease as another term and condition in the permit/lease renewal process.

Under all alternatives, measures included for protecting greater sage-grouse habitat would be implemented, with effects concentrated in the 233,200 acres of PHMA and 112,300 acres of GHMA currently available to grazing. Effects are described in detail in the LFO Greater Sage-Grouse Proposed RMP Amendment (BLM 2015a). In summary, measures to protect greater sage-grouse, including adaptive management, density and disturbance caps, regional mitigation, and lek buffers, could limit development and disturbance of livestock in certain areas. Further, areas not achieving the greater sage-grouse habitat objectives due to grazing would require site-specific adjustments to livestock grazing in order to achieve objectives. This strategy could result in site-specific changes in permitted use levels or grazing management strategy.

Adjustments to grazing management or authorized grazing use level would be tailored to achieve Standards for Rangeland Health (BLM 1997) and specific management thresholds. These would be based on greater sage-grouse habitat objectives (see **Table 2-4**) for the specific greater sage-grouse habitat type in the areas assessed; for example, breeding, nesting, and wintering habitat. The level and intensity of effects would vary on a site-specific basis.

All greater sage-grouse habitat objectives and management would be incorporated into AMPs and permit and lease renewals; therefore, effects would occur at a site-specific level during the renewal process. Assessments would be prioritized first in PHMA, followed by GHMA, with potential for changes to grazing management occurring in this order. In addition, limitations and special requirements on structural range improvements, such as fences and enclosures in PHMA, could increase the cost of building or maintaining these structures, as compared with current conditions. Similarly, permitting new water developments only when it also would maintain or increase greater sage-grouse habitat could affect the ability to distribute livestock effectively, particularly if water were limited on a given allotment.

Under all alternatives, surface-disturbing activities have the potential to directly disturb livestock and to effect livestock forage. Requirements to include BMPs or mitigation measures (**Appendix F**) for authorized land uses or activities would limit these effects. However, such limitations may also affect placement of structural range improvements or costs for range improvement construction and maintenance.

Alternative A

Under Alternative A, continuing to manage 1,311,000 acres as available to livestock grazing and 36,000 as unavailable to grazing and allocating approximately 40 percent of forage for livestock grazing would allow permitted grazing to continue at current levels (approximately 126,042 permitted AUMs).

Where allotments are found to not meet Standards for Rangeland Health (BLM 1997) as a result of livestock grazing, site-specific changes to grazing management could occur, with increased time and costs for permittees and lessees, as discussed in **Appendix W**.

Short-term changes to livestock management could also occur from drought management, with effects as discussed in **Appendix W**, at a site-specific level. Allocation of any vegetation increases in the watershed, until assessed by an interdisciplinary team, would limit the potential increases in forage from any vegetation treatments.

Similarly, any newly acquired lands would be assessed before allocation, with effects varying on a site-specific basis, based on land health conditions and other considerations.

Protecting other resources would have some potential for short-term limitations on livestock grazing management on a site-specific basis, as discussed in **Appendix W**; however, overall, few specific measures are in place. No limits on range improvement construction would be placed in areas with sensitive soils.

Maintaining state and federal water quality could result in some site-specific restrictions on livestock grazing operations in riparian areas. However, management would generally correspond with requirements for Standards for Rangeland Health (BLM 1997), so effects would be minimized. Requiring a 2-year rest period following major disturbance could result in site-specific limitations on livestock management. This would carry a potential for fencing requirements and related costs and effects on the ability to distribute livestock on a site-specific basis.

Areas available to grazing in Fire Management Category B (414,000 acres), and Category C (221,200 acres) to a lesser extent, would have limited effects from fire management due to emphasis on fire suppression in these areas. Over the long term, fire suppression in these areas is not likely to improve forage conditions or support rangeland health. Requiring a 2-year period of rest from grazing post-fire or other vegetation disturbance would result in site-specific limitation on forage available for grazing. The level of effects would vary, depending on the location and percent of a given allotment effected by such closures.

Prohibiting domestic sheep grazing in areas overlapping bighorn sheep habitat would affect the type of livestock permitted on approximately 11,900 acres, based on general current habitat models. Based on the guidance in the 1993 USFWS Grizzly Bear Recovery Plan, grazing operations should be compatible with grizzly management. However, no specific restrictions on livestock grazing would be in place, limiting direct effects.

As discussed in **Appendix W**, site-specific limitations on grazing management may occur for protecting sensitive sites, including cultural and paleontological sites, VRM Class I and Class II areas, and special designation areas. Limitations may restrict the ability to construct range improvements in areas available to grazing in VRM Class I (13,100 acres) and Class II areas (99,400 acres).

Site-specific limitations on livestock grazing management and ability to construct range improvements could occur in special designation areas, including 6,100 acres of ACECs, 12,200 acres of ONAs, and 9,800 acres of NHTs available to grazing. Exact effects would vary on a site-specific basis, depending on the nature of the special designation area, but restrictions on management for these areas could increase the time and costs for permittees and lessees. No areas would be managed to protect wilderness characteristics under Alternative A; therefore, there would be no limits on livestock grazing for this resource.

There is a potential for effects on livestock from developing land for other resource uses, as discussed in **Appendix W**. Under current management, oil and gas leasing would continue to be deferred, due to protest resolution. Limited conflicts would occur with livestock grazing due to lack of current development of only 5 percent of the decision area for federal oil and gas leases. Management for nonenergy solid leasables would have a limited effect on livestock grazing under all alternatives; no federal nonenergy solid mineral leases have been issued in the planning area, and this trend is expected to continue.

The potential for conflicts with livestock grazing and recreation would continue. Under Alternative A, there is potential for displacing or disturbing livestock in existing SRMAs (24,300 acres available to grazing) and ERMAs (1,100 acres available to grazing); however, the level of effects would vary on a site-specific basis, depending on the nature of the RMA, as discussed in **Appendix W**.

Excluding grazing in developed recreation sites under all alternatives would limit conflicts. Travel management designations would affect the degree of disturbance of livestock and livestock forage; disturbance is likely to be lowest in the 11,600 acres closed to OHV travel and the 1,400 acres closed to motorized use that are open to livestock grazing. These effects would be highest in areas with where OHV use is permitted (475,700 acres).

Development of ROWs can result in potential disturbance of livestock or livestock forage. Limiting development can limit these effects. Under Alternative A, livestock disturbance would be limited in the 13,000 acres available

to grazing and classified as ROW exclusion areas, and to some extent, in the 375,500 acres of ROW avoidance areas.

Disturbance from renewable energy development could also be limited in the 236,400 acres of ROW exclusion and 117,500 acres of ROW avoidance for wind development. However, because there are not currently any authorized wind ROWs or pending applications, effects are likely to be minimal.

On the 40,900 acres identified for disposal there is some potential for loss of effected allotments; however, any effected permittees and lessees would be notified 2 years prior, as discussed in **Appendix W**, thereby limiting effects.

Alternative B

Under Alternative B, making 66,900 acres unavailable to livestock grazing (twice that under Alternative A) would likely maintain the size of allotments and the current allocation. This is because most of these acres are currently unallocated. Effects on current operators from this management action would therefore be minimized. However, forage allocated to livestock grazing would be reduced overall, to approximately 20 percent of available forage (63,021 AUMS, approximately 50 percent less than Alternative A). As discussed in **Appendix W**, reducing permitted AUMs could result in effects on the ability of individual permittees and lessees to maintain operations, with a potential for economic effects at the individual or community level.

In addition, any areas that do not meet Standards for Rangeland Health (BLM 1997), due to livestock grazing for two consecutive rangeland health evaluation determinations, would be made unavailable. This could result in a long-term reduction in areas unavailable to grazing in the planning area, effecting the ability to distribute livestock and to maintain operations. Any additional forage available due to vegetation management would be allocated to watersheds; therefore; there would be no opportunity for increased livestock forage under this alternative.

Assessment of newly acquired lands to determine allocation of forage could result in some site-specific increases in forage availability. However, effects for individual permittees and lessees are likely to be minimal, due to the limited number of acquisitions likely to occur during the life of the plan.

Under Alternative B, additional restrictions on grazing management would be in place, beyond that under Alternative A, for the protection of other resources. This would raise the potential for increased management time and costs for permittees and lessees. For example, actions to increase the potential of riparian and wetland areas in natural condition could indirectly increase restrictions on livestock grazing in riparian areas, as compared with Alternative A. Effects would be concentrated in any areas where grazing was found to be effecting water conditions and would vary on a site-specific basis. As discussed in **Appendix W**, such restrictions could increase time and costs for permittees and lessees but would likely improve habitat conditions in the long term.

Replacing 15 percent of existing crested wheatgrass stands to native grass, forb, and sagebrush species by 2036 may result in some short-term effects on suitable forage availability. However, this is likely to promote healthy forage conditions for livestock over the long term.

Managing surface water impoundments to reduce watershed disconnection and decommissioning and developing alternative livestock/wildlife water for 14 sites, totaling 304 acres, could limit the ability to effectively distribute livestock in these areas. Similarly, limiting surface-disturbing activities in areas with weed infestations could also result in site-specific restrictions on constructing range improvements, with potential effects on the ability to effectively distribute livestock.

Under Alternative B, an increase in acres classified as Fire Management Category D (197,300 acres, compared with no acres under Alternative A) would allow fire to return to more natural regimes. This would increase short-term effects from wildfire (as stated in **Appendix W**) but also the potential for long-term promotion of healthy forage conditions and land health. Requirements for 2 years of minimum rest from grazing following all disturbances, including fire, would result in site-specific limitations on grazing, as discussed under Alternative A.

Prohibiting domestic sheep grazing in areas overlapping bighorn sheep habitat and prohibiting conversion of allotments to domestic sheep in 20 miles of occupied habitat would affect the type of livestock permitted on

approximately 212,500 acres, based on current habitat models (18 times increase over Alternative A). This would impose restrictions and potential increased costs on permittees and lessees grazing domestic sheep.

Under Alternative B, application of BMPs and conservation measures for sensitive status species could result in site-specific limitations on construction of structural range improvements or other grazing management. Effects would vary on a site-specific basis and would be analyzed prior to project level implementation.

In accordance with guidance in the 1993 USFWS Grizzly Bear Recovery Plan, grazing operations should be compatible with grizzly bear management. If the species were delisted, management would follow the NCDE Grizzly Bear Conservation Strategy (**Appendix K**), which would not allow a change to a smaller kind of livestock (i.e., a change from a cattle lease to sheep lease in primary conservation area (PCA) or Zone 1), resulting in potential restrictions on management for current permittees and lessees within this habitat.

As discussed in **Appendix W**, site-specific limitations on grazing management may occur for protection of sensitive sites, including special designation areas. Limitations may occur on the ability to construct range improvements in areas available to grazing in VRM Class I (12,400 acres, six percent less than Alternative A) and VRM Class II areas (318,200 acres, more than three times that in Alternative A).

Site-specific limitations on livestock grazing management and the ability to construct range improvements could also occur in 25,400 acres of ACECs (3 times that in Alternative A), and 1,600 acres of NHTs (108 percent more than Alternative A) available to grazing. Exact effects would vary on a site-specific basis depending on the nature of the special designation area, but management restrictions on management for these areas have the potential to result in increased time and costs for permittees and lessees.

Under Alternative B, 200,600 acres available to grazing would be managed for the protection of their wilderness characteristics (compared with no acres under Alternative A). Within this area, the prohibition of new or expanded range improvements could limit the ability of permittees and lessees to effectively distribute livestock. In the long term, limitations on development in special designation areas would promote healthy forage conditions for livestock grazing, as discussed in **Appendix W**.

Alternative B would result in additional limitations on development of land for other resources thereby reducing potential for disturbance of livestock grazing from these resources. For example, oil and gas development as well as solid mineral development would be limited as compared with Alternative A, in the form of additional closures to oil and gas leasing and nonenergy leasable exploration and development as well as additional NSO, CSU, and TL stipulations on fluid minerals. As discussed in **Appendix W**, where development occurs, there could be conflicts with livestock grazing. Due to the lack of substantial current development and the predicted low development potential and surface disturbance for fluid minerals (**Table W-1, Appendix W**), effects would be minimal. This represents potential for reduced disturbance from mineral development as discussed in **Appendix W**.

The potential for conflicts with livestock grazing and recreation would continue under Alternative B. There is a potential for displacing or disturbing livestock in ERMA (221,800 acres, 220 times more than under Alternative A); however, the level of effects would vary on a site-specific basis, depending on the nature of the RMA.

No SRMAs would be established under Alternative B. Disturbance from motorized travel is likely to be lowest in the 205,900 acres available to grazing and closed to motorized and mechanized use (compared with 11,600 acres closed to OHV travel and 1400 acres closed to motorized travel under Alternative A), and it would be highest in areas where OHV use on routes is permitted (386,600 acres, 89,100 fewer acres than under Alternative A).

Under Alternative B, livestock disturbance from ROW development would be limited in the 265,700 acres available to grazing and classified as ROW exclusion areas (20 times more than under Alternative A). To some extent, it also would be limited in the 326,700 acres of ROW avoidance areas (approximately 15 percent less than under Alternative A).

Disturbance from renewable energy development could also be limited in the 477,900 acres of ROW exclusion and 112,500 acres of ROW avoidance for wind development available to grazing. However, as stated under Alternative A, effects are likely to be minimal due to the lack of current or pending ROW applications.

Of the 9,800 acres identified for disposal, there is some potential for loss of acres available to grazing and associated forage in effected allotments; however, the effects would be minimal due to the limited acres identified and the likelihood that many of the parcels would continue to be grazed after disposal.

Alternative C

Under Alternative C, the total area available and unavailable to livestock grazing would be the same as under Alternative A. Maintaining grazing allotments at approximately 40 percent allocation for forage would allow livestock grazing to continue at approximately the same level of permitted use as now (approximately 126,042 AUMs). An additional 63,021 AUMs could be allocated across the planning area, if forage were to become available and Standards for Rangeland Health (BLM 1997) continue to be met.

Under Alternative C, new management suspending grazing in allotments not meeting Standards for Rangeland Health (BLM 1997) after 5 years of making management changes could result in the loss of some additional AUMs, at a cost to individual permittees and lessees. However, reauthorization could occur if standards and habitat objectives were obtained, so any losses would not be permanent.

One yearling would be assessed at a full AUM, and any permits and leases currently assessing yearlings at a lower AUM level would be modified at permit/lease renewal. This would result in some potential effects on some permittees and lessees; however, this is not likely to represent major differences in calculations.

As under Alternative B, assessment of newly acquired lands to determine allocation of forage could result in some site-specific increases in forage availability. However, effects for individual permittees and lessees are likely to be minimal, due to the limited number of acquisitions likely to occur during the life of the plan.

Some site-specific limitations for livestock grazing management could occur to protect other resources, but these would generally be similar to, or fewer than, those under Alternative A, depending on the resource. For example, surface-disturbing activities in sensitive soils would be permitted, with no limits on range improvement construction.

Managing lotic areas for PFC would correspond with current Standards for Rangeland Health (BLM 1997) and would not result in additional limitations on livestock grazing in riparian areas, compared with Alternative A. Maintaining livestock water at 14 sites, the same as under Alternative A, would allow for grazing to continue without additional restrictions. Managing existing crested wheatgrass seedings as spring use pastures to defer native rangeland grazing would have minimal effects on livestock management due to the flexibility of this action.

Effects from categorizing fire management would be the same as those described under Alternative A. Lack of minimum rest periods from grazing after disturbance would reduce direct limitations on grazing (e.g., change of class of livestock); effects would be determined on a site-specific basis. Over the long term, a lack of minimum rest periods may not promote healthy forage conditions and land health.

Prohibiting the conversion of allotments to domestic sheep grazing in areas overlapping occupied bighorn sheep habitat would affect the type of livestock permitted, the same as described under Alternative A. Some flexibility of management would be permitted in allotments with current sheep grazing, limiting effects for permittees and lessees.

Grizzly bear management effects would be as described under Alternative B, resulting in potential limitations on change of class of livestock for permittees and lessees. As discussed in **Appendix W**, site-specific limitations on grazing management may occur for protecting sensitive cultural and paleontological sites, as well as VRM Class I and Class II areas and special designation areas. In general, these restrictions would be decreased under this alternative, due to increased flexibility and reduced closures to grazing.

Limitations on the ability to construct range improvements from VRM designation would be reduced, as compared with Alternative A. There would be 1,400 acres available to grazing in VRM Class I, 89 percent less than under Alternative A, and 12,600 acres available to grazing in VRM Class II, 87 percent less than Alternative A.

As under Alternative A, no areas would be managed to protect wilderness characteristics, so no livestock grazing would be limited. Livestock grazing management and the ability to construct range improvements could be limited in special designation areas, including the 800 acres of NHTs (same as under Alternative A) available to grazing. The exact effects would vary on a site-specific basis, depending on the nature of the special designation area, but management restrictions for these areas could increase the time and costs for permittees and lessees. As discussed in **Appendix W**, restrictions on development in these areas would also promote healthy forage production in the long term.

The potential for conflicts with other resource uses and livestock grazing under Alternative C may increase, compared with Alternative A, due the greater degree of development of these resources promoted under this alternative. Under Alternative C, most of the planning area would remain open to fluid mineral leasing, as under Alternative A. Some additional limitations would apply in the form of fluid minerals NSO, CSU, and TL stipulations. As discussed in **Appendix W**, where development occurs, there could be conflicts with livestock grazing. Due to the lack of substantial current development and the predicted low development potential and surface disturbance for fluid minerals (**Table W-1, Appendix W**), effects would be minimal. Areas open to nonenergy leasable exploration and development would be the same as under Alternative A.

As discussed in **Appendix W**, there is potential for displacement or disturbance of livestock in SRMAs (17,500 acres available to grazing, 26 percent less than Alternative A) and ERMAs (210,700 acres available to grazing, more than 200 times that of Alternative A). However, the level of effects would vary on a site-specific basis, depending on the nature of the RMA. Travel management designations would affect the degree of disturbance of livestock and livestock forage; effects would be the same as under Alternative A.

Under Alternative C, disturbance of livestock from ROW development would be limited in the 1,400 acres available to grazing and classified as ROW exclusion areas (82 percent less than under Alternative A) and, to some extent, in the 345,500 acres of ROW avoidance areas (8 percent less than under Alternative A). Disturbance from renewable energy development could also be limited in the 263,300 acres of ROW exclusion and 269,100 acres of ROW avoidance for wind development. However, as stated under Alternative A, effects are likely to be minimal due to lack of current or pending ROW applications. No acres are identified for disposal so there would be no loss of acres available to grazing.

Alternative D

Under Alternative D, the total area available and unavailable to livestock grazing would be the same as under Alternative A. Maintaining grazing allotments at approximately 40 percent allocation for forage would allow livestock grazing to continue at approximately the same level of permitted use as current conditions (up to approximately 126,042 AUMs). As described under Alternative C, new management suspending grazing in allotments not meeting Standards for Rangeland Health (BLM 1997) after 5 years of making management changes, could result in the loss of some additional AUMs at a cost to individual permittees and lessees. However, reauthorization could occur if standards and habitat objectives were obtained, so any losses would not be permanent.

Effects from assessing the yearling factor would be the same as under Alternative C. Any increase in available forage would first be allocated to watersheds until stabilized and assessed, then allocated to grazing. These increases could provide additional flexibility in management for some permittees/lessees. Under Alternative D, as discussed under Alternative B, assessing newly acquired lands to determine allocation of forage could result in some site-specific increases in forage, but effects for individual permittees and lessees are likely to be limited.

As described in as described in **Appendix W** and other alternatives, restrictions in place for other resources may result in site-specific limitations on grazing management. In many cases under Alternative D, these restrictions would allow for some flexibility in management, thereby limiting effects on grazing.

Increasing the percentage of lotic areas in PFC or DFC could indirectly result in increased restrictions on livestock grazing in riparian areas, as compared with Alternative A. Effects would be concentrated in any areas where grazing was found to be affecting water conditions and would vary on a site-specific basis. As discussed in **Appendix W** such restrictions could increase the time and costs for permittees/lessees but would likely improve habitat conditions over the long term.

Under Alternative D, decommissioning and developing alternative livestock/wildlife water at eight sites, totaling 137 acres, could have site-specific effects on the ability to distribute livestock, as discussed under Alternative B, but intensity of effects would be reduced, due to limited acres and sites effected.

Management of crested wheatgrass and native restoration, where desired, may result in some short-term limits in forage. However, effects are likely to be minimal due to flexible term of management, and long-term improvement of forage conditions may occur.

Under Alternative D, effects from classifying fire management categories would be similar to those described under Alternative A. Under Alternative D, however, acres available to grazing would be decreased in Category B (322,900 acres, 24 percent less than under Alternative A) and increased in Category C (327,200 acres, 46 percent more than under Alternative A). As a result, the ability to use prescribed fire and wildfire to achieve management objectives, including those for forage health, would be increased.

No minimum rest period would be established; therefore, effects on grazing post-disturbance would vary on a site-specific basis. Management that restricts grazing until monitoring can demonstrate that grazing could be sustained would limit the long-term effects on forage conditions and land health.

Prohibiting domestic sheep grazing in areas overlapping bighorn sheep habitat and in 9 miles of habitat would affect the type of livestock permitted on approximately 72,500 acres available to grazing (five times more than under Alternative A, based on current general habitat models). Additional limitations in allotments from 9 to 20 miles from bighorn sheep habitat could result in some effects on permittees and lessees in these areas if separation from bighorn sheep were necessary. Grizzly bear management effects would be as described under Alternative B and would not allow a change to a smaller kind of livestock, limiting management options for permittees and lessees within this habitat.

As discussed in **Appendix W**, site-specific limitations on grazing management may occur to protect sensitive cultural and paleontological sites, VRM classes, and special designation areas. The ability to construct range improvements may be limited in areas available to grazing in VRM Class I (13,100 acres, 100 acres more than under Alternative A) and VRM Class II (124,500 acres, 25 percent more than under Alternative A).

Under Alternative D, 100,300 acres available to grazing would be managed for the protection of their wilderness characteristics, as compared with no acres under Alternative A. Within this area, by permitting range improvement construction and maintenance only when it can be shown to be consistent with wilderness characteristics, it could limit the type of structure permitted or the location of developments, potentially representing a higher cost and time for management.

Site-specific limitations on livestock grazing management and the ability to construct range improvements could occur in special designation areas, including 21,800 acres of ACECs (more than three-and-a-half times that under Alternative A) and 2,100 acres of NHTs (more than two-and-a-half times that under Alternative A). Exact effects would vary on a site-specific basis, depending on the nature of the special designation area; however, restrictions on management for these areas could increase time and costs for permittees and lessees. In the long term, limitations on development in special designation areas would promote healthy forage conditions for livestock grazing, as discussed in **Appendix W**.

Alternative D would result in additional limitations on resource development, compared with Alternative A, thereby limiting the conflicts with these resource uses and livestock grazing, as discussed in **Appendix W**. For example, oil and gas and solid mineral development would be restricted, as compared with Alternative A, primarily in the form of NSO, CSU, and TL stipulations on fluid minerals, and with some additional closures to leasing and nonenergy leasable exploration and development. This represents the potential for reduced disturbance from

development, as discussed in **Appendix W**. As discussed in **Appendix W**, where development occurs, there could be conflicts with livestock grazing. Due to the lack of substantial current development and the predicted low development potential and surface disturbance for fluid minerals (**Table W-1, Appendix W**), effects would be minimal.

As discussed in **Appendix W**, there is a potential for displacement or disturbance of livestock in SRMAs (17,700 acres available to grazing, 26 percent less than under Alternative A) and ERMAs (4,400 acres available to grazing, four times more than under Alternative A). However, the level of effects would vary on a site-specific basis, depending on the nature of the RMA. Disturbance of livestock and livestock forage is likely to be lowest in the 11,600 acres closed to OHV travel and open to livestock grazing (the same as under Alternative A). Disturbance would be highest in areas where OHV use on routes is permitted (475,700 acres). Additional limitations for mechanized use may further reduce effects.

Under Alternative D, disturbance of livestock and forage from ROW development would be limited in the 15,200 acres available to grazing classified as ROW exclusion areas (18 percent more than under Alternative A) and to some extent, in the 446,600 acres of ROW avoidance areas (19 percent more than under Alternative A). Disturbance from renewable energy development could also be limited in the 337,200 acres of ROW exclusion and 110,900 acres of ROW avoidance for wind development. However, as stated under Alternative A, effects are likely to be minimal due to a lack of current or pending renewable energy ROW applications. The effects of land disposal would be the same as those discussed under Alternative B, with some potential for a site-specific loss of acres available to grazing; however, the effects would be limited overall.

Cumulative

The analysis area used to analyze cumulative effects on livestock grazing includes the planning area. Past actions that have affected level of disturbance and available forage for livestock grazing are human-caused surface disturbances (mineral development, recreation, prescribed burning, mechanical vegetation treatments, and historical grazing practices) and wildfires that have contributed to current ecological conditions.

Present actions affecting livestock grazing are mainly those that disturb livestock or forage, reduce available grazing acreage, restrict management actions (including construction of range improvements), or effect the level of forage production in those areas. Key examples are wildfires, land disposals, motorized vehicle use, recreation, habitat restoration, fuel reduction, and special designations that restrict grazing.

Future actions affecting livestock grazing would be similar to present actions. Increased recreation and the potential for conflicts with livestock grazing are likely to increase over the life of the plan, resulting in increased disturbance of livestock and forage. Vegetation projects to reduce fire risk or improve habitat conditions, such as hazardous fuels reduction and conifer removal, may result in short-term restrictions on grazing management, but they could improve forage conditions in the long term. Construction of range improvement projects on private lands is expected to continue to increase through private funding and other federal programs, such as the Sage-Grouse Initiative and Environmental Quality Incentive Program.

Natural processes may also affect the type and quality of vegetation and forage availability over time. Increasing recurrence and severity of drought conditions have been predicted for this area as a result of climate variability. This could affect both forage availability and water availability, effecting management options for permittees and lessees. In addition, climate variability has the potential to increase the occurrence and severity of wildfires in the planning area, which would also affect short-term forage availability.

The presence of bighorn sheep populations, and management to protect bighorn sheep from disease, could affect the ability of current domestic sheep permittees or lessees to use the planning area or convert it from cattle use to domestic sheep use on specific allotments.

Cumulative projects that increase human disturbance in grazing areas could also directly affect grazing by displacing, injuring, or killing animals. Cumulative projects that increase human disturbance in grazing areas could also indirectly effect grazing by increasing weeds and invasive species. As stated above, weed invasion can reduce preferred livestock and wildlife forage and increase the chance of weeds being dispersed by roaming cattle.

The contribution to cumulative effects from proposed management under each alternative would parallel the effects of the alternatives in the general effect analysis, above. In general, management actions under every alternative would result in short-term or long-term changes in availability of forage. This would be due to treatment activities, other surface-disturbing and disruptive activities, human disturbance, the presence of grazing wildlife, threatened or endangered species, and special designations.

Grazing on private lands in the planning area is expected to remain stable or to slightly decrease as residential and recreational development increases. However, as Conservation Reserve Program lands become available and if livestock prices are stable, grazing may increase slightly. Under Alternative A, the contribution of BLM management actions to cumulative effects would be the same as under current conditions.

The greatest contribution to cumulative effects would occur under Alternative B, due to its greatest degree of restrictions on grazing on BLM-administered lands. The reduction of forage allocated for grazing on BLM-administered lands could affect area permittees and lessees economically and may put additional pressure on forage resources on private lands in the area. This is because permittees and lessees could be faced with reducing AUMs for their operations or locating replacement forage on lands not administered by the BLM.

Under Alternative C, reduced restrictions on grazing management, as compared with Alternative A, would decrease cumulative effects on forage availability; however, the potential for increased development could increase the cumulative effects of disturbance of livestock and forage from other land uses.

Under Alternative D, increased restrictions on grazing management, as compared with Alternative A, due to increased areas with special protection (i.e., ACECs and lands with wilderness characteristics) and additional measures for water protection, special status species, and vegetation, could contribute to cumulative effects on areas available for grazing and the ability to construct range improvements. Long term, the focus on land health improvement and restrictions on surface use would support maintenance or improvement of forage for livestock and wildlife.

Cumulative effects from each resource or resource use would be greater on livestock grazing if the cumulative projects were to occur simultaneously. However, standard mitigation identified in the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota, and South Dakota (BLM 1997) would be implemented across all alternatives and any other cumulative projects on BLM-administered lands, thereby reducing or minimizing cumulative effects on decision area lands.

4.3.3 Recreation and Visitor Services

Effects Common to All Alternatives

General Recreation and Visitor Services

Although the RMP does not limit the number of SRPs, current and forecasted demand would likely be met by implementing the handbook; if conflict arises or demand is not met, the RMP allows for site-specific analysis to resolve that issue.

Managing the Missouri Breaks Back Country Byway would continue to provide visitors with opportunities to enjoy unique scenic and historical opportunities on public lands.

Managing the Continental Divide NST and Lewis and Clark and Nez Perce NHTs would provide trail visitor experiences for public benefit.

The application of fluid minerals leasing stipulations (**Appendix L**), and BMPs and mitigation measures (**Appendix F**) for authorized land uses and activities would likely reduce effects on visitor experience associated with surface-disturbing activities such as road, pipeline, or power line construction; mineral development; range improvements; and recreational activities. Fluid minerals stipulations, and BMPs and mitigation would reduce or eliminate the removal or alteration of vegetation communities, and could maintain the existing physical setting by preserving natural landscapes.

Requiring a reclamation plan (**Appendix G**) for all surface-disturbing activities across all alternatives would stabilize disturbed areas in the short term and stabilize landscapes in the long term, and could maintain the existing physical setting by preserving natural landscapes.

Alternative A

General Recreation and Visitor Services

This alternative would continue to be insufficient to meet recreationists' and visitors' needs for improved recreation resources because it does not provide specific objectives or actions for improving these services. Effects would be expected where management plans for popular areas like Durfee Hills or Limekiln fail to provide adequate management direction for emerging recreation trends and increased visitation. These effects would likely become significant in specific areas over the life of the plan.

Existing developed recreation sites would often meet the current level of recreation demand in the planning area. The fluid minerals NSO stipulation that applies in 300 feet of developed recreation sites would continue to be sufficient in some areas and insufficient in others. This could result in diminished user enjoyment of certain areas. However, the LFO would continue to defer fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. (Nominated parcels not requiring special wildlife stipulations have continued to be leased in the LFO.) Oil and gas development in the decision area would continue to be limited to leases not requiring special wildlife stipulations. Because of this, effects from fluid mineral development would continue to be low.

The anticipated increase in recreation over the life of the RMP could result in demand for additional or expanded developed recreation sites because of negative user interactions and degraded recreation experiences.

Because no management actions are in place to protect lands with wilderness characteristics, there is no guarantee that primitive and unconfined recreation opportunities would be preserved over time. However, management in ACECs and the Square Butte WSA would protect primitive and unconfined recreation opportunities in special designation areas, similar to the management prescriptions for lands with wilderness characteristics. Conversely, continuing to restrict motorized use in these areas would limit the types of experiences available to enthusiasts.

The BLM would continue to manage 120,700 acres as VRM Class I and Class II, where outcome-focused objectives would be protected by maintaining the scenic quality of those lands. There would continue to be limitations on how and where routes are constructed in VRM Class I and Class II areas because any new routes must be constructed to meet the VRM objectives. Managing 193,300 acres as VRM Class III would not likely affect the type or amount of recreation use in these areas because the construction of facilities or routes to support recreation would be permitted, as long as the VRM Class III objective is being met. The 337,200 acres managed as VRM Class IV or without a designated VRM class allow the potential for development that could degrade outcome-focused objectives due to diminished scenic quality.

The BLM would continue to manage 15,700 acres as ROW exclusion areas, protecting recreation experiences by preserving opportunities for primitive and unconfined recreation. Continuing to manage 378,700 acres as ROW avoidance areas would present the potential for development that could conflict with desired recreation.

Under current management, oil and gas leasing would continue to be deferred, due to protest resolution, and limited conflicts would occur with recreationists due to lack of significant development and development of only 5 percent of the decision area for federal oil and gas leases. The BLM would continue to apply fluid minerals NSO stipulations on 58,300 acres, preserving the natural character of the landscape while maintaining existing recreation opportunities. Similar effects would continue to be experienced on the 281,700 acres where fluid minerals CSU stipulations would be applied.

Several management actions would result in seasonal restrictions on recreation. For example, applying seasonal OHV travel restrictions on 147,800 acres would affect non-consumptive wildlife enjoyment opportunities, particularly big game hunting, because the limitation is based primarily on big game hunting season. Seasonal OHV travel limitations, though, would temporarily reduce the area available for motorized recreation.

OSV travel would continue to be allowed throughout the entire decision area, resulting in the long-term preservation of those opportunities.

In the WSR suitability analysis, recreation is identified as an ORV for the Missouri River, Sun River Segment 1, and Sun River Segment 2, meaning recreational boating opportunities and experiences may be enhanced as a result of protecting that ORV. Recreation may be restricted if found to adversely affect ORVs, the free-flowing nature, or the tentative classification of the affected segment. Only a limited number of trail crossings would be allowed in scenic segments, reducing future potential for expanded recreation opportunities. Recreation would not be restricted in recreational segments, so long as ORVs are protected.

Continuing to manage the Acid Shale-Pine Forest ACEC, Square Butte ACEC, and Square Butte WSA as unavailable for harvesting timber would protect recreation experiences by improving the opportunity and experience for both consumptive and non-consumptive enjoyment of wildlife.

Range improvements could help to reduce conflicts with recreationists by preventing animals from wandering onto roads, trails, or developed recreation sites, such as campgrounds. Effects from grazing are trampling and poking of trails and campsites, livestock feces on trails and campsites, and decreased naturalness due to the presence of livestock. Direct encounters with livestock can also pose safety hazards to recreationists.

Management actions would not close backcountry airstrips to recreational aircraft, thereby protecting the experiences of aircraft users who use these backcountry airstrips.

Recreational target shooting would continue to be allowed throughout the decision area. This would continue to result in safety risks in certain areas, such as the Lowry Bridge campground, where shooting occurs near developed recreation sites.

SRPs would be allowed only in priority habitat if they are consistent with the goals and objectives for that habitat or species. This may limit the type or number of SRPs that can be issued in these areas.

The Lowry Recreation Site would continue to be managed as allowing only shotgun shooting. This restriction discourages target shooting, which has raised safety issues with nearby homeowners in the past.

The Durfee Hills area would continue to be managed as accessible only via aircraft. Without structured management guidance in the form of SRMA or ERMA designation, there would continue to be issues with access, garbage, camping, and aircraft landing sites.

Special Recreation Management Areas

Judith Mountains SRMA

There would continue to be limited supporting management for this area, depriving the BLM of management tools necessary to achieve outcome-focused objectives. While the area does not currently receive heavy use, visitation is expected to grow over the life of the plan. Without specific management actions and facility investments to support desired experiences and outcomes, growth in visitation would lead to negative user interactions, resource damage, and users dispersing to other areas perhaps less capable of facilitating recreation.

Judith River SRMA

This area would continue to be largely inaccessible to the public because it is surrounded by private land. As such, it would be difficult for users to achieve desired recreation experiences and outcomes. Management as VRM Class II would reduce visual intrusions on the landscape but may also restrict the placement of recreation facilities that improve access.

Snowy Mountains SRMA

More focused management would be needed to fully address issues associated with parking and staging where users prepare to enter adjacent National Forest System lands.

Extensive Recreation Management Areas

The Judith ERMA (comprised of 11 reservoirs) would continue to be undeveloped with little management support to facilitate outcomes or adapt to changing trends. This would result in fewer opportunities for the BLM to provide specific services, such as signage, to improve recreation opportunities.

The Nez Perce NHT ERMA would continue to be managed consistently with the NHT program and would likely facilitate adequate recreation opportunities over the life of the RMP because visitation is expected to increase only slightly.

Alternative B

General Recreation and Visitor Services

Under Alternative B, more stringent resource protection and fewer RMAs would promote quiet, dispersed recreation, benefiting those visitors who value a quiet soundscape and less structured recreation. Users seeking motorized recreation and those looking for a structured setting would find fewer opportunities than under Alternative A.

Not designating any reservoirs as ERMAs under this alternative could result in the long-term degradation of recreation in these areas. This is because the BLM would place less emphasis on providing facilities and other management actions to support recreation.

There would be 202,400 acres managed to protect their wilderness characteristics, increasing opportunities for primitive and unconfined recreation by way of restricting other resource uses and motorized recreation. Motorized travel would also be prohibited, but this is a negligible effect, because these areas are not currently popular for this type of recreation.

The types of effects from managing 346,400 acres as VRM Class I and Class II would be the same as those described under Alternative A, but they would occur over a greater area.

The BLM would manage 278,600 acres as ROW exclusion areas, covering 19.5 times more acres than Alternative A and the greatest area of any alternative. This would preserve opportunities for primitive and unconfined recreation. Managing 341,500 acres as ROW avoidance areas (10 percent fewer acres than Alternative A) would present the potential for development, which could conflict with recreation but over a slightly smaller area than under Alternative A.

The BLM would apply fluid minerals NSO stipulations on 744,000 acres (more than under Alternative A), preserving the natural character of the landscape while maintaining existing recreation opportunities. Similar effects would be experienced on the 241,400 acres where fluid minerals CSU stipulations would be applied.

Management actions that result in seasonal restrictions on recreation would be similar to those under Alternative A but would cover a smaller area. For example, applying seasonal OHV travel restrictions on 28,700 acres would cover the smallest area of any alternative. Effects would be similar but would cover a smaller area. Under Alternative B, these effects would be experienced year-round in many areas because of the large number of acres closed to OHV travel year-round. There would be 0 acres designated as closed to OHV travel, but 209,000 acres closed to motorized travel; much of this closure overlaps lands with wilderness characteristics. This would reduce opportunities for backcountry OHV recreation and administrative and permitted access but would also result in long-term preservation of quiet recreation settings for other users.

The Durfee Hills area would also be designated as closed to motorized travel, meaning it could also not be accessed via aircraft. This would eliminate motorized recreation opportunities in the area over the long term. There would be no RMA designation under this alternative either, resulting in a continued lack of focused management support for recreation in the area.

OSV travel would be prohibited on more acres than under any other alternative; however, many of the areas that would be closed are not popular for this type of recreation. For example, lands with wilderness characteristics do not receive consistent season-long snow coverage for OSV travel and are lightly used by mountain bikers. In other areas, however, the closures would be felt more prominently. This loss of access may be most noticeable

in the seasonal winter restrictions because these restrictions overlap the Moccasins area, where OSV use currently occurs.

The types of effects from VSR management would be the same as those described under Alternative A.

The types of effects from forestry actions would be the same as under Alternative A, but there would be additional areas closed to forest product sales. This would result in preserving a larger area for recreational enjoyment of resources.

Effects from grazing would be similar to those under Alternative A, but slightly more acres would be unavailable for grazing, thus slightly reducing the potential for conflict with recreation.

Unlike under Alternative A, areas with resource conflicts would be closed to recreational target shooting. This would reduce opportunities for this activity compared with Alternative A, but would also provide a benefit to public safety.

Using indicators to monitor SRP conditions of approval would likely result in fewer long-term conflicts among commercial outfitters. This is because the BLM would have an improved framework by which to analyze and monitor effects resulting from SRP issuance.

Special Recreation Management Areas

Not identifying any SRMAs would restrict the BLM's ability to provide program investments that adequately address recreation use and user demand. This issue would be especially acute in the short term under current or increased levels of visitation.

Extensive Recreation Management Areas

The four ERMAs in Alternative B would receive specific management consideration in order to address recreation use, demand, or recreation and visitor service program investments. ERMAs would be managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. Management of ERMAs would be managed along with the management of other resources and resource uses.

Arrow Creek BCA/ERMA

The Arrow Creek BCA/ERMA would be managed for primitive recreation in support of hunting. Management actions in the ERMA would largely support this objective. For example, management as VRM Class II, ROW exclusion, fluid minerals NSO stipulation, and closed to solid leasable minerals would help protect backcountry and primitive settings that facilitate enjoyable and productive hunting. In addition, similar effects would be realized by restricting the construction of new improved routes in designated areas, pursuant to emergencies and valid existing rights to conserve unfragmented habitat, hunting, and fishing. Mineral material disposal is allowed in the ERMA; development of associated facilities could interfere with hunting if wildlife move elsewhere.

Cemetery Road BCA/ERMA

This ERMA would be managed for primitive recreation in support of hunting and hiking. Management actions in the ERMA would largely support this objective. For example, management as VRM Class II, ROW exclusion, fluid minerals NSO stipulation, and closed to solid leasable minerals would help protect primitive settings that facilitate hunting and hiking. Mineral material disposal is allowed in the ERMA; development of associated facilities could interfere with hunting if wildlife move elsewhere. It could also interfere with hiking in a primitive setting by introducing audible and visual intrusions.

Crooked Creek BCA/ERMA

This ERMA would be managed for primitive recreation in support of hunters and anglers. Management actions would be the same as for the other ERMAs and would protect middle country, backcountry, and primitive settings by restricting surface disturbances. Similarly, mineral material disposal is allowed in the ERMA; development of associated facilities could interfere with hunting if wildlife move elsewhere.

Judith Mountains BCA/ERMA

The BLM would manage the Judith Mountains BCA to provide visitors with dispersed recreation for nonmotorized activities. Accordingly, a suite of travel management actions would maintain routes commensurate with public access needs and the ERMA's existing character. This would help facilitate access needed to engage in nonmotorized activities over the long term. VRM, ROW, and minerals management would be the same as in the other ERMAs and would help preserve recreation settings by restricting surface disturbance. Managing the ERMA as open to mineral material disposal would interfere less with its settings because the desired settings include more front-country and even rural settings.

Alternative C

General Recreation and Visitor Services

The types of effects from managing lands protected for their wilderness characteristics would be the same as those described under Alternative A.

Managing 16,800 acres as VRM Class I and Class II would result in the same type of effects as described under Alternative A, but over a smaller area than in any other alternative. The types of effects from managing 634,400 acres as VRM Class III and Class IV would be the same as under Alternative A, but would occur over a larger area than under any other alternative.

Under Alternative C, a total of 2,700 acres would be managed as ROW exclusion areas (the fewest of any alternative), and 345,500 acres would be managed as ROW avoidance areas. While the types of effects from ROW management actions would be the same as those described under Alternative A, the area available to activities potentially in conflict with desired recreation would be larger. For example, all SRMAs under Alternative C would be available for ROW location.

The types of effects from applying fluid minerals NSO and CSU stipulations would be the same as under Alternative A, but would cover a smaller area than under any other alternative. This would result in fewer restrictions on leasing and development that may conflict with recreation.

The effects from OHV travel designations would be the same as those described under Alternative A. The Square Butte WSA would be formally closed to mechanized travel. This area is currently managed as such, and effects would not be different from those under Alternative A.

OSV travel would be prohibited on 32,000 acres in WSAs and in crucial wildlife winter range. This would reduce the area available for OSV travel compared with current management, although these areas are not currently popular for OSV travel.

There would be no effects on recreation from WSR actions under this alternative because no stream segments would be determined suitable for inclusion in the NWSRS. Instead, water-based recreation would be protected via management of the Judith ERMA and a fluid minerals NSO stipulation, which prohibits surface occupancy and use within 500 feet of the bank-full edge of fishing reservoirs.

A smaller area than Alternative A would be closed to forest product sales, resulting in the fewest protections from short-term and long-term effects associated with harvest.

Effects from grazing would be the same as under Alternative A because the same number of acres would be available for grazing, with the same number of AUMs.

Effects from target shooting would be the same as those under Alternative A.

Effects from SRP management would be the same as under Alternative B; compared with Alternative A, there would likely be fewer long-term conflicts among commercial outfitters.

Special Recreation Management Areas

Judith Mountains SRMA

Under Alternative C, the Judith Mountains SRMA would allow for more development to meet the needs of the recreating public. Examples of actions to facilitate the objectives of the SRMA are those targeting the construction of facilities, improving access (e.g., new staging and parking areas), and maintaining trails.

Management of the SRMA as VRM Class III and as open to ROW location may allow developments that conflict with desired recreation, but it would also allow facilities construction to support motorized and nonmotorized activities.

The lack of restrictions on other resource uses may cause RSCs to shift toward front-country settings over the life of the plan. This would be largely consistent with desired RSCs but would conflict with the stated RSC for facilities, which is backcountry.

Lowry Bridge SRMA

There would be few restrictions on other resource uses, which could introduce developments that conflict with recreation. However, this could also better facilitate desired front-country operational RSCs by providing greater flexibility for improving visitor services and management controls. Developing access to Sun River would improve the access RSC, consistent with the desired front country setting. Providing visitor services, such as information kiosks and directional signs from the highway, may attract additional users, making it less likely that social RSCs for contacts and group size retain their desired backcountry setting over the life of the plan.

North Moccasin SRMA

Management in the North Moccasin SRMA would be focused on OHV and dirt-biking recreation. As in the other SRMAs, there would be few restrictions on other resource uses, resulting in similar effects. Because the desired physical RSCs for remoteness and naturalness are middle country and front country, respectively, additional development may not prevent the BLM from achieving these RSC settings over the life of the RMP.

Pursuing partnerships, promoting OHV-based tourism, and developing kiosks and other facilities would likely cause operational RSCs for visitor services and management controls to rise above their desired primitive setting. However, these actions would also facilitate enjoyable motorized recreation, helping achieve the targeted objective for the SRMA.

Snowy Mountains SRMA

The BLM would manage the Snowy Mountains SRMA for visitors to access neighboring National Forest System land from BLM staging areas. To this end, the BLM would develop new trails, perform trailhead maintenance, and provide additional facilities at staging areas. These actions would help achieve the management objective for the SRMA.

Providing additional facilities and services as described above would help facilitate positive recreation experiences by providing safe parking and pullouts, easing users' access to National Forest System land, and reducing unintentional trespass on nearby private land. These actions would likely raise the desired operational RSCs for visitor services and management controls above the desired primitive and backcountry setting.

Extensive Recreation Management Areas

Arrow Creek BCA, Cemetery Road BCA, and Crooked Creek BCA

Effects on recreation would be the same as under Alternative B, except that management as VRM Class III (and as Class IV for Cemetery Road BCA/ERMA) and ROW avoidance could detract from the ERMA's qualities and conditions. This is because these ERMAs would be more susceptible to development that could conflict with targeted activities and opportunities. Effects could be lessened because the BLM would consider whether the function or suitability of the fisheries and the recreation experience would be impaired when analyzing proposed ROWs. There would be less recreation facility development and other visitor services; however, this is not expected to conflict with the ERMA's objectives because they are targeted at dispersed nonmotorized activities that generally do not require this type of management.

Judith ERMA

There would be 10 reservoirs in this ERMA (one fewer than under Alternative A), but the BLM would institute more focused management in support of targeted activities and opportunities. For example, fishing opportunities would be protected by prohibiting surface occupancy or use within 500 feet of the bank-full edge, providing signage and brochures, and improving access to the reservoirs.

Alternative D

General Recreation and Visitor Services

This alternative identifies the areas most likely to require, or continue to require, management actions to support recreation and the attainment of outcome-focused objectives. The three SRMAs would be managed to protect and enhance a targeted set of activities, experiences, and outcomes. Effects by RMZ are discussed below. Across all SRMAs, management actions from other resource programs generally facilitate SRMA objectives. This alternative also proposes three ERMAs to support principal recreation and where recreation would be managed along with other resources and resource uses.

The types of effects on recreation from lands with wilderness characteristics management would be the same as identified under Alternative B, except the effects would be spread over a smaller area (100,410 acres) and OHV travel would be allowed on designated routes. Compared with Alternative A, there would be better opportunities for primitive and unconfined recreation in these areas over the life of the plan, unless OHV travel becomes widespread in these areas.

There would be 141,200 acres managed as VRM Classes I and II. The types of effects from these VRM classifications would be the same as those described under Alternative A, but would occur over a larger area.

Under Alternative D, a total of 18,000 acres would be managed as ROW exclusion areas and 446,600 acres would be managed as ROW avoidance areas. The types of effects from ROW actions would be the same as those described under Alternative A, but would occur over a larger area.

Surface occupancy and use would be prohibited on the 472,000 acres where fluid minerals NSO stipulations would be applied and would be restricted on the 632,900 acres where fluid minerals CSU stipulations would be applied. This would result in the same type of effects as under Alternative A, but over a larger area.

Effects on OHV travel would be the same as those under Alternative A. Effects on mechanized travel would be similar to those under Alternative A, except that there would be more areas where mechanized travel would be limited to designated routes yearlong; this would reduce opportunities for cross-country mechanized recreation.

Effects on OSV travel would be similar to those under Alternative C, except that they would occur on 30,700 acres. This would reduce the area available for OSV travel compared with current management, although these areas are not currently popular for OSV travel.

Effects on mechanized travel would be similar to those under Alternative C, except that 144,800 acres would be managed as limited to designated routes yearlong. This would reduce opportunities for cross-country mechanized recreation, compared with current management, though this use is not popular in the decision area because users prefer to recreate on trails.

As under Alternative C, there would be no effects on recreation from WSR actions under Alternative D because no stream segments would be suitable for inclusion in the NWSRS.

The type of effects from forestry management would be similar to those under Alternative A, except that an additional 114,200 acres (i.e., lands with wilderness characteristics and VRM Class I areas) would be closed to forest product sales. This would provide a long-term benefit to recreation that is improved by wooded settings or relatively undisturbed viewsheds.

Effects from grazing would be the same as those under Alternatives A and C, because the same number of acres would be available for grazing, with the same number of AUMs.

Effects on fixed-wing aircraft and helicopters would be the same as those under Alternative A.

Effects from target shooting would be the same as those under Alternative B.

Effects from SRPs would be the same as under Alternative B; compared with Alternative A, there would likely be fewer long-term conflicts among commercial outfitters.

Special Recreation Management Areas

Durfee Hills SRMA

This SRMA would be managed to support recreational opportunities for fixed-wing aircraft and helicopters and to enhance hunting and camping opportunities. These actions would improve recreation by minimizing the potential for user conflicts and providing targeted benefits that address current and anticipated use trends in the area. Other management actions, such as applying fluid minerals NSO stipulations near areas of concentrated use and developed sites, would help preserve desired physical RSCs for remoteness and naturalness.

Because this SRMA is accessible only by aircraft, the BLM should be able to maintain desired social RSCs for contact and group size; visitation should remain low over the life of the RMP.

Judith Mountains SRMA

Effects in both the Judith Peak/Red Mountain and Limekiln Canyon RMZs would be similar to those described under Alternative C, except that a fluid minerals NSO stipulation would provide additional protection of desired physical RSCs by restricting fluid mineral leasing. There would also be additional opportunities for developing new routes, which would affect targeted nonmotorized and motorized recreation by expanding and improving opportunities.

Lowry Bridge SRMA

Effects would be similar to those under Alternative C, except that there would be less emphasis on facility development and travel management improvements. This may prevent the BLM from maintaining the desired physical RSC for facilities and the desired operational RSC for access. Effects would be most acute if visitation were to increase dramatically, something that is not expected over the life of the RMP. Applying a fluid minerals NSO stipulation for areas receiving concentrated use and developed recreation sites would protect desired physical RSCs by limiting effects from fluid mineral leasing and development. There would be no firearm restrictions, which would improve opportunities for recreational shooting but may conflict with other users' recreational experiences.

Extensive Recreation Management Areas

Judith ERMA

Effects would be similar to those under Alternative C, except that the fluid minerals NSO stipulation applied within 0.25 mile of designated reservoirs with fisheries would protect recreation activities and opportunities across a larger area. The other difference from Alternative C is that the ERMA would manage eight undeveloped recreation sites associated with fishing reservoirs (as opposed to ten under Alternative C). Although smaller in number, the ERMA would focus on those with the best public access and fishing opportunities. This would help the BLM achieve the ERMA's management objective over the life of the RMP.

North Moccasin ERMA

Effects would be similar to those described for the SRMA under Alternative C, except that there would be less focus on improving recreation because the area would be managed as an ERMA. For example, there would be less focus on new route development for OHV recreation. Improvements in legal access issues may also be slower to develop. However, this should not affect the BLM's ability to achieve its objective to manage the ERMA for visitors to engage in OHV activities. This is because there would be a suite of actions for trail maintenance, additional facilities, and partnerships to improve targeted experiences.

Snowy Mountains ERMA

Effects would be similar to those described for the SRMA under Alternative C, except that there would be less focus on improving recreation opportunities because the area would be managed as an ERMA. For example, there

would be less focus on developing new facilities such as camping sites, informational kiosks, visitor registers, camping pads, vault toilets, picnic tables, fire pits, and shelters. Alternative D would, however, target the most important action needed to achieve the ERMA's objective by developing staging and parking areas. This would address current issues with access into adjacent National Forest System lands.

Cumulative

The analysis area used to analyze cumulative effects on recreation is the planning area, all big game herd units that intersect the planning area, and major rivers and trails that intersect the planning area. Any activities that affect game populations would, in turn, effect the potential for realizing recreation benefits (e.g., wildlife viewing and hunting) because of the loss or gain of the number of animals.

At the broadest level, the physical, social, and operational recreation character of BLM-administered lands is remaining relatively constant, with growth largely concentrated on nonmotorized activities, such as horseback riding and mountain biking. If growth is relatively small, it should preserve many of the activities, opportunities, and recreation experiences provided by land managers and partners. Targeted management for RMAs under Alternatives B, C, and D would provide improved recreation opportunities and experiences that are complementary to those on nearby lands, such as the Snowy Mountains area.

In addition, targeted recreation management could turn some areas into a local or regional destination by shifting use away from other areas. For example, with SRMA designation, the North Moccasins area could become a more popular destination for OHV recreation. Likewise, the Limekiln Canyon area could draw a higher percentage of users from other lands in the analysis area. These effects would be most pronounced under Alternative C, because this alternative includes the most targeted management actions in support of improving connectivity with adjacent lands.

Past and present actions that continue to have cumulative effects on recreation are surrounding BLM and Forest Service management plans, advances in outdoor recreation equipment, management in existing SRMAs and ERMAs, and energy development. Forest plans for nearby National Forest System lands and RMPs for adjacent BLM-administered lands have closed or are closing areas and routes to motorized recreation, causing users to move to BLM-administered lands in the planning area. This has also resulted in management concerns in areas where adjacent BLM-administered and National Forest System lands have differing levels of access for motorized travel. Cumulatively, motorized recreation opportunities across all land management types in the analysis area consist of fewer miles of routes available for use but higher quality experiences. This is due to targeted planning efforts that seek to improve travel networks.

Commercial recreation opportunities are expected to expand in the analysis area. The BLM has experienced an increase in SRPs for fishing in the past few years. Expanding outfitter and guide services in the analysis area could provide users with additional opportunities, but it could increase competition and potential conflict between providers of similar services.

4.3.4 Travel, Transportation Management, and Access

Alternative A

Travel and Transportation Management

Alternative A would continue to enable the most extensive access to BLM-administered lands via OHV, OSV, and mechanized travel. However, the BLM would not establish travel management areas to support specific resource management decisions and address public needs; accordingly, conflicts among the various types of travel modes would be greatest under Alternative A. Continuing to allow fixed-wing aircraft and helicopters to land on designated two-tracks and roads would preserve long-term access for these vehicles but may result in conflict with other modes of travel on roads used as landing strips.

Access

Where access to isolated BLM-administered lands requires crossing private property, access would continue to be at the discretion of the landowner. The BLM would continue to coordinate with them on a case-by-case basis. As a result, landowner permission would continue to be needed to access these isolated BLM-administered lands.

This would result in short-term and long-term uncertainty regarding public access where the landownership pattern is mixed.

Alternative B

Travel and Transportation Management

The greatest number of acres would be closed to motorized, OSV, and mechanized travel. This would reduce access for these types of vehicles, especially in backcountry settings, such as lands with wilderness characteristics and certain ACECs. Motorized, OSV, and mechanized use are not currently popular modes of travel in many of these areas. For example, lands with wilderness characteristics do not receive consistent season-long snow coverage for OSV travel and are lightly used by mountain bikers. In other areas, however, the closures would be felt more prominently. This loss of access may be most noticeable in the seasonal winter restrictions because these restrictions overlap the Moccasins area where OSV use currently occurs. Regardless of the amount of travel in an area, these increased closures would lead to a long-term loss of motorized travel access. Managing the Durfee Hills area as closed to motorized travel would result in the long-term loss of access by fixed-wing aircraft and helicopters in this area when compared with Alternative A. Establishing travel management areas would focus management on improving transportation access and minimizing conflicts among users over Alternative A.

Access

Where public motorized access is contingent on the governing consent of adjoining landowners, the BLM would exercise a reciprocal all or none road use policy. This action would result in greater consistency across the LFO. However, if many landowners choose to deny public access through their land, this action would result in the loss of access to isolated parcels of BLM-administered land. Aircraft could be allowed in isolated public lands if those lands are designated as limited to designated routes for OHV travel.

Alternative C

Travel and Transportation Management

OHV allocations would be the same as under Alternative A, so effects on OHV access would be the same. Compared with Alternative A, OSV and mechanized travel would be restricted on more acres, resulting in loss of access either seasonally or year-round. Alternative C would formalize management of the Square Butte WSA as closed to motorized, OSV, and mechanized travel. Because these modes of travel are not currently allowed in the WSA, Alternative C would not result in additional long-term effects. Effects on fixed-wing aircraft and helicopters would be the same as under Alternative A. Effects from establishing travel management areas would be the same as described under Alternative B and would improve transportation access and minimize conflicts among users, compared with Alternative A.

Access

Effects would be the same as under Alternative A.

Alternative D

Travel and Transportation Management

Effects from motorized and OHV allocations would be similar to those under Alternative A, with the major exception being that there would be fewer acres limited seasonally. This would allow greater year-round access to the transportation system via this mode of travel. Compared with Alternative A, OSV and mechanized travel would be restricted on more acres, resulting in the loss of access either seasonally or year-round. Effects from mechanized travel allocations would be similar to those under Alternative C, except that 144,800 acres would be managed as limited to designated routes. This would limit cross-country mechanized travel over the long term, though this method of travel is not common in the field office. Compared with current management, mechanized travel would be restricted on more acres, resulting in loss of access either seasonally or year-round. There would be an exception for game carts, which would be allowed off designated routes. This would help facilitate hunting opportunities over the long term. Manage the Durfee Hills SRMA to support recreational opportunities (primarily big-game hunting) for fixed-wing aircraft and helicopters would preserve long-term access while limiting the risk of vehicle collisions or congestion on the travel network. It would also improve safety on the travel network by creating a buffer against camping sites, providing certainty to airplane pilots and campers alike. Effects from

establishing travel management areas would be the same as described under Alternative B and would improve transportation access and minimize conflicts among users, compared with Alternative A.

Access

Effects would be the same as under Alternative B and there would be greater consistency in access to isolated parcels compared with Alternative A. Effects on fixed-wing aircraft would also be the same as under Alternative B.

Cumulative

Under all alternatives, the BLM would manage areas as limited or closed to motorized, OHV, and mechanized travel. The acreages of these areas would vary by alternative, with Alternative B resulting in the largest area of closures. Alternatives A, C, and D would mostly limit motorized, OHV, and mechanized travel to existing or designated routes. Managing areas as closed to motorized, OHV, and (where applicable) OSV and mechanized travel decreases access to the travel network.

Travel management planning has been completed in adjacent National Forest System lands. In some cases, this has restricted motorized vehicle access and resulted in use shifting onto nearby BLM-administered lands. Forest Service travel management planning also provides an opportunity for increased access across National Forest System and BLM-administered lands; this would occur where routes on BLM-administered lands are designated for certain uses in future travel management planning.

Long-term access to the many isolated parcels of BLM-administered land in the north and east portions of the LFO depends largely on private landowners allowing public access across their lands. Under Alternatives A and C, continuation of current trends would be expected because current BLM management would not change. Under Alternatives B and D, additional BLM-administered lands may become inaccessible if landowners decide to not allow public access. Conversely, if landowners decide to allow all public land users to cross their property, long-term preservation and improvement to access would be expected. This trend depends on the actions of individual landowners and, therefore, is difficult to predict with certainty.

Management actions that would protect or improve vegetation, habitat, and watershed resources could restrict motorized or OHV travel and recreational access in WSAs, ACECs, priority wildlife areas, and watersheds. Effects would vary by alternative but are expected to be most pronounced under Alternative B.

4.3.5 Lands and Realty

Effects Common to All Alternatives

A summary of the acreages that were used to analyze the effects on lands and realty under each alternative is provided **Table 2-2**.

Land Tenure

Requirements to retain lands in PHMA and GHMA, and to prioritize land acquisitions in PHMA, would affect the lands and realty land tenure program where those decisions conflict with other BLM-administered land tenure objectives.

Acquiring lands as opportunities arise through exchange or purchase with willing proponents or sellers would have the same effects as those described in **Appendix W**.

The management of ACECs under all alternatives would protect relevant and important resource values. ACEC management priorities would directly and indirectly affect the lands and realty program's ability to carry out land tenure actions where those actions would affect the relevant and important values for which the ACEC was designated. Pursuing legal access through land acquisitions or easements to the Blind Horse, Chute Mountain, Deep Creek/Battle Creek, and Ear Mountain ACECs/ONAs would have the potential to consolidate fragmented landholdings in and adjacent to the ACECs. This would improve BLM-administered land management efficiency in those areas.

Land Use Authorizations

Requiring authorized land uses or activities on sensitive soils, soils prone to slumping or instability, or other soils to develop BMPs or other mitigation measures (**Appendix F**) to reduce effects on those soils would be additional requirements of ROW grants to reduce effects.

Requiring authorized uses to comply with all applicable state and federal water quality standards could result in certain lands and realty objectives and actions being supported or restricted by state water law.

Designing authorized activities to ensure that riparian-wetland areas are maintained or improved could result in certain lands and realty objectives or actions being supported or restricted.

Modifying or removing existing fences, or building new fences, to enhance or allow wildlife passage could increase the number of new ROW applications for fences in those areas.

All PHMA would be managed as ROW avoidance. GHMA would also be managed as ROW avoidance for major ROWs (high voltage transmission lines and large pipelines) to reduce the potential for new ROW development in those areas.

Under all alternatives, the BLM would seek to resolve conflicts with cultural resources from human-caused deterioration. Should a conflict involve an element of the lands and realty program, resolution of the conflict could affect the BLM's ability to meet certain lands and realty program objectives.

Cultural resources management actions would affect ROW proposals based on site-specific NEPA analysis and development of mitigation measures to protect cultural resources. The BLM may require operators to relocate facilities to avoid cultural resources effects, thereby increasing costs and project feasibility.

Under all alternatives, the BLM would continue to manage recreation and visitor services to minimize conflicts with other resources and resources uses. There would be little to no effect on the lands and realty program where proposed lands and realty actions would complement recreation and visitor services management objectives. Where lands and realty actions have the potential to conflict with recreation objectives (e.g., in RMAs), resolution of these conflicts could affect the location, type, or extent of individual lands and realty decisions.

All alternatives would continue to prohibit cross-country OHV travel throughout the decision area, which would reduce the potential for disruption to, or conflict with, existing ROWs (e.g., pipelines and transmission lines) and lease sites (e.g., communication infrastructure) from unrestricted cross-country travel.

Under all alternatives, direct and indirect short- and long-term effects on the lands and realty program from renewable energy development would come from new wind energy development. Solar, hydropower, and biomass energy facilities would not be of a large enough scale to require ROWs or associated ROW infrastructure.

Continuing to confine communication sites to the Judith Peak and the South Moccasin Mountains communication sites would limit opportunities to expand the communication network to cover additional areas outside these current lease sites. However, it would also streamline permitting of new communication infrastructure in the existing sites.

Considering Section 302(b) leases (other than cabin site leases) on a case-by-case basis under all alternatives would continue to allow the potential for such development throughout the decision area.

The 20,400 acres currently withdrawn by other federal agencies would continue to limit opportunities for the BLM lands and realty program to approve certain types of land use authorizations or land tenure actions in those areas. This would be subject to the management authority of the applicable federal agency.

The management of ACECs under all alternatives would protect relevant and important resource values. ACEC management priorities would directly and indirectly affect the lands and realty program's ability to accommodate new ROWs where such development would affect the relevant and important values for which the ACEC was

designated. Management of the 1,900-acre Square Butte ACEC/ONA would directly affect new ROW development potential by excluding all new ROWs under all alternatives.

The management of national trails under all alternatives would avoid activities that are incompatible with the purposes for which the national trail was established. Therefore, national trail management priorities would directly and indirectly affect the lands and realty program's ability to accommodate new ROW development where it would affect the purposes for which the national trail was established.

BLM management WSAs (2,700 acres), which protects naturalness and preserves opportunities for solitude and primitive recreation, would exclude this area from any future permanent ROW development or other land use that would result in surface disturbance. If released from WSA consideration, the Square Butte WSA would be managed as the Square Butte ACEC and would continue to be excluded from any future permanent ROW development or other land use that would result in surface disturbance. Limitations on other surface-disturbing activities (e.g., mineral development) in this area would indirectly reduce or eliminate the need for new ROWs to support those uses.

Alternative A

Land Tenure

Alternative A would have the greatest potential to decrease the amount of BLM-administered lands by continuing to identify 6 percent (40,900 acres) of the decision area for disposal and the remaining 94 percent (610,300 acres) for retention. This would affect the lands and realty program as described in **Appendix W**.

Land Use Authorizations

Alternative A would continue to eliminate future land use authorizations on 2 percent (15,700 acres) of the decision area by managing those lands as ROW exclusion areas. Alternative A would also continue to limit the location, extent, and types of new ROW development on 58 percent (378,700 acres) of the decision area by managing those lands as ROW avoidance areas. The remaining 40 percent (256,800 acres) of the decision area would continue to be open to land use authorizations. Effects are described in **Appendix W**.

Excluding wind energy ROW development on 36 percent (236,300 acres) of the decision area, including 2,700 acres of areas classified as having wind resources of good or better, would eliminate the need for new wind-related power line ROWs in those areas. Avoiding wind energy ROWs on another 18 percent (117,500 acres) of the decision area and 2,200 acres of good or better wind resource areas would still allow ROW development in these areas, with restrictions.

Alternative A would minimize or prevent road and trail development in crucial big game and upland bird habitat areas, which would reduce future ROW development in areas designated as avoidance and exclusion.

Alternative A would continue to manage 18 percent (120,700 acres) of the decision area as VRM Class I or Class II. New ROW development, particularly for high-visibility features such as overhead transmission lines and roadways, would conflict with VRM objectives in these areas and would likely be approved only if relocated or designed to minimize effects on desired visual resource conditions. Alternative A would provide VRM Class III and Class IV objectives for 72 percent (473,800 acres) and no VRM class for the remainder of the decision area (56,700 acres). VRM objectives would support new or expanded ROW development in these areas, particularly in VRM Class IV and unassigned areas.

Under Alternative A, demand for new ROWs to support mineral development would continue to affect the lands and realty program. Under Alternative A, 394,100 acres of federal mineral estate would remain closed to nonenergy solid mineral leasing, 23,200 acres would remain withdrawn to locatable mineral entry, 0 acres would remain recommended for locatable mineral withdrawal, 110,400 acres would remain managed as closed to fluid mineral leasing, and NSO stipulations would continue being placed on fluid mineral development on 58,300 acres.

Continued restrictions on mineral development in these areas would indirectly affect the lands and realty program by reducing the need for roads, transmission lines, pipelines, and other ROWs normally required to support mineral development. In addition, the LFO would continue to defer fluid mineral leasing of nominated parcels that would require special stipulations to protect important wildlife values. (Nominated parcels not requiring special

wildlife stipulations have continued to be leased in the LFO.) Oil and gas development in the decision area would continue to be limited to leases not requiring special wildlife stipulations (see **Table W-1, Appendix W**). This would further reduce the need for support infrastructure.

Livestock grazing would continue under current levels and be allowed throughout 98 percent (636,600 acres) of the decision area. Lands and realty actions would continue to be evaluated for compatibility with livestock grazing management. Continued grazing levels would maintain the current demand for range infrastructure-related ROWS, generally; however, ROWs are not required for range infrastructure, so demand would remain low.

Alternative A would continue to manage 29,770 acres of the decision area as SRMAs and 1,100 acres as ERMA. No SRMAs or ERMA are managed as ROW avoidance or exclusion areas. Types of effects would be the same as those described in **Appendix W**.

Under Alternative A, the majority of the decision area (98 percent, or 636,300 acres) would continue to be limited to designated routes for OHV travel either seasonally or year-round. Limiting OHV travel to designated routes would maintain access opportunities for future ROWs and leases and, therefore, would have little to no effect on lands and realty. Alternative A would also continue to close 2 percent of the decision area to OHV (13,000 acres) or motorized (2,700 acres) travel. Although opportunities for OHV (non-administrative and non-permitted) access would be eliminated in these areas, access opportunities for future ROWs and leases would be maintained in the 13,000 acres where administrative and permitted use would be allowed; therefore, this would have little to no effect on lands and realty.

Encouraging co-location of new facilities in existing ROWs could streamline permitting of new facilities in existing sites.

Closing the decision area to cabin site leases would limit the potential for new cabin site development throughout the decision area and would reduce the applications and requests for related ROWs.

Alternative A would continue to manage 8 ACECs totaling 22,900 acres. ACEC management would directly affect new communication site development potential by excluding communication site leases in the Blind Horse, Chute Mountain, Deep Creek/Battle Creek, and Ear Mountain ACECs/ONAs (13,000 acres). Additionally, Alternative A would avoid ROWs on 19,500 acres in the following ACECs: Acid Shale-Pine Forest ACEC/RNA; Blind Horse, Chute Mountain, Deep Creek/Battle Creek, and Ear Mountain ACECs/ONAs (utility and transportation corridor ROWs); and Judith Mountains Scenic ACEC.

Alternative A would manage 89.9 miles along 27 stream segments as eligible for inclusion in the NWSRS. Although Alternative A would not specify any actions for those VWSRs, interim protective management guidelines for eligible segments would avoid activities that alter eligible segments' free-flowing nature or identified ORVs; this would directly and indirectly affect the lands and realty program's ability to accommodate new ROW development where it would affect the nature or values.

Alternative B

Land Tenure

Alternative B would identify 9 percent (55,800 acres) of the decision area for retention, 90 percent (585,700 acres) for retention-limited disposal, and 2 percent (9,800 acres) for disposal (5 percent less than under Alternative A). Disposal would only occur through exchanges on retention-limited disposal lands. This would affect the lands and realty program as described in **Appendix W**.

Alternative B would emphasize retaining and acquiring forested lands. This would have effects similar to those described in **Appendix W**.

Land Use Authorizations

Compared with Alternative A, Alternative B would have more restrictions on ROW development. Alternative B would eliminate future land use authorizations on 43 percent (278,800 acres) of the decision area, 41 percent more than under Alternative A, by managing those lands as ROW exclusion areas. Alternative B would limit the location, extent, and types of new ROW development on 53 percent (341,500 acres) of the decision area, 5

percent less than under Alternative A, by managing those lands as ROW avoidance areas. The remaining 4 percent (30,900 acres) of the decision area, 36 percent less than under Alternative A, would continue to be open to land use authorizations. Effects are described in **Appendix W**.

Alternative B would result in the lowest need for new ROWs to support wind energy development by excluding wind energy ROW development on 73 percent of the decision area, including 63 percent (29,600 acres) of areas classified as having developable wind resources. Avoiding ROWs on another 18 percent (8,500 acres) of good or better wind resource areas would still allow development, with restrictions.

Requiring current ROW holders to correct and modify existing power lines identified as having problems with wildlife collision or electrocution, or that do not meet Avian Power Line Interaction Committee standards, would affect the lands and realty program where the requirement would conflict with the terms and conditions of the existing ROW authorization. If BLM determines there is a conflict, ROW holders could be required to modify existing infrastructure at the time of ROW renewal or amendment. This would be in addition to requirements under Alternative A.

Under Alternative B, requiring surveys for special status plant and animal species could identify resources that would, through subsequent project-level NEPA analysis, force the relocation or mitigation of a project in areas not identified as ROW avoidance or exclusion areas. This would be an additional requirement to those required under Alternative A.

Alternative B would affect the lands and realty program by managing NRHP-eligible and NRHP-listed historic properties, and cultural sites allocated to conservation for future use, traditional use, and public use, as ROW exclusion. Prohibiting ROW development could reduce overall applications and requests in restricted areas or shift future ROWs to adjacent areas, effects that would not occur under Alternative A.

Visual resources management under Alternative B would have a greater potential to affect lands and realty compared with Alternative A by managing 53 percent (346,400 acres) of the decision area as VRM Class I or Class II. Alternative B would provide VRM Class III and Class IV objectives for the remaining 47 percent (304,800 acres) of the decision area. Effects on lands and realty in these areas would be the same as described in **Appendix W** and Alternative A.

Alternative B would decrease ROW demand from mineral development more than Alternative A by placing the most restrictions on all types of mineral development. Compared with Alternative A, Alternative B would close almost 3 times more acres to fluid mineral leasing, close 40 percent more acres to nonenergy solid mineral leasing, and place NSO stipulations on fluid mineral development on 12 times more acres. However, Alternative A would remain more restrictive, due to the current deferral of leases that would require a special wildlife stipulation, and would therefore reduce the need for ROWs for fluid mineral development more than any other alternative. In addition, the total forecasted oil and gas development in the decision area would further reduce the need for support infrastructure (see **Table W-1, Appendix W**).

Under Alternative B, approximately 95.5 percent (621,200 acres) of the decision area would be available for livestock grazing, a 2 percent decrease from Alternative A. Compared with Alternative A, this management would neither reduce the need for range infrastructure-related ROWs, nor the need to evaluate lands and realty actions to minimize conflicts with livestock grazing management.

Alternative B would not manage any SRMAs and would manage over 200 times more areas than Alternative A as ERMAs. Types of effects are described in **Appendix W**.

In all areas outside the Arrow Creek BCA/ERMA, Cemetery Road BCA/ERMA, Crooked Creek BCA/ERMA, and Judith Mountains BCA/ERMA, effects from recreation and visitor services management on lands and realty would be the same as Alternative A. Within these ERMAs, new ROW authorizations would be excluded and therefore preclude placement of new ROWs in these areas.

Alternative B would limit OHV travel to designated routes throughout 64 percent (413,500 acres) of the decision area. Limiting OHV travel to designated routes would maintain access opportunities for future ROWs and leases and, therefore, would have little to no effect on lands and realty, compared with Alternative A.

Requirements to co-locate new facilities or ROWs or to upgrade existing facilities in previously disturbed areas and existing ROWs would limit opportunities for placement of new facilities. However, collocation could streamline permitting of new facilities in existing sites.

Closing the decision area to cabin site leases would have the same effects as under Alternative A.

Alternative B would designate 40 percent (9,100 acres) more ACECs than Alternative A. ACEC management under Alternative B would have the greatest effects on the lands and realty program by prohibiting or restricting new ROWs in ACEC boundaries. ACEC management would directly affect new ROW development potential by excluding new ROWs in all ACECs except the 4,900-acre Sun River ACEC, where ROWs would be avoided. Direct effects from restrictions on new land use authorizations under Alternative B would be consistent with those discussed in **Appendix W**.

Alternative B could also indirectly affect non-ACEC lands by redirecting the demand for future development to those adjacent areas. In addition, Alternative B would affect new ROW development potential by prohibiting ROWs for the pumping and conveyance of surface or groundwater from BLM-administered lands in the Collar Gulch and Chicago Gulch watersheds.

Alternative B would result in more NST- and NHT-related restrictions on new land use authorizations than Alternative A by designating NSTs and NHTs as ROW avoidance areas.

Like Alternative A, Alternative B would determine the same 89.9 miles along 27 stream segments as suitable for inclusion in the NWSRS. The same protective management under Alternative A would apply to Alternative B. In addition, Alternative B would apply greater restrictions on lands and realty by managing wild segments (10.8 miles) as ROW exclusion and all but two scenic and recreational segments as ROW avoidance. Effects from limiting and excluding ROW development are described in **Appendix W**.

Alternative C

Land Tenure

Areas identified for disposal would be the less than those identified in any other alternative. Zero acres would be identified for disposal, 595,500 acres would Retention-Limited Disposal, and 55,800 would be identified as Retention. Effects are described in **Appendix W**. Alternative C would dispose of isolated forested lands. Effects would be the same as those described in **Appendix W** for land tenure adjustments.

Land Use Authorizations

Alternative C would eliminate future land use authorizations on the same percentage of the decision area as Alternative A by managing those lands as ROW exclusion areas. Compared with Alternative A, Alternative C would limit, through avoidance, the location, extent, and types of new ROW development on an additional 19 percent of decision area lands (54 percent, or 345,500 acres, of the decision area). The remaining decision area lands (47 percent, or 302,900 acres) would continue to be open to land use authorizations, a 17 percent increase from Alternative A with effects as are described in **Appendix W**.

Applications and requests for new ROWs to support wind energy development would be similar to Alternative A. However, Alternative C would exclude wind energy ROW development on 41 percent of the decision area, including 46 percent of areas classified as having developable wind resources; 2 percent (1,000 acres) of developable wind resource areas would be designated as ROW avoidance. Alternative C would also designate more acres (102,300) than Alternative A as potential wind energy development areas. Applications and requests for new supporting ROWs would be highest in these areas.

Requiring current ROW holders to correct and modify existing power lines identified as having problems with wildlife collision or electrocution, or that do not meet Avian Power Line Interaction Committee standards, would have the same effects as those described under Alternative B.

Visual resources management under Alternative C would have the least potential of any alternative to affect lands and realty by managing 2 percent (16,800 acres) of the decision area as VRM Class I or Class II. Alternative C would provide VRM Class III and Class IV objectives for the remaining 98 percent (634,400 acres) of the decision area. Effects on lands and realty in these areas would be the same as those described in **Appendix W** and Alternative A.

Effects of mineral development under Alternative C would be similar to Alternative A, except that the additional fluid minerals NSO stipulations under Alternative C would reduce the need for new ROWs in those areas. In addition, the forecasted total oil and gas development in the decision area would further reduce applications and requests for support infrastructure (see **Table W-1, Appendix W**).

Alternative C would manage 23 percent fewer acres than Alternative A as SRMAs and over 200 times more acres as ERMAs with the types of effects as described in **Appendix W**. The Arrow Creek BCA/ERMA, Cemetery Road BCA/ERMA, and Crooked Creek BCA/ERMA would be managed as ROW avoidance and would limit the location, extent, and types of new ROW development.

Effects of livestock grazing management under Alternative C would be the same as Alternative A. Areas limited to designated routes for OHV travel and areas closed to OHV travel would be the same under Alternative C as under Alternative A; effects would be the same. As under Alternative A, encouraging co-location of new facilities in previously disturbed areas or adjacent to similar ROWs could streamline permitting of new facilities in existing sites. No areas would be designated as ACECs; therefore, there would be no limitations on the lands and realty program. Because no river segments would be suitable for inclusion in the NWSRS under Alternative C, there would be no effects on lands and realty.

Alternative D

Land Tenure

Areas identified for retention, retention-limited disposal, and disposal would be the same as those under Alternative B. Effects are described under Alternative B. Disposal would occur through sales, exchanges, or both; effects are described in **Appendix W**.

Land Use Authorizations

Alternative D would eliminate future land use authorizations on 0.5 percent more decision area lands than Alternative A by managing those lands as ROW exclusion areas. Compared with Alternative A, Alternative D would limit, through avoidance, the location, extent, and types of new ROW development on an additional 11 percent of decision area lands (69 percent, or 446,600 acres, of the decision area). Effects from ROW avoidance would be similar to Alternative B but would occur over fewer acres. The remaining decision area lands (29 percent, or 186,600 acres), would continue to be open to land use authorizations, an 11 percent reduction from Alternative A. Effects are described in **Appendix W**.

Applications and requests for new ROWs resulting from wind energy development under Alternative D would be less than Alternatives A. Alternative D would exclude 59 percent (387,200 acres) of the decision area, including 58 percent (29,300 acres) of areas classified as having developable wind resources. Effects from ROW avoidance would be similar to Alternative B. Alternative D would identify 102,300 acres of potential wind development areas, in which the BLM would facilitate the processing of future wind energy applications.

Requiring current ROW holders to correct and modify existing power lines identified as having problems with wildlife collision or electrocution, or that do not meet Avian Power Line Interaction Committee standards, would have the same effects as those described under Alternative B.

Alternative D would affect the lands and realty program by managing NRHP-listed historic properties as ROW exclusion, NRHP-eligible historic properties as ROW avoidance, and cultural sites allocated to conservation for future use, traditional use, and public use as ROW avoidance. Prohibiting or limiting ROW development could reduce overall development in restricted areas or shift future ROWs to adjacent areas. Effects would be the same as those described under Alternative B but would occur over a smaller area.

Effects from visual resources management under Alternative D would be similar to Alternative A, with 22 percent (141,200 acres, 4 percent more than under Alternative A) of the decision area managed as VRM Class I or Class II, but would result in a slightly increased potential for new ROWs by managing 510,000 acres as VRM Class III and Class IV (7 percent more acres than under Alternative A).

Effects from mineral management on lands and realty under Alternative D would be similar to Alternative A. Additional acres closed to nonenergy solid mineral leasing (25 percent more acres than Alternative A), 6 percent more acres closed to fluid mineral leasing, and 8 times more acres with NSO stipulations for fluid minerals would reduce the need for new ROWs in those areas. In addition, the total forecasted oil and gas development in the decision area would further reduce the need for support infrastructure (see **Table W-1, Appendix W**).

Effects of livestock grazing management under Alternative D would be similar to Alternatives B and C. Effects of recreation management under Alternative D would be the same as Alternative B. Travel management under Alternative D would have the same effects on lands and realty as Alternatives A and C. Encouraging co-location of new facilities in previously disturbed areas or adjacent similar ROWs would have the same effects as those described under Alternative C. Closing the decision area to cabin site leases would have the same effects as under Alternative A.

Alternative D would designate 14 percent (3,100 acres) more ACECs than Alternative A. Management of these ACECs would result in more limitations on ROW development than Alternative A. Effects of ROW avoidance and exclusion in the Blind Horse, Chute Mountain, Deep Creek/Battle Creek, and Ear Mountain ACECs/ONAs (13,000 acres) would be the same as under Alternative A. The Acid Shale-Pine Forest ACEC/RNA and Sun River ACEC would manage 7,600 acres as ROW avoidance areas. Effects from avoiding new land use authorizations under Alternative D would be consistent with those discussed in **Appendix W**. Effects of prohibiting ROWs for withdrawal of surface or groundwater from BLM-administered lands in the Collar Gulch and Chicago Gulch watersheds would be the same as those described under Alternative B.

Because no river segments would be suitable for inclusion in the NWSRS under Alternative D, there would be no effects on lands and realty.

Cumulative

Cumulative effects on lands and realty are the result of past, present, and reasonably foreseeable future actions in, and next to, the planning area that increase or decrease demand for land tenure actions and land use authorizations. Past, present, and reasonably foreseeable future actions and conditions that have affected, and would likely continue to affect, lands and realty are minerals and energy development, recreation and visitor use, travel management, lands and realty, and associated roadway development.

Activity involving land tenure adjustments has traditionally been low in the decision area, and demand for land use authorizations has been between 15 and 18 ROW actions annually, mainly for roads. Concurrent management of public lands to protect sensitive biological, historical, cultural, and visual resources would continue to limit the locations where new authorizations could be approved and where lands would be retained or disposed. Interest in utility, wind energy, and mineral development in the planning area would continue to place demands on the BLM lands and realty program through ROW applications for transmission lines, roads, and pipelines.

Travel management actions that would close areas to motorized travel could affect ROW development where closures would restrict access to a potential ROW location. In areas available for OHV travel and livestock grazing, there would continue to be the potential for conflicts with existing and proposed ROWs, communication leases, and other authorized land uses.

The incremental effects from the demands on lands and realty would vary by alternative due to varying levels of management to protect biological, cultural, and visual resources. Alternative A specifies the fewest ROW avoidance or exclusion areas, followed by Alternative D, which would take more blended approaches to resource and resource use management and would have incrementally fewer effects on lands and realty. Under these alternatives, lands and realty actions would be expected to increase. Alternative B is the most restrictive and

would have the greatest potential to incrementally decrease lands and realty actions and associated applications and requests for those uses over time; Alternative C is the second-most restrictive.

4.3.6 Renewable Energy

Effects Common to All Alternatives

Wind and Biomass

Under all alternatives, renewable energy development would be considered and allowed in appropriate locations. These external market demands for renewable energy would have the greatest effect on wind energy development because wind resources in the planning area are of a high enough quality to support utility-scale wind energy development. Accordingly, depending on capacity to transmit energy to centers with demand, under all alternatives, the BLM would process an increasing number of ROW applications in high wind potential areas (i.e., areas with a wind power classification of excellent [500 W/m²] or higher) that are not affected by ROW exclusion area management.

The management of ACECs under all alternatives would protect relevant and important resource values. ACEC management priorities would directly and indirectly affect the BLM's ability to approve new ROWs where such development would affect the relevant and important values for which the ACEC was designated. Management of the 1,900-acre Square Butte ACEC/ONA would directly affect new wind or biomass energy development potential by excluding such development under all alternatives.

Excluding wind energy ROW development in PHMA and avoiding wind energy ROW development in GHMA would reduce or eliminate the likelihood for new wind energy projects in those areas.

Under all alternatives, the BLM would seek to resolve conflicts with cultural resources from human-caused deterioration. Should a conflict involve a proposed wind or biomass energy project, resolution of the conflict could result in the BLM denying the project or requesting the application to be amended to avoid the conflict. Mitigation measures and BMPs (**Appendix F**) that could be included as part of a site-specific NEPA analysis for a wind or biomass energy project could include the relocation of, or decrease in, total number of turbines or biomass facility components (such as storage areas, heat exchangers, or boilers) to avoid cultural resources effects. These mitigation measures and BMPs could affect project costs and overall feasibility.

Solar and Hydropower

Due to the limited solar energy resources available on BLM-administered lands in the planning area, utility-scale solar energy development in the decision area is unlikely. Similarly, there are few hydropower resources under BLM administration and no opportunities for utility-scale hydropower development. Small, site-specific solar and hydropower energy generation could occur in connection with other activities. For example, livestock grazing operations could use small hydropower devices in association with other range management facilities. Similarly, mineral operations could install photovoltaic solar panels to provide site-specific energy for mining facilities. However, neither of these examples would constitute a utility-scale energy development. Accordingly, solar and hydropower are not analyzed in detail below because proposed management under the range of alternatives would not increase or decrease opportunities for new utility-scale solar or hydropower development.

Alternative A

Wind

Under Alternative A, the BLM would continue to manage 236,300 acres (36 percent) of the decision area associated with PHMA, NSTs, and NHTs as ROW exclusion areas for wind energy, which would preclude wind energy ROW development in those areas. Wind energy development would be avoided on another 117,500 acres (18 percent) of the decision areas associated with the Acid Shale-Pine Forest ACEC, GHMA, and BLM-administered land in the Judith River Canyon, South Moccasin Mountains, and Judith Mountains.

The BLM would evaluate renewable energy ROW applications received in these areas for potential effects on greater sage-grouse habitat, the relevant and important values of the Acid Shale-Pine Forest ACEC, and the scenic, recreational, and biological characteristics in the remainder of the avoidance area. In avoidance areas, the BLM could apply siting restrictions or design requirements to ROW projects, or both, which could limit the number of turbines and generating capacity of any future development.

BLM management of ROW exclusion and avoidance areas would have the greatest effect in areas of “good” or “better” wind resources (i.e., wind speeds of 7 meters per second or higher at 120-meter heights). This is because the energy development potential is greatest in these areas.

For areas with wind speeds of 7 meters per second or higher at 120-meter heights under Alternative A, 54 percent would be within ROW avoidance or exclusion areas: 236,400 acres would be within exclusion areas and 117,500 acres would be within avoidance areas. The remaining 46 percent (280,200 acres) would be open to wind energy ROWs. Accordingly, nearly 100 percent of areas managed as ROW exclusion for wind energy would have developable wind resources at 120-meter tower heights, while 78 percent of avoidance areas would have developable wind resource potential at a 120-meter height.

Alternative A would continue to manage 18 percent (120,700 acres) of the decision area as VRM Class I or Class II. New wind energy ROW development would conflict with VRM objectives in these areas and would likely be approved only if they were relocated or designed to minimize effects on desired visual resource conditions. Alternative A would provide VRM Class III and Class IV objectives for 73 percent (473,800 acres) and no VRM class for the remainder of the decision area (56,700 acres). VRM objectives would support new wind energy ROW development in these areas, particularly in VRM Class IV and unassigned areas.

Biomass

Under a continuation of current management, the BLM would not explore opportunities to develop energy from woody biomass.

Alternative B

Wind

Compared with Alternative A, new wind energy development would be less likely to occur in the decision area under Alternative B. Proposed management would restrict new wind energy ROW development by managing 477,900 acres (73 percent) of the decision area as ROW exclusion areas. This would be done to protect greater sage-grouse habitat, historic properties and cultural sites, lands with wilderness characteristics, recreation opportunities in ERMAs and SRMAs, ACECs and relevant and important values, WSR ORVs, WSAs, NSTs and NHTs, and crucial seasonal wildlife habitat. BLM management to protect sensitive soils, GHMA, the Sun River ACEC’s relevant and important values, WSR ORVs, and national heritage values in the Rocky Mountain Front Conservation Management Area would result in another 118,600 acres (18 percent) of the decision area managed as ROW avoidance areas. The BLM would identify potential wind development areas in 46,900 of the remaining 54,700 acres (9 percent) of the decision area available for wind ROW development. This would further limit the potential for any future wind energy development.

Compared with Alternative A, Alternative B would limit the potential for expanded wind energy development using taller tower technology. This is because a larger portion of the decision area with 120-meter wind resources would be managed as ROW avoidance or exclusion areas. For areas with wind speeds of 7 meters per second or higher at 120-meter heights under Alternative B, 92 percent (558,800) would be within ROW avoidance or exclusion areas; 83 percent (463,200 acres) would be in exclusion areas. Only 8 percent (46,900 acres) of areas with wind speeds of 7 meters per second or greater at 120 meters would be open to wind energy ROWs. Approximately 97 percent of areas managed as ROW exclusion for wind energy would have developable wind resources at 120-meter tower heights, while 81 percent of avoidance areas would have developable wind resource potential at a 120-meter height.

Visual resources management under Alternative B would have a greater potential to affect new wind energy ROW proposals, compared with Alternative A, by managing 53 percent (346,300 acres) of the decision area as VRM Class I or Class II. Alternative B would provide VRM Class III and Class IV objectives for the remaining 47 percent (304,800 acres) of the decision area. Effects on wind energy development in these areas would be the same as described in **Appendix W** and Alternative A.

Biomass

Compared with a continuation of current management, which would not support new biomass energy production, BLM management of forestry and woodland products under Alternative B would identify biomass energy

production as an outcome of timber harvesting. The BLM would review biomass energy production requests on a case-by-case basis. Any approved facility would likely provide site-specific energy and would not require supporting infrastructure, such as transmission lines. The closure of approximately one-third of the decision area to timber harvesting would limit the total amount of woody biomass available for energy production. Although there would be more potential for utility-scale biomass energy production under Alternative B compared with current management, the limited amount of woody biomass likely to be available combined with avoidance and exclusion area management for ROWs that would support biomass energy production would preclude long-term biomass energy production in the decision area.

Alternative C

Wind

Compared with current management, there would be fewer opportunities for new wind energy development under Alternative C. Management under Alternative C to protect resource values and prevent surface disturbance in greater sage-grouse habitat, the Square Butte WSA, along NSTs and NHTs, and in the Rocky Mountain Front Conservation Management Area would result in 263,300 acres (41 percent) of the decision area being managed as ROW exclusion areas. There would be no opportunity for new wind energy development in these areas. Protection of GHMA, recreation opportunities in ERMA, and crucial seasonal habitat for ungulates would result in another 269,200 acres (41 percent) being managed as ROW avoidance areas. Effects on wind energy development in avoidance areas would be consistent with those described in **Appendix W**.

Indirect effects from managing 41 percent of the decision area as ROW exclusion would include fewer opportunities to develop new transmission lines for new wind energy generation. In ROW avoidance areas, added costs to comply with design or siting criteria for wind-related power lines could make new wind energy development economically impractical for developers.

Alternative C would also reduce the potential for expanded wind energy development using taller tower technology, compared with Alternative A. This is because a larger portion of the decision area with 120-meter wind resources would be managed as ROW avoidance or exclusion areas. For areas with wind speeds of 7 meters per second or higher at 120-meter heights under Alternative C, 77 percent (500,500 acres) would be within ROW avoidance or exclusion areas. The remaining 16 percent (102,300 acres) of areas with wind speeds of 7 meters per second or greater at 120 meters would be open to wind energy ROWs. Within ROW exclusion areas, 99 percent (263,300 acres) would have developable wind resources at 120-meter tower heights, while 89 percent (240,100 acres) of avoidance areas would have developable wind resources at a 120-meter height.

Compared with Alternative A, however, Alternative C would increase BLM management focus and support for wind energy development by identifying 102,300 acres as potential wind development areas. These areas would indicate to energy developers the BLM's intention to support wind energy development. This would increase the likelihood for new ROW applications for new and expanded wind energy development in those areas.

Visual resources management under Alternative C would have less potential than Alternative A to affect wind energy development by managing 2 percent (16,800 acres) of the decision area as VRM Class I or Class II. Alternative C would provide VRM Class III and Class IV objectives for the remaining 98 percent (634,400 acres) of the decision area. Effects on wind energy development in these areas would be the same as those described in **Appendix W** and Alternative A.

Biomass

Effects on biomass under Alternative C would be the same as Alternative B.

Alternative D

Wind

Expanded protections for wildlife, cultural, paleontological, recreation, and special designation resources and uses would lead to fewer opportunities for new wind energy ROWs under Alternative D, compared with Alternative A. Managing 387,200 acres (59 percent) of the decision area as ROW exclusion areas to protect PHMA, historic properties, lands with wilderness characteristics, ACECs, the Square Butte WSA, NSTs and NHTs, SRMAs, and

the Rocky Mountain Front Conservation Management Area would eliminate the potential for new wind energy development in those areas.

BLM management to limit surface disturbance and protect resource values associated with greater sage-grouse GHMA, NRHP-eligible properties, the Acid Shale-Pine Forest and Sun River ACECs, Blacktail paleontological area, and crucial seasonal range for ungulates would result in another 110,900 acres (17 percent) being managed as ROW avoidance areas. ROW avoidance management would affect wind energy development by directly limiting the number of new wind turbines or by placing siting or design conditions on the project that could reduce the scale of the project or result in the project being economically impractical to develop. The remaining 24 percent of the decision area (153,100 acres) would be open to wind energy development. The BLM would identify 137,200 acres in these areas as potential wind development areas to facilitate the processing of future wind energy applications.

ROW limitations would indirectly affect short- and long-term wind energy development potential by limiting opportunities for new wind-related power line development. Effects on wind energy would be greatest in, and directly adjacent to, ROW exclusion areas because these areas would not support any new wind turbine or associated transmission infrastructure. New development could occur in avoidance areas, but added costs to comply with avoidance criteria could make the development impractical.

Effects from visual resources management under Alternative D would be similar to Alternative A, with 22 percent (141,200 acres, 4 percent more than under Alternative A) of the decision area managed as VRM Class I or Class II; however, this would result in a slightly increased potential for new wind energy ROWs by managing 510,000 acres as VRM Class III and Class IV (7 percent more acres than under Alternative A).

Biomass

Effects would be the same as Alternative B.

Cumulative

Cumulative effects on renewable energy are the result of past, present, and reasonably foreseeable future actions in, and next to, the planning area that increase or decrease demand for renewable energy development.

Due to the low resource potential, there would be no cumulative effects on solar and hydropower under any alternative.

Wind

Past, present, and reasonably foreseeable projects are existing and planned wind energy generation sites on private lands, mainly in Meagher and Judith Basin Counties. There is one project proposed northeast of Lewistown in Fergus County (Renewable Northwest Project 2015). Due to the scattered nature of BLM-administered lands throughout the planning area, particularly in Meagher and Judith Basin Counties where wind energy development potential is high, future wind energy development is expected mostly on private lands.

ROW exclusion and avoidance areas designated under Alternatives B, C, and D would further reduce opportunities for new wind energy development by limiting new wind facilities and the power line infrastructure to support them. However, most of the exclusion areas are in Petroleum County where wind energy development potential is lower. As demand for new renewable energy sources increase, developers may eventually seek opportunities to develop new wind projects on the isolated BLM-administered parcels in Meagher and Judith Basin Counties. Any cumulative effects are therefore only anticipated in the long term if new development opportunities on public lands become equally or more attractive to development compared with those on private lands.

Biomass

There are no biomass energy production facilities in the planning area. Any new biomass energy production would occur on a case-by-case basis and would be a function of available biomass resources, such as timber. Harvest levels over the last 5 years have increased as a result of salvage operations in response to insect and disease outbreaks and other natural disturbances. Vegetation treatments, such as conifer removal to enhance greater sage-grouse habitat, could provide additional biomass material. While these trends would allow for new biomass

power generation opportunities, any new biomass energy production is expected to be site-specific (i.e., for an industrial facility or small urban community). Furthermore, the likelihood for cumulative effects on renewable energy from biomass in the decision area is low, since any new biomass facilities are likely to occur on private lands.

4.3.7 Withdrawals

Effects Common to All Alternatives

The 147,100 acres withdrawn in the planning area would continue to be withdrawn under all alternatives. Effects of these withdrawals would be the same as those described in **Appendix W**.

Cumulative

The existing withdrawals would continue as described under *Effects Common to All Alternatives*. There are no known future withdrawals aside from those in Chapter 2 of this plan. As such, there would be no cumulative effects on withdrawals beyond those described in *Effects Common to All Alternatives*.

4.3.8 Forest, Woodland, and Special Products

Effects Common to All Alternatives

Evaluating surface-disturbing activities and applying BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) would limit, but not prevent, the amount of erosion in montane forests and meadows. Soil erosion, combined with other effects from forest disturbance, could reduce forest sustainability and soil productivity (Elliot et al. 1999). On steep slopes or other areas susceptible to erosion, forest productivity and forest health indicators may be affected by decreased soil water availability, degraded soil structure, or loss of important soil biota.

Nearly all timber harvesting activities occur in the montane forests and meadows priority vegetation type; therefore, this analysis focuses on indicators of effects on this vegetation type. Effects on montane forests and meadows forest health are the same as those described under **Section 4.2.4**.

Under all alternatives, access restrictions would continue to make certain areas difficult to harvest due to the fragmented landownership pattern. WSAs would continue to restrict timber harvesting in approximately 1,700 acres of montane forests and meadows (BLM GIS 2015a).

Alternative A

Montane forests and meadows (and other priority vegetation types) are not defined or delineated under Alternative A. However, effects are described in the context of montane forests and meadows to provide a consistent lens for comparison across all alternatives.

Watershed protection measures would continue to limit clear-cut blocks to less than 10 acres and shaped to resemble natural openings. This management would limit the quantity and extent of available harvest in the short term; however, it would help to maintain adequate amounts of vegetation for future harvesting over the long term by not permitting large-scale clear-cutting.

Priority vegetation types are not specifically identified or managed for under Alternative A. However, general vegetation management would include inventory, monitoring, development of silvicultural prescriptions, and adaptive management strategies, which would emulate natural disturbance regimes in order to achieve long-term DFCs, as described under **Section 4.2.4**. However, as discussed in the AMS (BLM 2018), in montane forests and meadows, overall health is in decline for many conifer stands (i.e., acres with forest or woodland productions are lost due to overstocking, drought, or insect outbreaks), and these trends would continue under Alternative A.

Wildfire management may affect the availability or quality of forest products and general forest health conditions. Wildfires (particularly those occurring in VCC 3, with heavy fuel loads) could burn intensely, resulting in stand removal and loss of merchantable forest products. However, wildfires, under ideal conditions, could also improve stand health by restoring natural fire regimes, resulting in more productive forests. Trends in VCC would likely continue, and areas identified as VCC 2 and VCC 3 would continue to be at risk of losing key ecosystem

components. Loss of key ecosystem components in montane forests and meadows would likely translate to a long-term reduction in acres of forest or woodland products.

Managing 10,400 acres as VRM Class I and 37,100 acres as VRM Class II in the montane forests and meadows vegetation type would limit forest treatment types in these areas and would restrict access (BLM GIS 2015a).

Managing montane forest and meadow vegetation communities as ROW exclusion and ROW avoidance could affect access to commercial forest management areas. Within montane forests and meadows, 10,500 acres are ROW exclusion, and 18,600 acres are ROW avoidance (BLM GIS 2015a). However, because these areas already have restrictions on commercial timber harvesting (ACECs/ONA), or do not contain forest or woodland products (PHMA and GHMA in sagebrush/grasslands), there would be negligible effects on forest, woodlands, and woodland products.

Under Alternative A, allowable cut limits are approximately 650 million board feet (MMBF)/year in the Judith Valley and Phillips Resource Areas and 2.65 MMBF/year in the Headwaters Resource Area. These cut limits should support current levels of demand for forest products; average cut currently is 2 to 3 MMBF/year. Firewood gathering would be permitted throughout the planning area, allowing for public use of this resource. Any limitations on pre-commercial thinning and treatment of encroaching conifers would be imposed on a case-by-case basis; therefore, forest products generated from these activities would be variable.

In montane forests and meadows, 15,100 acres would be managed as an ACEC (BLM GIS 2015a), which would continue to limit the types of forest management in these areas and would restrict access.

Vegetation treatments would continue to provide feedstock available for use in biomass facilities.

Alternative B

Identifying and managing for sensitive soils in the montane forests and meadows priority vegetation community would reduce the potential for soil erosion and effects on soils and forest productivity. However, managing for sensitive soils also may further restrict access to forest products by limiting surface-disturbing activities (e.g., construction of temporary or permanent roads). Sensitive soils stipulations would result in increased access restrictions compared with Alternative A.

Establishing riparian management zones and limiting commercial timber harvest in these zones would result in a long-term reduction in lands available for harvest, compared with Alternative A, but following the Montana Streamside Management Zone law should reduce effects to soils, water quality, and riparian zones.

Identifying and managing for priority vegetation communities would help to maintain or improve forest ecological conditions. When compared with Alternative A, emphasizing restoring montane forests affected by insect and disease infestations and using silvicultural prescriptions based on the proven silvicultural methods for the forest type would likely increase the acres restored and therefore increase forested acres in DFC. Implementing adaptive management strategies to address specific climate vulnerabilities would allow for more vegetation management flexibility, in order to maintain or enhance forest and woodland ecosystems.

Wildlife management would maintain or improve deciduous woody vegetation. However, wildlife management may also restrict commercial timber harvesting by limiting access in certain areas (e.g., where sensitive species are present) by applying timing restrictions to projects (e.g., migratory bird nesting periods).

The types of effects associated with wildfire management would be similar to those described under Alternative A. However, unlike Alternative A, most acres of the montane forests and meadows vegetation type would be managed under Category C; that is, fire management would dictate fewer constraints on the use of fire (see **Section 4.2.4**). Increased fire under ideal conditions would help to restore historical vegetation structure and age-class conditions over the long term.

Managing 11,100 acres as VRM Class I and 41,600 acres as VRM Class II in the montane forests and meadows vegetation type would limit treatment types and restrict access in these areas. Because there are more acres managed as Class I and Class II compared with Alternative A, these effects would be more widespread than

current management. Areas managed as VRM Class III (19,600 acres) and Class IV (7,200 acres) in montane forests and meadows would have fewer restrictions on access and harvesting.

Managing 9,400 acres for the protection of their wilderness characteristics (in montane forests and meadows) and all suitable VSR segments classified as “wild” would reduce the number of acres available for harvest compared with Alternative A. This effect would be long term and would further restrict access to forest products.

The types of effects from lands and realty would be similar to those discussed under Alternative A. However, more acres of ROW exclusion (30,300 acres) and ROW avoidance (40,600 acres) would be managed in montane forests and meadows. As a result, there would be less access to commercial forest land. There would also be more restrictions on land use authorizations (e.g., transmission lines and renewable energy developments), which might otherwise conflict with forest management activities by removal of timber (i.e., loss of acres containing forest or woodland products).

Under Alternative B, probable sale quality would be reduced to 2.7 MMBF/year, with potential for reduction in total commercial harvest. Current harvest levels are around 2 to 3 MMBF/year. Assuming demand remains consistent, probable sale quantities would still support demand for forest products. Flexibility in probable sale quantities could increase or reduce the allowable harvest based on resource needs; effects would depend on level of adjustments made. Additional limitations on road construction for commercial forestry work would be in place compared with Alternative A, potentially limiting access or increasing costs for harvest. Limits on collecting standing dead trees or downed wood for firewood could limit the public’s ability to use this resource near roads, therefore reducing the removal of fuels and a tool to strengthen these roads as fire control features. Allowing no pre-commercial thinning would inhibit growth, lead to unhealthy future forest conditions, and thus reduce future stand volumes. Relying on natural disturbance for treating encroaching conifers would limit the forest product that would be sold from these activities.

Managing 9,100 additional acres under Alternative B as ACECs would further restrict access for commercial forestry operations.

Silvicultural treatments would primarily rely on prescribed fire to restore forest health conditions. As such, there would be fewer opportunities to utilize biomass feedstock for energy generation compared with Alternative A. However, the BLM would explore opportunities to provide a reliable and sustainable supply of woody biomass, which could help to meet future demands.

Alternative C

The effects of managing soils on woodlands and forest plant communities would be similar to those described under Alternative A. Using ES&R and BMPs would minimize any potential effects of erosion on forest productivity.

Identifying and managing for priority vegetation communities would help to maintain or improve forest ecological conditions. Using commercial and pre-commercial thinning would reduce stand density and improve forest productivity and resiliency to disturbance. The effects from adaptive management for climate would be the same as those under Alternative B, providing more management flexibility to maintain or enhance forest and woodland ecosystems.

The effects of fish and wildlife management would be the same as described under Alternative B.

The types of effects associated with wildfire management would be similar to those described under Alternative A. However, all montane forests and meadows would be managed as Category B. Emphasis on unwanted fire suppression would limit the number of forest acres that could be lost or damaged by intense wildfire.

Within montane forests and meadows, 1,700 acres would be managed as VRM Class I (an 88 percent decrease compared with Alternative A), and 9,200 acres would be managed as VRM Class II (a 75 percent decrease compared with Alternative A; BLM GIS 2015a). Remaining areas would be managed as VRM Class III and Class IV. As such, there would be fewer restrictions on accessing and harvesting forest resources compared with current management.

The types of effects from lands and realty would be similar to those discussed under Alternative A. However, fewer acres of ROW avoidance (300 acres, a 98 percent reduction compared with Alternative A) would be managed in montane forests and meadows. Most lands would be managed as open to ROWs, which would allow for increased accessibility to forest products and increased likelihood of loss or removal of commercial forest lands due to ROW clearing and construction.

Under Alternative C, probable sale quantity would be 4.9 MMBF/year, supporting current level of demand and allowing for increased production. Harvest levels may vary, depending on forest health conditions and the objectives of restoration projects.

No areas would be designated as ACECs; therefore, there would be no special management for the protection of the relevant and important values of the potential ACECs that would restrict commercial forest management operations. Using commercial and pre-commercial thinning would yield woody materials for biomass use. As with Alternative B, the BLM would explore opportunities to provide a reliable and sustainable supply of woody biomass, which could help to meet future demands.

Alternative D

The effects of managing soils, vegetation, and fish and wildlife on woodlands and forest plant communities would be the same as described under Alternative C. The effects from adaptive management for climate variability would be the same as those under Alternative B, providing more management flexibility to maintain or enhance forest and woodland ecosystems.

The effects of wildfire management would be similar to those described under Alternative B. There would be no change in acres of BLM-administered lands managed as Categories B and D in the montane forests and meadows vegetation type. In general, there would be an increase in acres managed as Category C for other priority vegetation types, including those adjacent to montane forest communities; however, this would have a negligible effect on forest products.

Within montane forests and meadows, 10,600 acres would be managed as VRM Class I (a 1 percent increase compared with Alternative A), and 3,300 acres would be managed as VRM Class II (a 90 percent reduction compared with Alternative A; BLM GIS 2015a). There would generally be fewer restrictions on accessing and harvesting forest resources in the montane forests from VRM; however, fragmented landownership patterns would continue to make certain areas difficult or infeasible to harvest.

Managing lands for the protection of wilderness characteristics could further restrict access to forest products. However, there would be no lands with wilderness characteristics in the montane forests and meadows vegetation type. As such, effects on woodlands and forest products would be negligible.

The effects of lands and realty would be the same as those described under Alternative C.

Under Alternative D, probable sale quantity would be 4.1 MMBF/year, supporting current level of demand and allowing for increased production. Flexibility in probable sale quantities could increase or reduce the allowable harvest based on resource needs; effects would depend on level of adjustments made. Specific standards would be imposed on road construction, potentially increasing costs for access compared with Alternative A. Allowing both temporary and permanent road construction for commercial harvest activities would limit effects on the ability to access products. Collecting standing dead trees and downed wood for firewood would be permitted, allowing continued public use of this resource. Allowing pre-commercial thinning and vegetation treatments to remove encroaching conifers could produce forest products available for sale from these activities.

Managing 3,100 additional acres as ACECs would further restrict access for commercial forestry operations. Allowing some exceptions for limited activities for stand preservation in ACECs could reduce effects.

The effects on biomass would be the same as those discussed under Alternative C.

Cumulative

The fragmented landownership pattern in the planning area, in combination with topography, slope, vegetation quantity and type, and distance to forest product manufacturing infrastructure, would continue to make certain areas economically infeasible to harvest on BLM-administered lands under all alternatives. Resource use restrictions would further restrict access, specifically under Alternative B. Overall, the cumulative effects on access would be similar for Alternatives A, C, and D. Timber harvest activities are likely to continue on adjacent private, state, and National Forest System lands.

Forest health monitoring, silviculture prescriptions, treatments, and land health assessments would minimize the future effects of insect infestations under all alternatives. However, the BLM does not manage most surface lands in the planning area, and widespread infestations and die-offs would continue to affect overall forest health under all alternatives. Areas affected by insect infestation may provide a short-term increase in salvage timber yield, although there would be a long-term loss of forest products.

Vegetation treatments are likely to occur on adjacent lands not managed by the BLM (e.g., National Forest System lands). Vegetation treatment byproducts could support biomass production, depending on the distance to biomass facilities and market demand.

4.4 SPECIAL DESIGNATIONS

4.4.1 Areas of Critical Environmental Concern and Outstanding Natural Areas

Acid Shale-Pine Forest ACEC/RNA

The Acid Shale-Pine Forest ACEC/RNA is a designated 2,700-acre ACEC/RNA, with identified relevant and important plants and soil resource values. Surface-disturbing activities (e.g., route proliferation, constructing structural range improvements, and access ROWs) have the potential to affect the soils such that the endemic plant community would be altered.

Effects Common to All Alternatives

The application of BMPs and mitigation measures (**Appendix F**) for surface-disturbing activities would likely reduce effects on ACECs associated with authorized land uses or activities such as road, pipeline, or power line construction; mineral development; range improvements; and recreational activities. BMPs and mitigation would improve habitat and could protect, and prevent irreparable damage to, relevant ACEC values.

Requiring a reclamation plan (**Appendix G**) for all surface-disturbing activities across all alternatives would stabilize disturbed areas in the short term and stabilize landscapes in the long term, and could protect, and prevent irreparable damage to, relevant ACEC values.

Alternative A

The Acid Shale-Pine Forest is designated as an ACEC/RNA (2,700 acres) under Alternative A. The area is managed to allow research at the War Horse unit (900 acres) and to maintain Briggs Coulee as a control site (1,800 acres). The ACEC is managed to protect an endemic plant community unique to the area and a fragile watershed. Research is allowed to determine the effects of grazing and fire on this type of plant community. Relevance and importance criteria would be primary management; research would be secondary. Research would be conducted to determine the effects of grazing, fire, and other effects on this type of plant community.

Disposal of forest products is prohibited unless necessary for stand preservation. Prohibiting forest product disposal would minimize soil disturbances in the Solberg soils.

All OHV travel is limited to designated routes year-round. This would reduce ongoing soil disturbance effects and the spread of invasive species from OHV use off of designated routes. However, the threat of illegal route proliferation is present and would remain so as long as OHVs are allowed to access the area.

Being open to mineral entry would not ensure the biological and soil resources are adequately safeguarded from the surface disturbances associated with this type of activity.

The entire ACEC is managed as a ROW avoidance area. ROW development could occur in the area under certain conditions; however, development activities and placement of facilities would take into account the biological and soil resources at the project level to minimize effects.

The area is a Fire Management Category B, which does not allow wildfire for resource benefit. The area would be managed for intensive wildfire suppression. This would prevent wildfire from being used as a tool for forest thinning but would help protect the unique Solberg soils.

Alternative B

The potential Acid Shale-Pine Forest ACEC (2,700 acres) would be designated under Alternative B. The area would be managed to allow research to be conducted to determine the effects of grazing, fire, and other effects on this type of plant community and unique soil type (Solberg). The ACEC is managed to protect an endemic plant community unique to the area and a fragile watershed. Research is allowed to determine the effects of grazing and fire on this type of plant community. Relevance and importance criteria would be primary management; research would be secondary.

Disposal of forest products would be prohibited unless necessary for stand preservation. Effects would be the same as Alternative A.

All OHV travel would be limited to designated routes at all times. Effects would be the same as Alternative A.

The entire ACEC would be recommended for withdrawal from locatable mineral entry and closed to mineral material disposal, nonenergy solid mineral leasing, and fluid mineral leasing, which would ensure the biological and soil resources are adequately safeguarded from surface disturbances associated with these activities.

The ACEC would also be managed as a ROW exclusion area. This restriction would preclude effects on the relevant and important values but may also reduce opportunities for scientific discovery by limiting development of research facilities.

The area is a Fire Management Category B, which does not allow wildfire for resource benefit. Effects would be the same as under Alternative A.

Alternative C

The potential Acid Shale-Pine Forest ACEC would not be designated under Alternative C. Timber harvest would be allowed. This type of activity can disturb the soils and damage or destroy the plants.

All OHV travel would be limited to designated routes at all times. Effects would be the same as Alternative A.

The potential ACEC would be closed to mineral materials disposal and nonenergy solid minerals leasing. This restriction would preclude effects on the relevant and important values. While the area would be open to fluid minerals leasing, it would be subject to NSO stipulations; effects would effectively be the same as under Alternative B.

The potential ACEC would be managed as a ROW avoidance area. Surface disturbance associated with ROW location could damage or destroy the plants and also cause soil erosion, disrupting the rare soil resources. Because the area would not be designated as an ACEC, consideration of the relevant and important values would not be needed.

The area is a Fire Management Category B, which does not allow wildfire for resource benefit. Effects would be the same as under Alternative A.

Alternative D

The potential Acid Shale-Pine Forest ACEC (2,700 acres) would be designated under Alternative D. The area would be managed to allow research to be conducted to determine the effects of grazing, fire, and other effects on this type of plant community and unique soil type (Solberg). The ACEC is managed to protect an endemic plant community unique to the area and a fragile watershed. Research is allowed to determine the effects of

grazing and fire on this type of plant community. Relevance and importance criteria would be primary management; research would be secondary.

Disposal of forest products would be prohibited unless necessary for stand preservation. Effects would be the same as Alternative A.

All OHV travel would be limited to designated routes at all times. Effects would be similar as under Alternative A; however, additional measures to address route proliferation and braided routes would reduce the likelihood of soil disturbance and invasive species.

The area would be closed to fluid mineral leasing, which would ensure the biological and soil resources are adequately safeguarded from the surface disturbances of this activity.

The entire ACEC would be managed as a ROW avoidance area. Effects would be the same as Alternative A.

The area is a Fire Management Category B, which does not allow wildfire for resource benefit. Effects would be the same as under Alternative A.

Blacktail Creek ACEC

The potential Blacktail Creek ACEC (1,200 acres) has relevant and important paleontological values. Major threats are rock collecting, quarrying, and surface occupancy.

Surface disturbance and excavations could affect fossils that could occur on or underneath the surface. Types of effects are permanent loss of the paleontological resource and the scientific data it could provide through damage or destruction caused by surface-disturbing activities. Without removing some rock surrounding fossils, they would remain largely undetected; therefore, management actions that result in erosion do not necessarily result in damage to paleontological resources. Excessive erosion, especially from other surface disturbance on exposed localities, could damage fossils at the surface.

Effects can typically be mitigated to below a level of significance by implementing paleontological mitigation identified in the BMPs or fluid minerals stipulations (**Appendix L**), such as construction monitoring, excavating materials, or avoiding surface exposures. Pedestrian surveys would typically be necessary before any surface-disturbing activities were authorized in those units with a high potential for yielding fossil vertebrates (e.g., the Morrison formation); on-site monitoring could be required during construction. If data recovery were the prescribed mitigation, this could also result in fossils being salvaged that may never have been unearthed as the result of natural processes. These newly exposed fossils would become available for scientific research, education, display, and preservation into perpetuity at a public museum. Unmitigated surface-disturbing activities could dislodge or damage paleontological resources and features that were not visible before surface disturbance.

Effects Common to All Alternatives

Under all alternatives, 320 acres (27 percent) of the potential ACEC are withdrawn from settlement, sale, location, or entry under the general land laws, including the US mining laws, but not from leasing under the mineral leasing laws. This withdrawal, which was extended for 20 years in 2008, protects paleontological resources on those acres from potential damage by surface-disturbing activities.

Alternative A

The potential Blacktail Creek ACEC is not designated. The area is open for casual collection of invertebrate fossils. Removal of invertebrate fossils results in potential loss of scientific knowledge when rare or unusual fossils are not preserved.

Outside of the 320 acres that are currently withdrawn, the remainder of the potential ACEC is open to all forms of mineral entry, and the entire potential ACEC is open to mineral leasing and ROW location. Effects of the type previously described could be experienced in this area. It should be noted that the moratorium on fluid minerals leasing for leases that may require stipulations for wildlife has reduced fluid minerals leasing throughout the decision area, so effects from this type of activity are not anticipated.

The area is a Fire Management Category B, which does not allow wildfire for resource benefit. The area would be managed for intensive wildfire suppression, which would help protect paleontological resources from extensive resource damage from managed wildfire.

Alternative B

The potential Blacktail Creek ACEC would be designated. Invertebrate fossils would still be protected because casual collection would not be allowed in this area. This would protect the area from direct loss of the resource and potential scientific knowledge that could be gained.

Outside of the 320 acres that are currently withdrawn, the remainder of the potential ACEC would be recommended for withdrawal from locatable mineral entry. If withdrawn, the same protections would be afforded to the remainder of the ACEC as currently afforded on the 320 acres withdrawn. Until that time, however, the area could experience effects as previously described.

The ACEC would be closed to nonenergy solid mineral leasing, which would preserve the relevant and important values by precluding development that could otherwise contrast with the characteristic landscape and damage paleontological resources. This area would be open to fluid mineral leasing but subject to an NSO stipulation. The stipulation would require that surface occupancy be located outside of the ACEC area, so the rare paleontological resources would be protected from potential new energy development.

The ACEC would also be a ROW exclusion area, so no new ROWs could be developed. This would eliminate the potential for effects from new ROW location. Compared with all alternatives, designating the ACEC under this alternative would provide the most protection to the paleontological resources in the ACEC.

The area is a Fire Management Category C, which allows wildfire for resource benefit. Wildfire and prescribed fire would be allowed. Wildfire, prescribed burning, and fuels management could damage or destroy paleontological resources.

Alternative C

The potential Blacktail Creek ACEC would not be designated; however, the casual collection of invertebrate fossils would not be allowed on the 320-acre withdrawal area, and the effects would be the same as under Alternative B in this area. In the remainder of the potential ACEC, casual collection of invertebrate fossils would be allowed, and effects would be the same as under Alternative A in this area.

Outside of the 320 acres that are currently withdrawn, the remainder of the potential ACEC is open to all forms of mineral entry, and the entire potential ACEC is open to mineral leasing and ROW location. Effects of the type previously described could be experienced in this area. On the 320-acre withdrawal area, fluid minerals leasing would be subject to an NSO stipulation. Effects would be the same as under Alternative B in this area.

The area is a Fire Management Category B. Effects would be the same as under Alternative A.

Alternative D

The potential Blacktail Creek ACEC would not be designated; however, the casual collection of invertebrate fossils would not be allowed on the 320-acre withdrawal area, and effects would be the same as under Alternative B in this area. In the remainder of the potential ACEC, casual collection of invertebrate fossils would be allowed, and effects would be the same as under Alternative A in this area.

Outside of the 320 acres that are currently withdrawn, the remainder of the potential ACEC is open to all forms of mineral entry, and the entire potential ACEC is open to mineral leasing and ROW location. Effects of the type previously described could be experienced in this area. On the 320-acre withdrawal area, fluid minerals leasing would be subject to an NSO stipulation. Effects would be the same as under Alternative B in this area.

The area is a Fire Management Category C. Effects would be the same as under Alternative B.

Blind Horse, Chute Mountain, Deep Creek/Battle Creek, and Ear Mountain ACECs/ONAs

The potential Blind Horse (4,900 acres), Chute Mountain (3,200 acres), Deep Creek/Battle Creek (3,100 acres), and Ear Mountain A and B (1,760 acres) ACECs/ONAs are currently designated as ONAs and contain identified relevant and important scenic values, geologic features, and wildlife habitat.

Effects Common to All Alternatives

The potential ACECs are in the Rocky Mountain Front Conservation Management Area designated under the Rocky Mountain Front Heritage Act. The Rocky Mountain Front Conservation Management Area was designated in 2014 to protect wildlife habitat. It prevents the expansion of motorized use, prohibits new roads, and protects horse, foot, and cycling trails. This would help protect the relevant and important values by maintaining intact landscapes.

The potential ACECs would be closed to OHV travel (or motorized travel under Alternative B, which includes closure to administrative and permitted use), which would ensure the relevant and important values are adequately safeguarded from surface disturbances associated with these activities.

Land acquisition resulting in increased access to these potential ACECs would be on a willing seller basis. No additional public access to Blind Horse potential ACEC, Deep Creek/Battle Creek potential ACEC, or Chute Mountain potential ACEC has been provided. Currently, the only legal access to these potential ACECs is through adjacent National Forest System lands to the west. Legal access issues have not been resolved.

Alternative A

The Blind Horse (4,900 acres), Chute Mountain (3,200 acres), Deep Creek/Battle Creek (3,100 acres), and Ear Mountain A and B (1,760 acres) areas are managed as ONAs, although no formal designation has been made.

The ONAs are managed as VRM Class I, directly protecting the scenic relevant and important value. The objective of VRM Class I is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. Managing to this standard would also prevent large-scale surface-disturbing activities that would affect the relevant and important values. However, it is unlikely that the relevant and important values would be affected in these areas due to the lack of development being permitted in these areas.

While the areas are avoidance areas for utility and transportation corridors, it is unlikely that such development could meet the objectives of VRM Class I and so such development is unlikely.

All ACECs and ONAs would be in the Front FMU and would be managed as a Fire Management Category C, which allows wildfire for resource benefit. Wildfire and prescribed fire would be allowed. Wildfire, prescribed burning, and fuel management is directed to maintain or improve the current scenic values and wildlife habitat in the area.

Alternative B

The potential Blind Horse (4,900 acres), Chute Mountain (3,200 acres), Deep Creek/Battle Creek (3,100 acres), and Ear Mountain (1,800 acres) areas would be designated as ACECs and recommended for designation as ONAs.

The ACECs would be managed as VRM Class I. Effects would be the same as Alternative A. Furthermore, the ACECs would be managed as exclusion areas for all ROWs. While this is more restrictive than Alternative A, effects would be the same because it is unlikely that utility and transportation corridors could be developed in the areas in such a manner as to meet VRM Class I objectives.

All ACECs would be in the Front FMU and would be managed as a Fire Management Category C, which allows wildfire for resource benefit. Wildfire and prescribed fire would be allowed. Wildfire, prescribed burning, and fuel management is directed to maintain or improve the current scenic values and wildlife habitat in the area.

Alternative C

The potential Blind Horse, Chute Mountain, Deep Creek/Battle Creek and Ear Mountain areas would not be designated as ACECs. The area would be open or available to such surface-disturbing activities as commercial

timber harvest, and ROW location. These types of activities can cause soil erosion and impair scenic quality and wildlife habitat in these areas. However, due to the area's rugged topography, the likelihood of such activities occurring is unlikely.

The ACECs would be in Fire Management Category B, which does not allow wildfire for resource benefit. This means that wildfire cannot be used as a tool for forest thinning to improve wildlife habitat.

Alternative D

The potential Blind Horse (4,900 acres), Chute Mountain (3,200 acres), Deep Creek/Battle Creek (3,100 acres), and Ear Mountain (1,800 acres) areas would be designated as ACECs.

The ACECs would be managed as VRM Class I. Effects would be same as Alternative A.

New range improvement projects would be permitted to support land health objectives that would protect or enhance relevant or important values. Maintaining existing range improvement facilities would be allowed in a manner consistent with the long-term preservation of relevant or important values.

The ACECs would be closed to commercial wood product sales or harvest, which would indirectly help protect the relevant and important scenic values.

All ACECs would be managed as exclusion areas for communication site ROWs, and all utility and transportation corridors would be managed as avoidance areas. Effects would be the same as Alternative A.

All ACECs would be in the Front FMU and would be managed as a Fire Management Category C; effects would be the same as under Alternative B.

Collar Gulch ACEC

Collar Gulch is a currently designated 1,500-acre ACEC that contains identified relevant and important biological resources and geologic values. Collar Gulch is a mountain stream habitat that contains a genetically pure strain of westslope cutthroat trout, a BLM sensitive species.

Also included in the existing ACEC is the Tate-Poetter Cave, which possesses significant biologic, geologic, educational and scientific, and recreational cave resources. The cave contains a winter bat hibernaculum for Townsend's big-eared bat, a BLM sensitive species.

The major threat to this ACEC is degradation of water quality due to surface disturbances on the porphyry formations in the Collar and Chicago Gulch watershed.

Effects Common to All Alternatives

Surface-disturbing activities would be managed to minimize effects on the Collar Peak Trail to protect the Tate-Poetter Cave resources.

Alternative A

The potential Collar Gulch ACEC is designated under Alternative A (1,500 acres).

Some nonmotorized recreational use would be authorized, while emphasizing wildlife habitat protection and improvement for the westslope cutthroat trout populations by designing developments and enhancement structures to improve trout habitat.

When flow in the Collar Gulch Creek drops below 3 cubic feet per second in specific areas entering private lands, withdrawal of surface or groundwater would be restricted. This would ensure the relevant and important biological resources would be protected for the westslope cutthroat trout populations.

Concurrent reclamation would be emphasized, which would reduce effects on the relevant and important values by reducing erosion and sedimentation potential.

The area is a Fire Management Category B, which does not allow wildfire for resource benefit. The area would be managed for intensive wildfire suppression, which would prevent wildfire being used as a tool for forest thinning.

Alternative B

The potential Collar Gulch ACEC would be designated, including a 1,200-acre expansion, for a total of 2,700 acres. The expansion would include the Chicago Gulch watershed.

The entire ACEC would be proposed for withdrawal from locatable mineral entry and closed to mineral material disposal, nonenergy solid mineral leasing, and fluid mineral leasing, which would ensure the biological resources and geologic values are adequately safeguarded from surface disturbances associated with these activities.

Out of all the alternatives, Alternative B would provide the most protection to relevant and important values from ROW development by managing the Collar Gulch ACEC as a ROW exclusion area, which would eliminate potential effects from surface development.

The ACEC would be closed to commercial timber harvest, and new roads for forest management activities would not be allowed. This would ensure the relevant and important biological resources would be protected from potential effects caused by these types of surface development.

ROWs for withdrawal of surface or groundwater would not be authorized in the Collar Gulch and Chicago Gulch watersheds. This would ensure the relevant and important biological resources would be protected for the westslope cutthroat trout populations.

The Collar Gulch ACEC would be in the Island Ranges FMU and would be managed as a Fire Management Category C, which allows wildfire for resource benefit. This means that wildfire can be used as a tool for forest thinning to improve wildlife habitat and overall forest health.

Alternative C

The potential Collar Gulch ACEC would not be designated. The area would be open or available to such surface-disturbing activities as commercial timber harvest, energy and mineral development, and ROW location. These types of activities can cause soil erosion and impair water quality and habitat for westslope cutthroat trout in the area.

The area is a Fire Management Category B. Effects would be the same as under Alternative A.

Alternative D

The potential Collar Gulch ACEC would be designated, including a 1,200-acre expansion, for a total of 2,700 acres. The expansion would include the Chicago Gulch watershed.

Some nonmotorized recreational use would be authorized, while emphasizing wildlife habitat protection and improvement for the westslope cutthroat trout populations by designing developments and enhancement structures to improve trout habitat.

The entire ACEC would be proposed for withdrawal from locatable mineral entry and closed to mineral material disposal and nonenergy solid mineral leasing, which would ensure the biological resources and geologic values are adequately safeguarded from surface disturbances associated with these activities.

All developments and projects (including timber harvest) would be designed to protect and enhance aquatic habitat, thereby protecting the relevant and important biological resources in this ACEC.

ROWs for withdrawal of surface or groundwater would not be authorized in the Collar Gulch and Chicago Gulch watersheds. Effects would be the same as Alternative B.

New permanent roads for forest management activities would not be allowed. This would ensure the relevant and important biological resources would be protected from potential effects caused by further surface development.

The Collar Gulch ACEC would be in the Island Ranges FMU and would be managed as a Fire Management Category C; effects would be the same as under Alternative B.

Judith Mountains Scenic ACEC

The Judith Mountains Scenic Area is an existing 3,800-acre ACEC that contains identified relevant and important scenic values. An additional 1,000 acres have been proposed for designation to expand the ACEC to a total of 4,800 acres. The expansion includes the Crystal Cave, which meets the relevance and importance criteria for significant geologic features.

Major threats to this ACEC are ROW development, vegetation treatments, invasive weeds, OHV travel, recreation, and fire suppression activities.

Effects Common to All Alternatives

OHV travel both in the 3,800 acres currently designated as an ACEC and in the 1,000-acre potential expansion would be limited to designated routes year-round. This would reduce ongoing soil disturbance effects and the spread of invasive species from OHV use.

Alternative A

The potential Judith Mountains Scenic ACEC is designated for scenic values (3,800 acres). The ACEC is managed as VRM Class II. The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. The casual observer would be unlikely to notice any changes to the landscape, so the scenic relevant and important value would be maintained.

The entire ACEC is managed as a ROW avoidance area. ROW development could occur in the area under certain conditions; however, development activities and placement of facilities would take into account scenic values at the project level to minimize effects.

Timber harvest is restricted. This helps to ensure the scenic values would be protected from potential effects caused by further surface development and facilities.

The ACEC would be in Fire Management Category B in the Island Ranges FMU, which does not allow wildfire for resource benefit. This means that wildfire cannot be used as a tool for forest thinning to improve wildlife habitat.

Alternative B

The potential Judith Mountains Scenic ACEC would be designated, including the expansion, for a total of 4,800 acres.

The ACEC would be managed as VRM Class II; effects would be the same as under Alternative A. The relevant and important scenic values would be minimally effected in these areas due to the lack of development being permitted in this area. Any effects from surface-disturbing activities would be mitigated.

The ACEC would be closed to large-scale surface-disturbing activities such as ROW location (exclusion area), mineral materials disposal, and fluid and nonenergy solid minerals leasing. This would eliminate the potential for effects on the scenic value from this type of surface disturbance. Furthermore, the potential for weed spread from vehicles and soil disturbance would be eliminated.

The Judith Mountains Scenic ACEC would be in the Island Ranges FMU and would be managed as a Fire Management Category C, which allows wildfire for resource benefit. This means that wildfire can be used as a tool for forest thinning to improve wildlife habitat and overall forest health.

Alternative C

The potential Judith Mountains Scenic ACEC would not be designated. The 4,800-acre area would be managed as VRM Class III. The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate, and activities may attract attention but should not dominate the view of the casual observer. This would allow for forms of development that could effect the scenic value.

The potential ACEC is open to all forms of energy and mineral development and ROW location. Provided these activities could meet VRM Class III objectives, they could be permitted in the area and effect the scenic value. Surface-disturbing activities also increase weed spread as soils are disturbed and seeds deposited.

While surface-disturbing activities are unlikely to directly effect the cave resource, because the BLM would not have to consider the resource when permitting activities, there could be some indirect effects.

The area is a Fire Management Category B. Effects would be the same as under Alternative A.

Alternative D

The potential Judith Mountains Scenic ACEC would not be designated. The 4,800-acre area would be managed as VRM Class III; effects would be the same as under Alternative C. Allocations would be the same as under Alternative C, so the effects would be the same.

The area is a Fire Management Category C. Effects would be the same as under Alternative B.

Square Butte ACEC/ONA

The potential Square Butte ACEC/ONA is an existing 1,900-acre ONA that contains identified relevant and important cultural resources, scenic values, rare geologic features, and wildlife.

Effects Common to All Alternatives

The 1,900 acres of the potential ACEC is segregated from the mining and leasing laws, so no energy or mineral development occurs in the area. This protects the relevant and important values by precluding this type of surface-disturbing activity that could impair the relevant and important values. It is also an exclusion area for all types of ROWs, which would have the same type of protection for relevant and important values from ROW location.

Approximately 1,900 acres of the potential Square Butte ACEC overlap the Square Butte WSA. The Square Butte WSA is managed according to VRM Class I objectives. Managing according to VRM Class I objectives ensures that the characteristic landscape remains intact, directly protecting the scenic relevant and important value and also providing incidental protection of the other values by reducing the amount of surface disturbance in order to comply with VRM Class I objectives.

If the Square Butte WSA is released by Congress from further consideration as wilderness, one of the goals of the ACEC would be to pursue legal access to the area. Currently, overnight camping is allowed if a private landowner grants permission to cross his or her land to access Square Butte. Overnight use would increase if more access were granted. Increased use could have adverse effects on cultural resources in the ACEC.

Alternative A

The Square Butte ACEC/ONA is currently designated (1,900 acres). The ACEC is closed to motorized travel. If the WSA were to go away and legal access acquired, only nonmotorized travel could occur in the ACEC. This would likely limit the number of people accessing the area, reducing the potential for effects on the relevant and important values, particularly the cultural resources.

Outside of the 1,900 acres that are currently designated, 800 acres of the potential ACEC expansion are not designated. This area is open to such surface-disturbing activities as fluid and nonenergy solid minerals leasing, mineral material disposal, locatable mineral entry, and ROW location. These types of activities could directly affect the relevant and important cultural resources, scenic values, and wildlife habitat. Cultural resources could be damaged or destroyed by surface disturbance, wildlife habitat could be altered or fragmented such that it is no longer suitable, and scenic values could be affected by activities that strongly contrast with the existing characteristic landscape.

Finally, the entire 1,900 acres is at risk of timber encroachment, which affects wildlife habitat. The area is a Fire Management Category B, which does not allow wildfire for resource benefit. This means that wildfire cannot be used as a tool for forest thinning to improve wildlife habitat.

Alternative B

The potential Square Butte ACEC would be designated, including an 800-acre expansion from the current ACEC for a total of 2,700 acres. This area would also be recommended for designation as an ONA. Effects would be similar to Alternative A but would occur over a greater area due to the expansion to 2,700 acres.

Except for the 1,900 acres that would be closed to motorized and mechanized travel in the Square Butte WSA, all OHV travel would be limited to designated routes at all times. This would reduce soil erosion effects near rare geologic features. It would also limit the number of people accessing the area, reducing the potential for effects on the relevant and important values, particularly the cultural resources.

The entire ACEC/ONA would be managed as VRM Class I. This would provide protection to the scenic values even if the WSA were released from Congress. It is unlikely that the relevant and important values would be affected in these areas due to the lack of development being permitted in these areas.

The entire 2,700 acres would be a Fire Management Category C, which allows wildfire for resource benefit. This means that wildfire can be used as a tool for forest thinning to improve wildlife habitat.

Alternative C

The Square Butte ACEC would not be designated. The area would be open or available to potential surface-disturbing activities such as ROW location. These types of activities can cause disturbances which could affect cultural resources, scenic values, rare geologic features, and wildlife.

Wildfire and prescribed fire would be allowed. Wildfire, prescribed burning, and fuel management is directed to maintain or improve the current visual resources, wildlife habitat, watersheds, and public uses of the area. The entire 2,700 acres would be a Fire Management Category C, which allows wildfire for resource benefit. This means that wildfire can be used as a tool for forest thinning to improve wildlife habitat and overall forest health.

Alternative D

The potential Square Butte ACEC would be designated, including an 800-acre expansion from the current ACEC for a total of 2,700 acres. The allocations would be the same as under Alternatives A and C, so effects would be the same.

Sun River ACEC

Sun River ACEC is a potential 4,900-acre ACEC with identified relevant and important scenic values and cultural and paleontological resources. The area provides the foreground setting against which the Rocky Mountain Front sharply rises to the west. It is the only consolidated, federal land portion of the mixed-grass prairie portion of the prairie/mountain interface. Threats are ROW development, particularly transmission lines and ROWs needed to support hydroelectric energy development; subdivisions (residential housing) on adjacent private lands; route proliferation; vandalism of vertebrate fossils; collection of invertebrate fossils; spread of weeds; and unauthorized uses or activities. In addition, maintaining open viewsheds from the prairie to the adjacent mountains is important.

Surface disturbance and excavations could affect cultural and paleontological resources that could occur on or underneath the surface. Types of effects are permanent loss of the resource and the scientific data it could provide through damage or destruction caused by surface-disturbing activities. Without removing some rock surrounding cultural artifacts or fossils, they would remain largely undetected; therefore, management actions that result in erosion do not necessarily result in damage to cultural or paleontological resources. Excessive erosion, especially from other surface disturbance on exposed localities, could damage cultural and paleontological resources at the surface.

Effects typically can be mitigated to below a level of significance by implementing BMPs and mitigation measures for authorized land uses or activities (**Appendix F**) or fluid minerals stipulations (**Appendix L**), such as construction monitoring, excavating materials, or avoiding surface exposures. Pedestrian surveys would typically be necessary before any surface-disturbing activities were authorized for cultural resources and, for paleontological resources, in those units with a high potential for yielding fossil vertebrates (e.g., the Morrison formation); on-site monitoring could be required during construction.

If data recovery were the prescribed mitigation, this could also result in fossils being salvaged that may never have been unearthed as the result of natural processes. These newly exposed fossils would become available for scientific research, education, display, and preservation into perpetuity at a public museum. Unmitigated surface-disturbing activities could dislodge or damage cultural or paleontological resources and features that were not visible before surface disturbance.

Effects Common to All Alternatives

The potential ACEC is in the Rocky Mountain Front Conservation Management Area designated under the Rocky Mountain Front Heritage Act. The Rocky Mountain Front Conservation Management Area was designated in 2014 to protect wildlife habitat. It prevents the expansion of motorized use, prohibits new roads, and protects horse, foot, and cycling trails. This type of protection would help protect the cultural and paleontological resources by emphasizing backcountry uses and minimizing large-scale developments.

Alternative A

The potential Sun River ACEC is not designated. The potential ACEC does not have an assigned VRM classification. This increases the risk that development could occur that would contrast with the characteristic landscape and effect the scenic value. Cultural and paleontological sites could also be damaged from development. A portion of the potential ACEC overlaps the eligible Sun River Segment I, which has scenic and cultural ORVs. Any project in the study corridor would have to consider the ORVs, and the BLM would not approve projects that would impair the ORVs. Therefore, there would be some protection to the ACEC values where the potential ACEC overlaps the WSR study corridor.

The area is open for casual collection of invertebrate fossils. Removal of invertebrate fossils results in a potential loss of scientific information when rare or unusual fossils are not preserved.

The area is a Fire Management Category C, which allows wildfire for resource benefit. Wildfire and prescribed fire would be allowed. Wildfire, prescribed burning, and fuels management could damage or destroy cultural and paleontological resources.

Alternative B

The potential Sun River ACEC (4,900 acres) would be designated under Alternative B for the protection of scenic qualities, rare paleontological resources, and cultural resources. The casual collection of invertebrate fossils would not be allowed, protecting the area from direct loss of the resource and potential scientific knowledge that could be gained.

The Sun River ACEC would be managed as VRM Class II. The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. The casual observer would be unlikely to notice any changes to the landscape, so the scenic relevant and important value would be maintained. In addition, VRM Class II would restrict large-scale development if it cannot meet the VRM Class II objectives. This would also limit the effect of disturbance on cultural and paleontological resources.

The ACEC would be managed as a ROW avoidance area. ROW development could occur in the area under certain conditions; however, development activities and placement of facilities should take into account the paleontological and cultural resources at the project level to minimize effects. They also must be designed to meet VRM Class II objectives, which would limit the size and placement of most ROWs. In some instances, they could be precluded altogether if they do not meet VRM Class II objectives.

The potential Sun River ACEC would be a Fire Management Category C in the Front FMU. Wildfire and prescribed fire would be allowed. Wildfire, prescribed burning, and fuel management would be directed to maintain or improve the current scenic, rare paleontological, and cultural resources of the area.

Alternative C

Although the potential Sun River ACEC would not be designated, the casual collection of invertebrate fossils would still not be allowed; effects would be the same as under Alternative B.

The potential ACEC would be open to all types of ROW development. ROW development in the ACEC could affect the views from the prairie to the background mountain vistas. In addition, surface disturbance could damage or destroy cultural or paleontological resources as previously described.

The potential ACEC would be managed as VRM Class III. The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate, and activities may attract attention but should not dominate the view of the casual observer. This would allow for forms of development that could affect the scenic value. It could also allow for expanded development, and surface disturbance could damage or destroy cultural or paleontological resources as previously described.

The area is a Fire Management Category B, which does not allow wildfire for resource benefit. The area would be managed for intensive wildfire suppression, which would help protect cultural and paleontological resources from extensive resource damage from managed wildfire.

Alternative D

The potential Sun River ACEC (4,900 acres) would be designated under Alternative D for the protection of scenic qualities, rare paleontological resources, and cultural resources. Allocations would be the same as under Alternative B; therefore, effects would be the same as under Alternative B.

The potential Sun River ACEC would be a Fire Management Category C in the Front FMU; effects would be the same as under Alternative B.

Cumulative

Past and present actions in the cumulative effects analysis area effecting ACECs are mineral exploration and development, livestock grazing, lands and realty development activities, recreation, travel management, invasive weeds, and management of fire.

Effects are surface disturbance and vegetation disturbance, displacement of species, habitat fragmentation, and changes to the visual landscape that could affect resources in ACECs. Effects would be greater where recreation areas, such as SRMAs or ERMAs, or development were next to an ACEC. The BLM would adaptively manage to protect ACEC values and minimize effects where applicable and feasible.

The Blind Horse, Chute Mountain, Deep Creek/Battle Creek, and Ear Mountain ACECs/ONAs and Sun River ACEC are in the Rocky Mountain Front Conservation Area. The Rocky Mountain Front Conservation Area Land Protection Plan is a USFWS program to protect a unique, highly diverse, and mostly unfragmented ecosystem by acquiring conservation easements in this area. This project helps protect the Front from drastic change caused by widespread, unplanned residential and commercial development. This type of conservation would help protect the relevant and important values by maintaining intact landscapes.

Reasonably foreseeable future actions are likely to have similar effects on the past and present actions. Grazing in the cumulative effect analysis area is expected to continue. Ongoing mineral exploration and development and renewable energy development, as described in **Table W-2**, have the potential to effect ACECs by creating surface disturbance and potentially removing sensitive resources. Similarly, ROW grants could disturb lands. With a projected increase in population and recreational use, there may also be an increased risk of recreational use and visitation and wildfire.

Under all alternatives, incremental effects on existing and proposed ACECs would be limited from minerals, lands and realty, and renewable energy development, as most ACECs have use restrictions applicable to these uses. Incremental effects from livestock grazing would be higher under Alternatives A and C and would decrease under Alternative B due to potential reductions in forage allocation and AUMs. Incremental effects would increase under all alternatives for recreation, as public use would continue to increase over time. Alternatives B, C, and D would reduce OHV effects in ACECs due to designation of travel management areas. Vegetation and habitat improvement projects would improve ACEC vegetation values under all alternatives.

4.4.2 Back Country Byways

Effects Common to All Alternatives

Measures to encourage partnerships and interpretive programs would enhance visitor experiences along the Missouri Breaks Back Country Byway corridor over the long term. This is because the BLM could leverage partnerships to develop additional facilities, materials, and programs to improve visitor experiences. Also, an action to evaluate future routes for potential inclusion as back country byways could lead to the BLM identifying additional back country byways. This would provide additional opportunities for public enjoyment of these roads over the life of the plan.

Fluid minerals stipulations (**Appendix L**), BMPs and mitigation measures for authorized land uses or activities (**Appendix F**), and reclamation (**Appendix G**) to protect against soil erosion and maintain vegetation are proposed under all alternatives and would effect byways by enhancing or preserving the landscape characteristics of adjacent lands. Managing the byway corridor as limited to designated routes for OHV travel could introduce changes in natural and scenic characteristics. These effects would be both short and long term and include vehicle noise (especially during the fall hunting season) and trail degradation.

Alternative A

The 1-mile-long portion of the Missouri Breaks National Back Country Byway corridor (0.5 miles wide) on BLM-administered lands consists of approximately 600 acres that are designated VRM Class IV (see **Table 4-44** Summary of VRM Effects on Back Country Byways). Development allowed under this VRM classification could degrade scenic values if it is easily seen by those traveling on a byway.

The current deferral of fluid mineral leasing, along with management of the byway corridor as ROW avoidance, would preserve natural and scenic landscape characteristics that the back country byway is intended to highlight. This management direction would limit development and associated surface disturbances.

Table 4-44
Summary of VRM Effects on Back Country Byways

VRM Class	Alternative A	Alternative B	Alternative C	Alternative D
I	0	0	0	0
II	0	0	0	0
III	0	500	100	1,900
IV	600	1,400	500	0

Source: BLM GIS 2015a

Alternative B

Effects would be similar to those under Alternative A. Although 500 acres of the byway corridor (1 mile wide) would be managed as VRM Class III under this alternative (the remaining area would be managed as VRM Class IV), the long-term protection of scenic quality would be only slightly better than under strictly VRM Class IV management (see **Table 4-44**).

There would be an overlapping fluid minerals NSO stipulation on the byway corridor; effects would be similar to those described under Alternative A for the deferral of fluid mineral leases.

Alternative C

Effects would be similar to Alternative A except that 100 acres would be managed as VRM Class III, providing slightly more protection (see **Table 4-44**).

There would be an overlapping fluid minerals NSO stipulation on the byway corridor; effects would be similar to those described under Alternative A for the deferral of fluid mineral leases.

Alternative D

Effects would be similar to those under Alternative A except that the entire byway corridor would be managed as VRM Class III (see **Table 4-44**). This would slightly reduce the potential for long-term effects on scenic quality as compared with VRM Class IV.

Cumulative

Because of its remote location, multiple-use resource activities have remained limited in the byway corridor. OHV use has introduced visual intrusions that disrupt the overall character of the landscape. This activity is especially popular during fall hunting seasons. Cumulative effects on back country byways are not expected to vary by alternative because proposed BLM management and relevant cumulative actions would be the same under all alternatives.

4.4.3 National Trails**Effects Common to All Alternatives**

Table 4-45, Allocations that Overlap National Trail Corridors, displays acreage allocations that overlap national trail corridors in each alternative.

Table 4-45
Allocations that Overlap National Trail Corridors

Alternative	Allowable Use	Continental Divide NST (acres)	Lewis and Clark NHT (acres)	Nez Perce NHT (acres)
A	NSO	6	14	0
	CSU	100	60	6
	Open to forest product sales and harvest	100	200	400
	ROW avoidance	100	40	400
	ROW exclusion	0	0	0
	VRM Class I	0	0	0
	VRM Class II	0	60	0
	VRM Class III	0	0	100
	VRM Class IV	0	0	300
	VRM unclassified	100	200	0
B	NSO	400	400	1,100
	CSU	600	1,800	1,800
	Open to forest product sales and harvest	400	500	1,100
	ROW avoidance	400	500	1,100
	ROW exclusion	0	100	30
	VRM Class I	0	0	0
	VRM Class II	400	600	0
	VRM Class III	0	0	1,100
	VRM Class IV	0	0	0
C	NSO	50	50	300
	CSU	10	10	0
	Open to forest product sales and harvest	100	200	400
	ROW avoidance	0	40	400
	ROW exclusion	0	0	0
	VRM Class I	0	0	0
	VRM Class II	0	0	0
	VRM Class III	100	200	400
	VRM Class IV	0	0	0
D	NSO	400	400	1,100
	CSU	400	300	500
	Open to forest product sales and harvest	400	600	1,100
	ROW avoidance	0	100	1,100
	ROW exclusion	0	10	20
	VRM Class I	0	0	0
	VRM Class II	0	0	0
	VRM Class III	400	600	1,100
	VRM Class IV	0	0	20

Source: BLM GIS 2015a

Note: Calculations use a .5-mile-wide trail corridor for Alternatives A and C. For Alternatives B and D a 1-mile-wide corridor is used.

The Nez Perce NHT corridor and a majority of the Lewis and Clark NHT corridor would continue to be available to grazing and grazed with an active permit under all alternatives. Effects would be as described in **Appendix W**. The Continental Divide NST would be unavailable for grazing; therefore, there would be no degradation of recreational opportunities.

The Continental Divide NST would be managed for nonmotorized uses, thereby preserving desired recreational opportunities over the long term.

Enhancing interpretive programs would improve opportunities for the public to see and enjoy the unique scenic and historical opportunities associated with national trails.

Fluid minerals stipulations (**Appendix L**), BMPs and mitigation measures for authorized land uses or activities (**Appendix F**), and reclamation (**Appendix G**) to protect against soil erosion and maintain vegetation cover are proposed under all alternatives and would effect national trails by enhancing or preserving the landscape characteristics of adjacent lands.

There would be minimal effects on national trail corridors in the planning area from BLM actions, because less than 1 percent of each trail's corridor in the planning area is on BLM-administered land.

Alternative A

The BLM would manage a half-mile-wide trail corridor for national trails.

Lewis and Clark NHT

The trail corridor would continue to be vulnerable to direct and indirect effects. There are no ROW restrictions, and the trail corridor is largely managed as an undesignated VRM class. The lack of protection against ROW development and visual intrusions could allow surface disturbances that result in the loss of integrity or destruction of physical remnants of the trail, or result in a change in the trail corridor's cultural landscape. Although there is no overlapping fluid mineral stipulation, leasing in the decision area is deferred and there would continue to be reduced potential for effects from new fluid mineral leases.

Nez Perce NHT

Effects would be similar to those described for the Lewis and Clark NHT, except that this trail corridor would be managed as ROW avoidance. This would restrict development that could directly or indirectly degrade the trail corridor and user experiences.

Continental Divide NST

Some actions would continue to protect the Continental Divide NST, while others would leave it at risk of effects that may degrade its scenic quality. Under Alternative A, the trail corridor would be managed as ROW avoidance, which would provide long-term protection against surface-disturbing activities that may degrade the corridor's scenic quality. However, the trail corridor would also be managed as open to forest product sales and as an undesignated VRM class. These actions could both alter the scenic quality of the corridor if timber harvest or development occurred that altered the viewshed. Effects from fluid minerals management are the same as for the Lewis and Clark NHT.

Alternative B

The BLM would manage a minimum mile-wide trail corridor, up to 10 miles, for national trails. Because of this wider trail corridor, all effects discussed below for each trail segment would occur over a larger area than under the other alternatives. In most cases, this would lead to increased protection in this larger area. In addition, the BLM could acquire more land from willing sellers within the management corridors through funding from the Land and Water Conservation Fund. This would increase management and protection of the trails by reducing uncontrolled development and by preserving or restoring the historical landscape.

Lewis and Clark NHT

There would be more long-term protection of the trail corridor's physical integrity and cultural landscape than under Alternative A. A majority of the trail corridor would be managed as ROW avoidance or exclusion, and the entire corridor would be managed as VRM Class II. There also would be overlapping fluid minerals NSO and CSU

stipulations, providing protection similar to the lease deferral under Alternative A. All of these actions would reduce the potential for direct and indirect effects on the trail corridor by restricting development.

Nez Perce NHT

Effects would be similar to those described for the Lewis and Clark NHT, except that there would not be an overlapping fluid minerals CSU stipulation and the corridor would be managed as VRM Class III. The absence of a fluid minerals CSU stipulation may be offset by the overlapping NSO stipulation, depending on whether this stipulation is applied to leases in the corridor. Management as VRM Class III could allow development that directly or indirectly effects the trail corridor. However, in accordance with BLM Manual 6280, the BLM may not permit actions along national trails that substantially interfere with the nature and purposes of the trails (BLM 2012b). Therefore, the BLM could not permit actions that effect the historic nature of the trail.

Continental Divide NST

There would be more long-term protection of the trail corridor's scenic quality than under Alternative A. Most resource use allocations that overlap the trail corridor would provide long-term protection against degradation of scenic quality. For example, there would be overlapping fluid minerals NSO and CSU stipulations and management as ROW avoidance and VRM Class II. All of these actions would restrict surface-disturbing activities. However, the trail corridor would also be open to timber harvest; effects from this action would be the same as described under Alternative A.

Alternative C

The BLM would manage a half-mile-wide trail corridor for national trails (the same as Alternative A).

Lewis and Clark NHT

Effects on the trail corridor's physical integrity and cultural landscape would be similar to those described under Alternative A. This is because fluid mineral and ROW restrictions and VRM management would be similar.

Nez Perce NHT

There would be more long-term protection of the trail corridor's physical integrity and cultural landscape than under Alternative A because there would be slightly more stringent protections from VRM Class III. An overlapping fluid minerals NSO stipulation would also provide long-term protection against direct and indirect effects associated with fluid mineral leasing.

Continental Divide NST

There would be less long-term protection of the trail corridor's scenic quality than under Alternative A. Most of the trail corridor would not be covered by fluid mineral leasing stipulations (or deferred from leasing), there would be no acres managed as ROW avoidance or exclusion, the trail corridor would be available for forest product sales, and management as VRM Class III could allow modifications to the landscape that alter the trail corridor's scenic quality.

Alternative D

The BLM would manage a 1-mile-wide trail corridor for national trails. The management corridor would be larger than under Alternative A. Effects of managing a larger corridor would be similar to those of Alternative B but could be over a smaller area.

Lewis and Clark NHT

Effects would be similar to those described under Alternative A, except that the trail corridor would be managed as VRM Class III. This would provide greater protection against degradation of the trail corridor's scenic quality.

Nez Perce NHT

Effects would be similar to those described under Alternative A, except that there would be a greater percentage of the trail corridor managed as VRM Class III. This would provide greater long-term protection against degradation of the trail corridor's scenic quality.

Continental Divide NST

Effects would be similar to those described under Alternative A, except that managing the trail corridor as VRM Class III and the presence of an overlapping fluid minerals NSO stipulation would provide greater long-term protection against direct and indirect effects as compared with undesignated VRM classification and an overlapping fluid minerals CSU stipulation under Alternative A.

Cumulative

Because less than 1 percent of the national trail mileage in the planning area is on BLM-administered lands, the incremental effect of implementing each alternative in this RMP would be negligible. Actions on BLM-administered lands would largely serve to protect the physical elements and scenic quality of the trails. Management under the NPS (Lewis and Clark NHT) and Forest Service (Nez Perce NHT and Continental Divide NST) comprehensive plans would provide long-term protection for those portions of the trail corridor on other federal land in the planning area. Actions on private land, such as increased development, could affect physical elements of the Lewis and Clark and Nez Perce NHTs because of the mixed landownership pattern along both trail corridors.

Vehicle traffic is expected to continue to affect the cultural landscape of the Lewis and Clark NHT by introducing audible and visual effects, particularly in areas where Highway 200 and Interstate 15 parallel the historic route.

Future BLM and Forest Service comprehensive travel and transportation management (CTTM) implementation decisions could directly affect trail usage. Travel restrictions would affect the types of experiences available along these trails. Opening the trails to more types of uses would likely increase use levels but could increase conflicts.

4.4.4 Wild and Scenic Rivers

Armells Creek

Alternative A

The eligible portion of Armells Creek is the headwaters in the Judith Mountains. The area is managed as VRM Class II, which would directly protect the scenic ORV of the segment. The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. The casual observer would be unlikely to notice any changes to the landscape, so the scenic ORV would be maintained.

The area is open to all forms of energy and mineral development; however, leasing in the decision area is deferred and there would continue to be reduced potential for effects from new fluid mineral leases. Such development is also largely incompatible with the objectives of VRM Class II, so it is unlikely to be permitted. Furthermore, the BLM would not authorize an action that would affect the ORV, free-flowing nature, or tentative classification of the eligible segment.

Alternative B

Under Alternative B, the eligible portion of Armells Creek would be determined suitable for inclusion in the NWSRS. It would continue to be managed as VRM Class II; effects are the same as described for Alternative A. The area would be open to all forms of energy and mineral development. However, such development is largely incompatible with the objectives of VRM Class II, so it is unlikely to be permitted. Furthermore, the BLM would not authorize an action that would affect the ORV, free-flowing nature, or tentative classification of the suitable segment. Overall, effects would be the same as under Alternative A.

Alternative C

Under Alternative C the segment would be determined not suitable for inclusion in the NWSRS and would be released from further consideration. The segment would be managed as VRM Class III. The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate and activities may attract attention but should not dominate the view of the casual observer. This would allow for forms of development that could affect the scenic ORV.

Further, the area would be open and available to all types of surface-disturbing activities, including energy and minerals development, ROW location, commercial forestry, and renewable energy development. Large-scale development could affect the scenic ORV by changing the characteristic landscape. Approximately 330 acres (78

percent) of the study corridor would be subject to NSO stipulations for fluid minerals, effectively eliminating the potential for visual intrusion in that area covered by the NSO stipulation.

The area would also overlap the Judith Mountains SRMA. Facilities needed for the SRMA could also affect the overall scenic quality of the area. This alternative has the greatest potential to affect the scenic value of the study corridor.

Alternative D

Under Alternative D the segment would be determined not suitable for inclusion in the NWSRS and would be released from further consideration. The segment would be managed as VRM Class III; this would allow for forms of development that could affect the scenic ORV.

The area would be open and available to all types of surface-disturbing activities, including energy and minerals development, ROW location, commercial forestry, and renewable energy development. Large-scale development could affect the scenic ORV by changing the characteristic landscape. The area would not be subject to fluid minerals NSO stipulations but rather CSU stipulations throughout the whole study corridor. CSU stipulations have the potential to reduce effects by requiring certain design features or moving a fluid minerals operation. However, any form of fluid minerals development in the study corridor would affect the scenic ORV.

The area would also overlap the Judith Mountains SRMA. As under Alternative C, facilities needed for the SRMA could also affect the overall scenic quality of the area.

Blindhorse Creek, Edwards Creek, Frenchy Gulch, North Fork Blindhorse Creek, North Fork Deep Creek, Pamburn Creek, Rinker Creek, South Fork Blindhorse Creek, and South Fork Deep Creek

Effects Common to All Alternatives

Under all alternatives, Blindhorse Creek, North and South Forks Blindhorse Creek, Frenchy Gulch, Pamburn Creek, and Rinker Creek are in the Blind Horse ACEC. Edwards Creek and North Fork Deep Creek are in the Chute Mountain ACEC. South Fork Deep Creek is in the Deep Creek/Battle Creek ACEC. The Blind Horse, Chute Mountain, and Deep Creek/Battle Creek ACECs are designated to protect, among other things, scenic values, which is the only ORV for these segments, except for South Fork Deep Creek, which also includes a fish value (westslope cutthroat trout).

The action alternatives would vary in the objectives to maintain or increase water quantity availability for natural instream flow to benefit fish, wildlife, riparian-wetland areas, and water quality. Maintaining or increasing instream flows in South Fork Deep Creek would protect the fish ORV. While Alternative A does not have a similar objective, there is a year-round instream water reserve for South Fork Deep Creek to protect habitat for westslope cutthroat trout and game fisheries. Therefore, effects would be the same under all alternatives.

The segments are in the Rocky Mountain Front Conservation Management Area designated under the Rocky Mountain Front Heritage Act. The Rocky Mountain Front Conservation Management Area was designated in 2014 to protect wildlife habitat. It prevents the expansion of motorized use, prohibits new roads, and protects horse, foot, and cycling trails. This would help protect the scenic ORV by maintaining intact landscapes.

Alternative A

Under Alternative A, the ACECs are managed as VRM Class I. The objective of VRM Class I is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. Managing to this standard would also prevent large-scale surface-disturbing activities that would affect the scenic and fish ORVs. Precluding these activities would also protect the free-flowing nature of the segment on BLM-administered lands.

The ACECs are an avoidance area for utility and transportation corridors. While transportation corridors could affect the wild classification, the BLM would not authorize activities that could affect the ORV, free-flowing nature, or tentative classification prior to making a suitability determination.

Alternative B

Under Alternative B, the ACECs would be managed as VRM Class I; effects would be the same as under Alternative A. Further, the ACECs would be an exclusion area for all types of ROWs. The area would also be managed to protect wilderness characteristics. Managing to maintain naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation also prevents the type of development that could affect the scenic ORV.

Finally, because the BLM would not authorize activities that could affect the ORVs, free-flowing nature, or tentative classification prior to Congressional action on the segments, effects would not be different from Alternative A.

Alternative C

Under Alternative C, these segments would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. The potential ACECs would not be designated under this alternative, so there would be no incidental protection from ACEC management or objectives. However, topography and existing access limitations further reduce the of the development of utility or transportation corridors, which could otherwise contribute to potential runoff and erosion that would affect these segments and their ORVs.

Alternative D

Under Alternative D, the segments would be in the Blind Horse or Chute Mountain ACECs, and management prescriptions for the ACECs would be the same as under Alternative A. While the segments would be determined not suitable for inclusion in the NWSRS, they would still receive the same incidental protections from the overlapping ACECs. Managing the ACECs as an avoidance area for utility and transportation corridors could affect the scenic ORV if they are permitted in the area. However, managing the area according to VRM Class I objectives would preclude large-scale development that could affect the ORV. Topography and existing access limitations further reduce the possibility of these types of developments.

Given the same management prescriptions and the limitations imposed by natural barriers, effects would be the same as under Alternative A.

Collar Gulch Creek

Effects Common to All Alternatives

The action alternatives would vary in the objectives to maintain or increase water quantity availability for natural instream flow to benefit fish, wildlife, riparian-wetland areas, and water quality. Maintaining or increasing instream flows would protect the fish ORV. While Alternative A does not have a similar objective, it is unlikely that water would be depleted in the stream so as to affect the fish ORV.

Alternative A

Under Alternative A, Collar Gulch Creek is in the Collar Gulch ACEC, which is designated to protect habitat for the westslope cutthroat trout, one of the ORVs for Collar Gulch Creek. The scenic ORV can receive incidental protection from the ACEC management. For example, the ACEC is managed as VRM Class II. The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. The casual observer would be unlikely to notice any changes to the landscape, so the scenic ORV would be maintained. The area would be open to all forms of energy and mineral development. However, such development is largely incompatible with the objectives of VRM Class II, so it is unlikely to be permitted.

Commercial forestry practices have caused erosion and runoff that can threaten the habitat for the westslope cutthroat trout primarily because of the soil type in the area. The BLM would not authorize any activity that would affect the ORVs of the segment.

Alternative B

Under Alternative B, Collar Gulch Creek would be in the proposed Collar Gulch ACEC, which would be designated to protect habitat for the westslope cutthroat trout, one of the ORVs for Collar Gulch Creek. Like Alternative A, the scenic ORV could receive incidental protection from the ACEC management. The ACEC would be managed as VRM Class II, as under Alternative A; effects would be the same as under Alternative A. Unlike

Alternative A, the ACEC would be closed to all forms of energy and mineral development and ROW location. This would ensure protection of the scenic ORV, and protection from erosion and runoff that could affect the fish habitat. The ACEC would also be closed to commercial forestry practices, further ensuring protection for the fish habitat and the scenic ORV.

Alternative C

Under Alternative C, Collar Gulch Creek would be determined not suitable for inclusion in the NWSRS and would be released from further consideration. The potential Collar Gulch ACEC would not be designated under this alternative, so there would be no incidental protection from ACEC management or objectives.

The segment would be managed as VRM Class III. The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate, and activities may attract attention but should not dominate the view of the casual observer. This would allow for forms of development that could affect the scenic ORV.

Further, the area would be open and available to all types of surface-disturbing activities, including energy and minerals development, ROW location, commercial forestry, and renewable energy development. Large-scale development could affect the scenic ORV by changing the characteristic landscape. These types of activities, particularly forestry practices, which are the most prevalent in the area, could affect the fish ORV through increased erosion and runoff. Approximately 710 acres (77 percent) of the study corridor would be subject to NSO stipulations for fluid minerals, effectively eliminating the potential for visual intrusion in that area covered by the NSO stipulation.

Alternative D

Under Alternative D, Collar Gulch Creek would be determined not suitable for inclusion in the NWSRS and would be released from further consideration. The scenic and fish ORVs would still receive protection from the proposed Collar Gulch ACEC. The ACEC would be managed as VRM Class III; this would allow development that could affect the scenic ORV. The ACEC would be closed to mineral material disposal, nonenergy solid minerals leasing, and wind energy development. This would protect the scenic ORV by limiting development that could change the characteristic landscape. Other projects would be allowed but must be designed to protect and enhance aquatic habitat, including timber harvest. While such designs would protect the fish ORV, there could still be effects on the scenic ORV due to flexibility with the VRM Class III objectives.

Cutrock Creek

Effects Common to All Alternatives

Cutrock Creek is in the Rocky Mountain Front Conservation Management Area, as designated under the Rocky Mountain Front Heritage Act. The Rocky Mountain Front Conservation Management Area was designated in 2014 to protect wildlife habitat. It prevents the expansion of motorized use, prohibits new roads, and protects horse, foot, and cycling trails. This would help protect the scenic ORV by maintaining intact landscapes.

Alternative A

Under Alternative A, the Cutrock Creek study corridor is open to mineral material disposal and does not have an assigned VRM classification. Access needed to get to authorized mineral materials sites would affect the wild classification of the segment. Developing a mineral materials site would also strongly contrast with the characteristic landscape and change the scenic quality of the area. This type of development would not be constrained by an assigned VRM classification. However, because Cutrock Creek is eligible, the BLM would not authorize any actions that would affect the scenic ORV, the wild tentative classification, or the free-flowing nature of the segment. Therefore, there would not be any effects.

Alternative B

Under Alternative B, Cutrock Creek would be suitable for inclusion in the NWSRS. The area would be managed according to VRM Class I objectives, precluding large-scale disturbance that would affect the scenic ORV and also the wild tentative classification. Further, the area would be closed to mineral material disposal and an exclusion area for all types of ROWs, including wind. No effects on the segment are expected.

Alternative C

Under Alternative C, Cutrock Creek would be determined not suitable for inclusion in the NWSRS and would be released from further consideration. Like Alternative A, it would be open for mineral material disposal. The BLM would not have to consider the scenic ORV, tentative classification, or free-flowing nature when authorizing activities; therefore, the potential for development exists to some degree. Commercial development of mineral materials are usually large-scale operations that would, in this area, contrast with the characteristic landscape and effect the scenic quality of the area. The area would be managed as VRM Class III, which would allow landscape modifications that attract the attention of the casual observer.

The area would also be open to commercial forestry. Large-scale timber harvest would sharply contrast with the characteristic landscape and effect the scenic quality of the area.

Alternative D

Under Alternative D, Cutrock Creek would be determined not suitable for inclusion in the NWSRS and would be released from further consideration. Allocations would be the same as under Alternative C except that the area would be managed as VRM Class II. Managing according to VRM Class II objectives would limit large-scale surface-disturbing activities that could affect the scenic ORV.

Fords Creek

Alternative A

The eligible portion of Fords Creek is in the Collar Gulch ACEC, which is managed to protect westslope cutthroat trout. This is not the ORV for Fords Creek, as the species is not known to occur in Fords Creek; however, management to protect the watershed would also protect the free-flowing nature of the segment.

While the Collar Gulch ACEC is not managed to protect scenic values, some management to protect the watershed characteristics for the species can incidentally protect the scenic ORV for Fords Creek. Most directly, the ACEC is managed as VRM Class II. The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. The casual observer would be unlikely to notice any changes to the landscape, so the scenic ORV would be maintained. The area would be open to all forms of energy and mineral development. However, such development is largely incompatible with the objectives of VRM Class II, so it is unlikely to be permitted.

Alternative B

The suitable portion of Fords Creek would be in the proposed Collar Gulch ACEC; effects on the free-flowing nature would be the same as under Alternative A. The area would also be managed as VRM Class II; effects would be the same as under Alternative A. While the area would be closed to minerals and energy development and ROW location, which is stricter than Alternative A, the VRM Class II objectives would largely preclude this type of development. Therefore, the effects are not expected to differ from Alternative A.

Alternative C

Under Alternative C, the segment would be determined not suitable for inclusion in the NWSRS and would be released from further consideration. The area would also not be managed as an ACEC, so the scenic ORV would not receive any incidental protection. The segment would be managed as VRM Class III. The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate, and activities may attract attention but should not dominate the view of the casual observer. This would allow for forms of development that could affect the scenic ORV. Further, the area would be open and available to all types of surface-disturbing activities, including energy and minerals development, ROW location, commercial forestry, and renewable energy development. This alternative has the greatest potential to affect the scenic value of the study corridor.

Alternative D

Under Alternative D the segment would be determined not suitable for inclusion in the NWSRS and would be released from further consideration. The suitable portion of Fords Creek would be in the proposed Collar Gulch ACEC; effects on the free-flowing nature would be the same as under Alternative A. The segment would be managed as VRM Class III; this would allow development that could affect the scenic ORV. Some types of surface-

disturbing activities would be prohibited, including mineral materials disposal, nonenergy solid minerals leasing, and wind energy. However, the area would be available for commercial forestry, which has occurred in the past. Timber harvest can clear large swaths of trees from an area, creating a contrast with the existing character of the landscape and reduce the scenic quality of the area. The area would also overlap the Judith Mountains SRMA. Facilities needed for the SRMA could also affect the overall scenic quality of the area.

Judith River

Effects Common to All Alternatives

The geologic feature that comprises the ORV is such that it would not be affected by BLM management proposed in the various alternatives. Below is a description of the ORV from the Draft Wild and Scenic River Report (**Appendix V**).

Geology in the upper half of the segment is dominated by highly scenic white cliffs of Virgelle sandstone (the lower unit of the Eagle sandstone formation). These appear as rimrocks along a narrow river valley at Ming Coulee. They slip below the alluvium of the valley floor just below the segment's confluence with Box Elder Creek. As the white Virgelle sandstone moves from the rim to the valley floor, it is replaced along the rim, and then along the slopes, by alternating beds of gray to buff sandstone, shale, carbonaceous shale, and coal of the upper and middle members of the Eagle formation. The Eagle formation is then overlain by the brownish-gray marine shales of the Claggett formation. As Anderson Bridge is approached, cliffs again appear along the rim. Here the light-brown sandstone of the Judith River formation becomes more and more of a dominant feature. The Claggett and Judith River formations form badlands-type topography.

Middle Fork Dearborn River

Effects Common to All Alternatives

The area is in the Rocky Mountain Front Conservation Management Area designated under the Rocky Mountain Front Heritage Act. The Rocky Mountain Front Conservation Management Area was designated in 2014 to protect wildlife habitat. It prevents the expansion of motorized use, prohibits new roads, and protects horse, foot, and cycling trails. This would help protect the scenic ORV by maintaining intact landscapes.

Furthermore, there are steep slopes on either side of the river. If development were to occur beyond the slopes, it would not significantly affect the scenic value as seen from the river.

While there would be varying levels of management across the alternatives in terms of assigned VRM classification and allocations for energy, mineral, and ROW development, the goals of the Rocky Mountain Front Conservation Management Area and the topography of the segment make it such that the effects would not be significantly different between the alternatives.

Missouri River

Effects Common to All Alternatives

The recreational ORV is primarily related to fishing and floatboating on the river. Access to the river from BLM-administered lands is very limited. Boat launches and developed recreation sites are on lands not administered by the BLM. The fisheries rely on habitat and management outside of the BLM's control; sport fisheries are generally managed by the state. For these reasons, BLM management has limited potential to directly or indirectly influence the recreational ORV. Effects would not be significantly different between the alternatives.

The upper portion of the segment in Lewis and Clark County has high scenic quality (Scenic Quality A). Effects would generally be screened from the river because of steep canyon walls, so effects would be the same under all alternatives no matter the VRM classification. As the terrain transitions to the prairie in Cascade County, existing cultural modifications increase and the scenic quality is diminished. New development in this area would not substantially alter the existing character of the landscape. Effects would be the same under all alternatives no matter the VRM classification.

The study corridor is in the management corridor of the Lewis and Clark NHT, which is the historic ORV for the Missouri River. Under all alternatives, the corridor would be available for fluid minerals leasing, and the alternatives vary with respect to stipulations that would be applied. The upper portion of the study corridor in

Lewis and Clark County is likely undesirable for fluid minerals development, particularly in the viewshed of the river, because of the topography. BLM parcels become increasingly scattered and small as the river transitions into the prairie in Cascade County. Fluid minerals development in the study corridor is unlikely. Therefore, effects would not be significantly different between the alternatives.

Under all alternatives, the corridor would be an exclusion area for wind energy development because of the overlap with the Lewis and Clark NHT management corridor. Effects on the scenic and historic ORVs would be eliminated. Restrictions on other types of ROWs vary among the alternatives, from no restriction to exclusion in some areas and avoidance in the remaining part of the corridor. However, the upper portion of the study corridor in Lewis and Clark County is likely undesirable for ROW location, particularly in the viewshed of the river, because of the topography. As the river transitions into the prairie in Cascade County, existing ROWs become more prevalent and the railroad and highway parallel the river for much of the stretch. Additional ROWs would not substantially affect the historic ORV. Therefore, effects would not be significantly different between the alternatives.

North Fork Flatwillow Creek and South Fork Flatwillow Creek

Alternative A

North and South Forks Flatwillow Creek are eligible for inclusion in the NWSRS. They are managed according to VRM Class II objectives. The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. The casual observer would be unlikely to notice any changes to the landscape, so the scenic ORV would be maintained. The area would be open to all forms of energy and mineral development and ROW location. However, such development is largely incompatible with the objectives of VRM Class II, so it is unlikely to be permitted. Furthermore, the BLM would not permit activities that would affect the ORV, tentative classification, or free-flowing nature of the segments.

Alternative B

North and South Forks Flatwillow Creek would be suitable for inclusion in the NWSRS with a scenic ORV and a scenic classification. They would be managed according to VRM Class II objectives; effects would be the same as under Alternative A. The area would be open to all forms of energy and mineral development. However, such development is largely incompatible with the objectives of VRM Class II, so it is unlikely to be permitted. Furthermore, the BLM would not permit activities that would affect the ORV, tentative classification, or free-flowing nature of the segments. Fluid minerals leasing would be subject to NSO stipulations, effectively precluding surface occupancy in the study corridor, helping to maintain the scenic value in that area.

Alternative C

Under Alternative C, North and South Forks Flatwillow Creek would be determined not suitable for inclusion in the NWSRS and released from further consideration. They would be managed according to VRM Class IV objectives. The objective of VRM Class IV is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. This would allow substantial changes to the characteristic landscape.

The area would be open to all forms of energy and mineral development and ROW location. Given the lack of VRM constraints, large-scale development could occur in this area of the degree that would change the characteristic landscape. Fluid minerals leasing would be subject to NSO stipulations on approximately 220 acres (79 percent) of the study corridor along South Fork Flatwillow Creek, effectively precluding surface occupancy in the study corridor, helping to maintain the scenic value in that area.

Alternative D

Under Alternative D, North and South Forks Flatwillow Creek would be determined not suitable for inclusion in the NWSRS and released from further consideration. They would be managed according to VRM Class III objectives. The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate, and activities may attract attention but should not dominate the view of the casual observer. This would allow for forms of development that could affect the scenic ORV along both segments.

The area would be open to all forms of energy and mineral development and ROW location. Given the lack of VRM constraints, large-scale development could occur in this area of the degree that would change the characteristic landscape. Fluid minerals leasing would be subject to CSU stipulations on approximately 220 acres (79 percent) of the study corridor along South Fork Flatwillow Creek, and throughout all of the study corridor of North Fork Flatwillow Creek. CSU stipulations have the potential to reduce effects by requiring certain design features or moving an operation. However, any form of fluid minerals development in the study corridor would affect the scenic ORV.

North Fork Sheep Creek, North Fork Stickney Creek, South Fork Sheep Creek, and South Fork Stickney Creek

Effects Common to All Alternatives

The area is inaccessible to the public because of the checkerboard landownership surrounding the study segments. In addition, topography prevents much of the large-scale development that would affect the scenic ORV. While there would be varying levels of management across the alternatives in terms of assigned VRM classification and allocations for energy, mineral, and ROW development, the topography and landownership pattern surrounding the segment make it such that the effects would not be significantly different between the alternatives.

North Fork Teton River

Effects Common to All Alternatives

The area is in the Rocky Mountain Front Conservation Management Area as designated under the Rocky Mountain Front Heritage Act. The Rocky Mountain Front Conservation Management Area was designated in 2014 to protect wildlife habitat. It prevents the expansion of motorized use, prohibits new roads, and protects horse, foot, and cycling trails. This would help protect the scenic ORV by maintaining intact landscapes.

The action alternatives would vary in the objectives to maintain or increase water quantity availability for natural instream flow to benefit fish, wildlife, riparian-wetland areas, and water quality. Maintaining or increasing instream flows would protect the fish ORV. While Alternative A does not have a similar objective, it is unlikely that water would be depleted in the stream so as to affect the fish ORV.

The alternatives would vary in the assigned VRM classification from no assigned classification in Alternative A, VRM Class III in Alternative B, VRM Class II in Alternative C, and VRM Class I in Alternative D. While Alternatives A and B would manage the area for less stringent objectives, the BLM would not permit activities that would affect the segments' ORVs. Therefore, there would not be a substantial difference between the alternatives.

Pike Creek

Alternative A

Under Alternative A, the Pike Creek study corridor is available for livestock grazing and has an active grazing permit. Intensive use in riparian and wetland corridors can reduce streambank stability and the ability of the areas to filter pollutants, including livestock waste, increasing the amount of runoff into the stream. Streambank instability can increase streambank erosion, causing sedimentation and increased turbidity. When the stream or river is unable to effectively transport the sediment, it could reduce the number of scour pools or otherwise suitable habitat. If livestock grazing is determined to be affecting the fish ORV, the BLM could change grazing practices to protect the ORV until a suitability determination is made.

Pike Creek is managed as a ROW avoidance area, so such developments as road crossings should be minimized in the area. Construction of road crossings can have similar effects on livestock grazing in terms of erosion and sedimentation. The BLM would not authorize an action that effected the fish ORV in the creek.

Alternative B

Under Alternative B, the Pike Creek study corridor would be available for livestock grazing. However, the area-wide amount of forage allocated to livestock would be reduced by half from Alternative A. This would generally reduce the number of cattle grazing on BLM-administered lands in the decision area, including in the Pike Creek study corridor. The potential for effects from livestock grazing would be reduced under this alternative compared with Alternative A. If livestock grazing is determined to be affecting the fish ORV, the BLM could change grazing practices to protect the ORV until a suitability determination is made.

Pike Creek would be managed as a ROW avoidance area; effects would be the same as under Alternative A. The BLM would not authorize an action that effected the fish ORV in the creek.

Alternative C

Under Alternative C, Pike Creek would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. The Pike Creek study corridor would be available for livestock grazing. The types of effects would be the same as Alternative A. Livestock grazing would be an increased threat to the species' habitat.

Pike Creek would be managed as a ROW avoidance area; effects would be the same as under Alternative A. The BLM would not consider ORVs under Alternative C because the segment would be determined not suitable for inclusion in the NWSRS and released from further consideration. ROW development, such as stream crossings, would be an increased threat to the species' habitat.

Alternative D

Under Alternative D, Pike Creek would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. The Pike Creek study corridor would be available for livestock grazing. The types of effects would be the same as Alternative A. Livestock grazing would be an increased threat to the species' habitat.

Pike Creek would be managed as a ROW avoidance area; effects would be the same as under Alternative A. The BLM would not consider ORVs under Alternative D because the segment would be determined not suitable for inclusion in the NWSRS and released from further consideration. ROW development, such as stream crossings, would be an increased threat to the species' habitat.

Sacagawea River (aka Crooked Creek)

Effects Common to All Alternatives

The United States and Montana have agreed to the terms of a compact, settling for all time the United States' federal reserved water rights claims for the Charles M. Russell NWR. The Charles M. Russell NWR Reserved Water Rights Compact prevents the construction of new impoundments on the river and establishes water rights for instream use. This would help protect the free-flowing nature of the segment and ensure sufficient flows for the fish ORV.

Soil-disturbing activities would affect water quality for fish and aquatic communities though increased turbidity or physical alteration of habitats. Evaluating surface-disturbing activities and applying mitigation measures would limit, but not prevent, the effects of soil disturbance on warm water aquatic habitats. Soil erosion from authorized activities or resource uses, in combination with soil erosion from natural disturbances, would increase sediment levels. This could result in a long-term trend toward decreased water depths in lentic and lotic systems as sediment is deposited. This, in turn, could reduce the depth of scour pools and reservoirs. It should be noted that the species found in this reach can generally tolerate turbidity and so are not as greatly affected by sediment influxes.

Alternative A

Surface-disturbing activities associated with land use authorizations may increase erosion and sediment levels, which could affect habitat availability and complexity. However, approximately 56 percent of the study corridor on BLM-administered lands has wilderness characteristics now, meaning that the area is roadless and of sufficient size and having the quality of naturalness. While there are not specific restrictions that would necessarily protect this quality into the future, such qualities are present under current management and are likely to continue to some degree in this area into the foreseeable future, given the topography of the area. Further, the BLM would not authorize actions that would affect the ORV or tentative classification of the segment.

Alternative B

Under Alternative B, approximately 5,000 acres (70 percent) of the study corridor on BLM-administered lands overlap with five units managed to protect wilderness characteristics. In these areas, surface-disturbing activities such as energy and minerals development and ROW location would be prohibited. Outside of the lands with

wilderness characteristics, additional restrictions on surface-disturbing activities would be in place throughout most of the segment. The BLM would not authorize actions that would affect the ORV or tentative classification of the segment.

Alternative C

Unlike under Alternatives A and B, under Alternative C, the BLM would not consider the fish ORV, because the Sacagawea River would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. Surface-disturbing activities associated with land use authorizations may increase erosion and sediment levels, which could affect habitat availability and complexity. However, approximately 56 percent of the study corridor on BLM-administered lands has wilderness characteristics now, meaning that the area is roadless and of sufficient size and having the quality of naturalness. While there are not specific restrictions that would necessarily protect this quality into the future, such qualities are present under current management and are likely to continue to some degree in this area into the foreseeable future, given the topography of the area.

Alternative D

Under Alternative D, the Sacagawea River would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. Approximately 4,400 acres (63 percent) of the study corridor on BLM-administered lands overlap with three units managed to protect wilderness characteristics. In these areas, and in areas outside of lands managed to protect wilderness characteristics in the study corridor, surface-disturbing activities such as energy and minerals development and ROW location would be prohibited or avoided. This would reduce potential effects of sedimentation and runoff in the study corridor.

Sun River Segment I

Effects Common to All Alternatives

Sun River Segment I is in the Rocky Mountain Front Conservation Management Area designated under the Rocky Mountain Front Heritage Act. The Rocky Mountain Front Conservation Management Area was designated in 2014 to protect wildlife habitat. It prevents the expansion of motorized use, prohibits new roads, and protects horse, foot, and cycling trails. This would help protect the scenic and cultural ORVs by maintaining intact landscapes. It would also protect the recreational ORV by protecting backcountry uses.

The action alternatives would vary in the objectives to maintain or increase water quantity availability for natural instream flow to benefit fish, wildlife, riparian-wetland areas, and water quality. Maintaining or increasing instream flows would protect the fish ORV. While Alternative A does not have a similar objective, it is unlikely that water would be depleted in the stream so as to affect the fish ORV.

Alternative A

Under Alternative A, Sun River Segment I does not have an assigned VRM class. This increases the risk that ROW development could occur that would contrast with the characteristic landscape and effect the scenic ORV. Cultural sites could also be damaged from the construction of ROWs. However, the BLM would not authorize an action that would affect the ORVs.

Alternative B

Under Alternative B, a portion of the study corridor would be in the proposed Sun River ACEC, which would be designated, in part, to protect cultural resources. In addition to the withdrawal, the area would also be managed as an avoidance area for ROWs, further reducing the potential for effects in the study corridor on BLM-administered lands. Further, the BLM would not authorize an action that would affect the ORVs.

Alternative C

Under Alternative C, Sun River Segment I would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. The potential Sun River ACEC would not be designated, so the ORVs would not receive incidental protection from ACEC management. The area would be open to ROW location, except for wind energy development, which could affect the scenic ORV if large transmission lines are sited in areas that do not currently have similar types of development. Surface disturbance could also damage cultural sites.

Most of the study corridor (410 acres; 93 percent) would be managed as VRM Class III. The objective of VRM Class III is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate, and activities may attract attention but should not dominate the view of the casual observer. This would allow for forms of development that could affect the scenic ORV along both segments. The remaining portion of the study corridor would be managed as VRM Class IV, which would allow substantial changes to the characteristic landscape.

Alternative D

Under Alternative D, the Sun River Segment 1 would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. Under Alternative D, a portion of the study corridor would be in the proposed Sun River ACEC, which would be designated, in part, to protect cultural resources. In addition to the withdrawal, the area would also be managed as an avoidance area for ROWs, further reducing the potential for effects in the study corridor on BLM-administered lands.

The study corridor would be managed as VRM Class II. The objective of VRM Class II is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. The casual observer would be unlikely to notice any changes to the landscape, so the scenic ORV would be maintained.

Sun River Segment 2

Effects Common to All Alternatives

The recreational ORV is primarily related to fishing and floatboating on the river. Access to the river from BLM-administered lands is very limited. Boat launches are on lands not administered by the BLM. The fisheries rely on habitat and management outside of the BLM control; sport fisheries are generally managed by the state. For these reasons, BLM management has limited potential to directly or indirectly influence the recreational ORV. Effects would not be significantly different between the alternatives.

Alternative A

Any surface-disturbing activity could damage cultural sites. On the other hand, surface disturbance can lead to discovery of unknown resources, increasing scientific knowledge. The study corridor is open to all forms of energy and mineral development, and most of the study corridor is open to ROW location. These types of activities could affect the cultural ORV. Sun River Segment 2 does not have an assigned VRM class. This increases the risk that development could occur that would damage cultural resources. However, the BLM would not authorize an activity that would affect the ORVs on BLM-administered lands.

Alternative B

Under Alternative B, there would be more restrictions on energy and mineral development and ROW location that could affect the cultural ORV. The study corridor would also be managed as VRM Class II or III, further restricting large-scale development activities, especially in the VRM Class II area. The BLM would not authorize an activity that would affect the ORVs on BLM-administered lands, so effects would effectively be the same as under Alternative A.

Alternative C

Under Alternative C, Sun River Segment 2 would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. Under Alternative C, the study corridor would be open to all forms of energy and mineral development, and most of the study corridor would be open to ROW location. These types of activities could affect the cultural ORV. The study segment would be managed as VRM Class III and IV, which would allow changes to the characteristic landscape that are noticeable and dominate the view. These types of actions can be large in size, further increasing the potential for effects on cultural resources.

Alternative D

Under Alternative D, Sun River Segment 2 would be determined unsuitable for inclusion in the NWSRS and would be released from further consideration. Allocations under Alternative D would be nearly the same as under Alternative C; effects would effectively be the same between the two alternatives, and there would be potential for changes to the characteristic landscape when compared with current management.

Cumulative

Several segments are in the Rocky Mountain Front Conservation Area (Blindhorse Creek, Edwards Creek, Frenchy Gulch, North and South Forks Blindhorse Creek, North and South Forks Deep Creek, Pamburn Creek, Rinker Creek, Cutrock Creek, Middle Fork Dearborn River, North Fork Teton River, and Sun River Segment 1). The Rocky Mountain Front Conservation Area Land Protection Plan is a USFWS program to protect a unique, highly diverse, and mostly unfragmented ecosystem by acquiring conservation easements in this area. This project helps protect the Rocky Mountain Front from drastic change caused by widespread, unplanned residential or commercial development. This type of conservation would help protect the scenic ORV on lands not administered by the BLM by maintaining intact landscapes.

The United States and Montana have agreed to the terms of a compact, settling for all time the United States' federal reserved water rights claims for the Charles M. Russell NWR. The Charles M. Russell NWR Reserved Water Rights Compact prevents the construction of new impoundments on the river and establishes water rights for instream use. This would help protect the free-flowing nature of the Sacagawea River, and ensure sufficient flows for the fish ORV.

The recreational ORVs along the Missouri River and Sun River Segments 1 and 2 are related to fishing and floatboating. Access to the river from BLM-administered lands is very limited. Boat launches and developed recreation sites are on lands not administered by the BLM. The fisheries rely on habitat and management outside of the BLM control; sport fisheries are generally managed by the state. For these reasons, BLM management has limited potential to directly or indirectly influence the recreational ORV.

Scenic values for the Sun River Segment 1 are primarily provided by the Rocky Mountain Front on National Forest System land next to the segment. Because of this, the BLM's capacity to manage and protect this value is low. Similarly, cultural values for Sun River Segments 1 and 2 lie primarily in unrecorded cultural sites along the length of the river, potentially including BLM-administered lands. Therefore, the BLM's capacity to manage and protect this resource is limited to those sites potentially on BLM-administered lands.

Most of the segments are very short or are interspersed with lands not administered by the BLM. Landownership surrounding all segments is very fragmented, making effective management of the ORVs difficult.

4.4.5 Wilderness Study Areas

Effects Common to All Alternatives

BLM Manual 6330 (BLM 2012a) requires WSAs to be managed so as to not impair their suitability for preservation as wilderness. Square Butte would retain its wilderness characteristics and suitability for preservation. The lack of public access also helps to maintain the area's suitability for preservation.

Cumulative

The cumulative effect analysis area is the Square Butte WSA and the surrounding area. Continued management to the nonimpairment standard would maintain the area's suitability for preservation as wilderness.

4.5 SOCIAL AND ECONOMIC

4.5.1 Social and Economic Conditions

Economic Effects

Effects Common to All Alternatives

Resources (e.g., air and special status species) do not have a direct effect on the analysis area economy. Resource uses (e.g., livestock grazing and recreation and visitor use) are the channels through which BLM management directly affects local economic conditions. However, this does not mean that BLM-administered land resources that are not managed for use and consumption lack economic value. The natural and cultural resources on public lands that the LFO manages will be addressed in the discussion of non-market and social values. Given data limitations, this discussion will be largely qualitative, and not detailed enough to separate the economic effect of distinct resources. Therefore, this analysis will group resources together under the category of the protection of natural and cultural resources, which will include a discussion of administrative designations and values associated with sense of place (SoP).

Table 4-46, Employment by Resource Area, by Alternative), and **Table 4-47**, Annual Labor Income by Resource Area, by Alternative (Thousands 2010 USD), display estimated employment and labor income attributable to activities on BLM-administered lands in the LFO, by resource area. As the tables show, employment and labor income are expected to be consistent across alternatives for several activities. Economic effects from BLM expenditures would be the same for each alternative. Although non-market values and payments-in-lieu-of-taxes are expected to differ between alternatives, the discussion of their effects is largely consistent across alternatives. Therefore, these three topics will be addressed in this section. In addition, economic analysis of the RFD scenario for oil and gas will be presented here.

Analysis of other resource uses, and activities will occur in subsequent alternative-specific sections, with reference to these tables.

From 2009 to 2013, the LFO employed an average annual workforce of approximately 55 full-time employees and 60 other than permanent employees. Over this period, the LFO spent approximately \$2.0 million on non-salary goods and services (e.g., equipment for trail maintenance) and \$5.9 million on salary. The LFO employees live in the planning area, and likely spend a large percentage of their income purchasing goods and services in the local area.

Likewise, some of the non-salary expenditures of the LFO procure goods and services from local businesses, which affect local employment and income. LFO expenditures (salary and non-salary) contribute approximately 160 jobs and \$614,000 in labor income to the analysis area economy, annually (**Table 4-46**, Employment by Resource Area, by Alternative).

Table 4-46
Employment by Resource Area, by Alternative

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Grazing	231	116	231	231
Recreation	90	92	93	94
Minerals	-	17	20	19
<i>Unconstrained RFD Scenario</i>	24	-	-	-
<i>Constrained RFD Scenario</i>	0	-	-	-
Timber	14	14	26	22
Externally funded management	7	7	7	7
Payments to states and counties	13	14	14	14
BLM expenditures	160	160	160	160
Total BLM management¹	540 (Unconstrained) 516 (Constrained)	420	551	546

¹Totals may not reflect the sum due to rounding.

Table 4-47
Annual Labor Income by Resource Area, by Alternative (Thousands 2010 USD)

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Grazing	\$3,324	\$1,662	\$3,324	\$3,324
Recreation	\$2,717	\$2,767	\$2,806	\$2,813
Minerals	-	\$682	\$798	\$759
<i>Unconstrained RFD Scenario</i>	\$974	-	-	-
<i>Constrained RFD Scenario</i>	\$0.05	-	-	-
Timber	\$1,455	\$1,476	\$2,677	\$2,240
Externally funded management	\$262	\$262	\$262	\$262
Payments to states and counties	-	\$599	\$606	\$606
<i>Unconstrained RFD Scenario</i>	\$579	-	-	-
<i>Constrained RFD Scenario</i>	\$559	-	-	-

Resource	Alternative A	Alternative B	Alternative C	Alternative D
BLM expenditures	\$8,157	\$8,157	\$8,157	\$8,157
Total BLM management	\$17,466 (Unconstrained) \$16,472 (Constrained)	\$15,604	\$18,630	\$18,160

¹Totals may not reflect the sum due to rounding.

None of the alternatives are expected to affect LFO expenditures. However, future expenditures are uncertain and the economic effect depends on federal budget allocations.

A portion of the management activities occurring on BLM in the planning area are conducted with funds appropriated to the LFO for salary and program related expenditures discussed above. These funds often come from external sources such as stewardship grants or donations from partners. It is anticipated that current opportunities for collaboration with partners and external funding of management on the LFO would continue under all the alternatives. As a result, current contributions associated with externally funded projects contribute seven total jobs and \$262,000 in labor income, annually; (Table 4-46 and Table 4-47) this would continue under all the alternatives.

The BLM administers a fee policy that is outlined in its Recreation Permits and Fees Manual (2930) and Recreation Permit and Fee Administration Handbook (H-2930-1, BLM 2014). The purpose of this program is to establish a permit and fee program that supports the emphasis on resource-dependent recreation opportunities, while responding to demonstrated needs for recreation programs and facility development. These protect resource values and public health and safety.

There are no fee areas in the planning area that currently provide additional sources of revenue under any alternative. However, fee sites may be established in the future, based on demand and use.

Alternative A

Livestock grazing management would not change under this alternative and permitted use would continue providing about 126,000 AUMs annually. On an average annual basis, grazing would support approximately 231 jobs and \$3.3 million in labor income (Table 4-46, Employment by Resource Area, by Alternative). The precise economic effect of grazing on BLM-administered lands in the planning area would depend on forage condition and market conditions.

Regardless, BLM-administered land grazing-related jobs would continue to support important contributions to the agricultural and cattle and sheep ranching sectors in the analysis area economy. As noted in the economic specialization discussion in the AMS (BLM 2018), the analysis area is specialized in the Agricultural sector and the LFO forage contribution supports a maximum of about 16 percent of direct employment in the cattle and sheep ranching sector. Under this alternative the important role the LFO plays in the agricultural sector would continue.

Annual recreation visits to the LFO are estimated at approximately 166,000. These visits are distributed among local and non-local visitors who visit the LFO for the unique opportunities and experiences it has to offer.

Alternative A is not expected to change visit frequency or type. However, the management decisions may affect the experience of recreation users, which is addressed in the recreation effects section. Recreation participation may change as a result of population growth, demographic change, and recreation preferences (e.g., a growth in OHV use). None of these trends are expected to be affected by BLM management decisions.

Table 4-48, Annual LFO Recreation Visits by Type of Trip, displays recreation visitor data for the LFO. These data are used to estimate the economic consequences of recreation on BLM-administered lands within the planning area.

Table 4-48
Annual LFO Recreation Visits by Type of Trip

Visitor Type	Alternative A	Alternative B	Alternative C	Alternative D
Non-local day	34,763	35,806	36,501	36,154
Non-local overnight on BLM	33,107	34,100	34,431	34,762
Non-local overnight off BLM	21,520	21,735	21,950	22,058
Local day	54,627	55,173	56,266	55,720
Local overnight on BLM	18,209	18,573	19,119	19,119
Local overnight off BLM	3,311	3,344	3,410	3,377

Source: BLM 2015b

Elements of recreation opportunities differ between alternatives and these changes result in anticipated increases in visitation and economic effects under the other alternatives, relative to Alternative A. Thus, this alternative provides slightly less employment and labor income to the analysis area economy than the action alternatives (**Table 4-46** and **Table 4-47**). As noted in the AMS (BLM 2018), recreation opportunities and visitation play an important role in the analysis area's recreation-related economy: the analysis area is specialized in the Retail trade sector, and the second largest LFO employment contributions are made to the Accommodation and Food Services sector. These contributions to the analysis area recreation-related economy would continue under this alternative but would be slightly less than anticipated increases under the other alternatives.

Non-local and local recreation visitation supports approximately 90 jobs and \$2.7 million in labor income in the analysis area economy (**Table 4-46** and **Table 4-47**). Non-local visitation is important since non-local visitors bring "new money" into the analysis area economy—that is, money that would not otherwise be spent in the area. Effects from non-locals would contribute 71 and \$2.0 million of the jobs and labor income reported in **Table 4-46** and **Table 4-47**.

Alternative A is expected to support 24 jobs and \$974,000 in labor income from mineral activity on BLM within the planning area (**Table 4-46** and **Table 4-47**) when oil and gas protest resolution is not accounted for. This unconstrained scenario includes contributions from oil and gas (production and drilling) in addition to a small contribution from sand, gravel, and clay uses (less than 1 percent of employment and labor income contributions). While the employment and labor income contributions from sand, gravel, and clay are small; the use of these materials is important to analysis area communities for road resurfacing and other needs. These uses would continue under this alternative.

Anticipated oil and gas drilling would be less under this alternative than contributed currently with anticipated decreases in well activity (from 31 and 56 dry and producer holes, respectively, to 18 and 50 over the life of the plan) resulting in decreases in oil and gas production: from 20,437 oil barrels (bbl) and 10,111 thousand cubic feet (MCF) in 2013 to 18,247 bbl and 9,028 MCF on an average annual basis, under this alternative.

Effects associated with drilling would be greater than under the other alternatives; providing 4 jobs and \$190,000 in labor income to the analysis area economy, annually. Effects associated with production would also be greater than the other alternatives; providing 20 jobs and \$747,000 in labor income to the analysis area economy, annually. While greater than the other alternatives, this alternative would contribute less to the oil and gas industry than currently. As noted in the AMS (BLM 2018), the LFO currently contributes about 8 percent of analysis area employment in sectors relating to production of oil and gas, drilling of oil and gas wells, and support activities for oil and gas operations.

The effect of applying the protest resolution for fluid minerals, under the constrained RFD scenario, would eliminate the economic effects associated with oil and gas drilling and production. With the constrained RFD scenario, 24 fewer jobs and \$994,000 less in labor income would be generated on an average annual basis.

As a result of anticipated decreases in oil and gas production, revenue sharing with local governments would also decrease under Alternative A (from \$48,000 currently to \$45,000). Current employment and labor income contributions from oil and gas related payments are less than 5 percent of contributions to states and counties depicted in **Table 4-46** and **Table 4-47**. As a result of the decrease in royalties, employment and income would

decrease by less than a quarter of a job and \$10,000 in labor income. In addition, when the effect of applying the protest resolution for fluid minerals is examined under the constrained RFD scenario, revenue sharing associated with oil and gas production would be eliminated.

Softwood saw timber, poles, posts, fuel wood, and other forest products (biomass and Christmas trees) are removed from the LFO for both commercial and personal use. Under Alternative A, allowable cut limits are approximately 3.3 MMBF/year and should continue to support current levels of demand for forest products (average cut currently is around 2-3 MMBF/year). The harvesting and processing of current forest products support 14 jobs and \$1.5 million in local labor income in the analysis area economy, annually (**Table 4-46** and **Table 4-47**).

In addition, feedstock available for utilization in biomass facilities would continue to be made available, however; based on recent trends (see the AMS [BLM 2018]), the development of new biomass facilities within the planning area is unlikely (see **Section 4.3.6**).

While the BLM is a small contributor of forest products and employment to the analysis area, these contributions may be more important for individual counties and communities, and would continue under this alternative. In addition, the LFO would continue to provide forest products important for personal and subsistence uses.

Payments in lieu of taxes (PILTs) are paid to counties with federal lands to offset the loss in property tax revenue that arises from the tax-free status of federal lands. In FY 2015, counties with BLM-administered lands in the LFO received approximately \$1.3 million in PILT attributable to BLM in the LFO (DOI 2015) which resulted in 13 jobs and \$581,000 in labor income (approximately 95 percent of contributions from current payments to counties).

The decisions to be made in this RMP may affect the number of acres that the LFO makes available for disposal. Any acres that transfer from public to private ownership would no longer provide PILT. However, privately held land would be subject to property taxes.

Under Alternative A, current payments could decrease if lands identified for disposal are conveyed. Alternative A has the greatest potential, of all the alternatives, to decrease the amount of BLM-administered lands by continuing to identify 6 percent (40,900 acres) of the decision area for disposal (see **Section 4.3.5**). Under a maximum potential disposal scenario this would reduce employment and income effects by less than 1 job and less than \$40,000 in labor income from current contributions.

ROWs would continue to be limited, under this alternative, through avoidance and exclusion areas as discussed in **Section 4.3.5** on lands and realty. Alternative A would continue to eliminate future land use authorizations on 2 percent (15,700 acres) of the decision area by managing those lands as ROW exclusion areas.

Alternative A would also continue to limit the location, extent, and types of new ROW development on 58 percent (378,700 acres) of the decision area by managing those lands as ROW avoidance areas. Since these restrictions are a reflection of current management, effects on dependent community infrastructure and future development are not anticipated. In addition, effects on current levels of revenues received by BLM from ROW leases are not anticipated.

The economic consequences of protected resources (through Administrative Designations or other management decisions) cannot be captured using the economic input-output method used to analyze the economic effects of other resources and uses. The benefits of protected natural and cultural resources exist outside the market economy. The economic contribution estimates calculated for market resources (those discussed above) cannot be compared with non-market values.

The economic values associated with these protected resources are generally called “non-market” or “ecosystem service” values. Non-market values include goods and services that are not bought and sold in markets. The value of recreating on a fee-free site is an example of a non-market value. The lack of an access fee does not diminish the value of the recreation or cultural experience. Ecosystem services are goods and services provided by nature that support human life and well-being. Clean water, biodiversity, and carbon sequestration are examples of

ecosystem services. Although such services are not typically priced in the market, they are fundamental to human existence and are, therefore, quite valuable.

In addition, lands managed to protect wilderness character and other natural amenity values have been shown to attract new residents and tourists to nearby communities (see the AMS [BLM 2018]). In-migration spurs economic growth as new residents engage in business and spend money locally.

Administrative designations and the protection of resources promote non-market and ecosystem service values. Although the precise economic value of the goods and services protected by administrative designations and other management decisions is unknown, a positive relationship between protected acres and non-market/ecosystem service values is a reasonable assumption.

Table 4-49, Areas with Administrative Designation Protection, displays acreage and administrative designation protecting non-market values for all alternatives. Alternative A would provide less protective designation than Alternatives B and D but more than Alternative C. Therefore, Alternative A is estimated to provide greater non-market economic value than Alternative C but less than Alternatives B and D.

**Table 4-49
Areas with Administrative Designation Protection**

Administrative Designations	Alternative A	Alternative B	Alternative C	Alternative D
Areas managed to protect wilderness characteristics (acres)	0	202,400	0	100,410
ACEC (acres)	2,700	2,700	0	2,700
WSR Suitability for Armells Creek	Eligible	Suitable	Released from consideration	Released from consideration

Alternative B

Alternative B would permit 63,021 AUMs annually. These reductions, relative to Alternative A, could result in effects on ability of individual permittees/lessees to maintain operations. Thus, this alternative would result in adverse effects at the individual or community level. On an average annual basis, grazing would support approximately 116 jobs and \$1.7 million in labor income (**Table 4-46** and **Table 4-47**). The precise economic effect of grazing on BLM-administered lands would depend on forage and market conditions. Regardless, BLM-administered land grazing-related jobs would not continue to support important contributions to the agricultural and cattle and sheep ranching sectors in the analysis area economy: as noted in the economic specialization discussion in the AMS (BLM 2018), the analysis area is specialized in the Agricultural sector and the LFO forage contribution currently supports a maximum of about 16 percent of direct employment in the cattle and sheep ranching sector. Under this alternative, the LFO would not play the important role in the agricultural sector. In addition, the loss of available permitted AUMs would result in loss to the agriculture, cattle and sheep ranching sector and adverse effects on individual permittees/lessees in the analysis area economy.

As noted in the AMS (BLM 2018), recreation opportunities and visitation play an important role in the analysis area’s recreation-related economy: the analysis area is specialized in the Retail trade sector, and the second largest LFO employment contributions are made to the Accommodation and Food Services sector. These contributions to the analysis area recreation-related economy would continue under this alternative and would be slightly greater than Alternative A with designation of ERMA’s for Judith Mountains BCA, Cemetery Road BCA, Crooked Creek BCA, and Arrow Creek BCA. This would result in 3 percent increases, over Alternative A, for non-locals on day trips and non-locals staying overnight on BLM (**Table 4-48**).

Non-local visitation is important since non-local visitors bring “new money” into the analysis area economy—that is, money that would not otherwise be spent in the area. Effects from non-locals would contribute 73 and \$2.1 million of the jobs and labor income reported in **Table 4-46** and **Table 4-47**. This is about 2 percent more than non-local contributions under Alternative A.

Alternative B is expected to support 17 jobs and \$682,000 in labor income from mineral activity on BLM within the planning area (Table 4-46 and Table 4-47). This includes contributions from oil and gas (production and drilling) in addition to small contributions from sand, gravel, and clay uses (less than 1 percent of employment and labor income contributions). While the employment and labor income contributions from sand, gravel, and clay are small; the use of these materials is important to analysis area communities for road resurfacing and other needs. These uses would continue under this alternative.

Anticipated oil and gas drilling would be less under this alternative than under Alternatives C and D with more acres closed under the moderate oil and gas potential category (and all categories; see Table 4-46 and Table 4-47); providing 3 jobs and \$133,000 in labor income to the analysis area economy, annually. Effects associated with production would also be less than Alternatives C and D; providing 14 jobs and \$549,000 in labor income to the analysis area economy, annually. While less than Alternatives C and D, some of this decrease is anticipated despite BLM management, as depicted in the discussion of Alternative A above. Regardless, these decreases would occur relative to Alternative A and the other alternatives.

As a result of anticipated decreases in oil and gas production, revenue sharing with local governments would also decrease under Alternative B (from \$48,000 currently to \$38,000), as compared with Alternative A. Current employment and labor income contributions from oil and gas related payments are less than 5 percent of contributions depicted in Table 4-46 and Table 4-47. As a result of the decrease in royalties, employment and income would decrease by less than a quarter of a job and \$10,000 in labor income.

Softwood saw timber, poles, posts, fuel wood, and other forest products (biomass and Christmas trees) are removed from the LFO for both commercial and personal use, and would continue to be made available under Alternative B. Under Alternative B, probable sale quantity would be reduced to 2.7 MMBF/year (from the allowable cut limit of 3.3 MMBF/year under Alternative A), but should continue to support current levels of demand for forest products (average cut currently is around 2-3 MMBF/year; see **Section 4.3.8**). The harvesting and processing of probable sale quantity under this alternative would support 14 jobs and \$1.5 million in local labor income in the analysis area economy, annually (Table 4-46 and Table 4-47).

Since forest treatments would primarily rely upon the use of prescribed fire to restore forest health conditions, there would be fewer opportunities to utilize biomass feedstock for energy generation (see **Section 4.3.8**). However, the BLM would explore opportunities to provide a reliable and sustainable supply of woody biomass, which could help to meet future demands. However, based on recent trends (see the AMS [BLM 2018]), the development of new biomass facilities within the planning area is unlikely (see **Section 4.3.6**).

While BLM is a small contributor of forest products and employment to the analysis area, these contributions may be more important for individual counties and communities, and would continue under this alternative. In addition, the LFO would continue to provide forest products important for personal and subsistence uses.

Under Alternative B, current payments associated with PILT could decrease if lands identified for disposal are conveyed. Alternative B has less potential, than Alternative A, to decrease the amount of BLM-administered lands by identifying 1 percent (9,800 acres) of the decision area for disposal (see **Section 4.3.5**). While PILT attributable to LFO lands is responsible for 95 percent of current employment and labor income contributions associated with payments to counties, the potential decrease in jobs and labor income is very small: under a maximum potential disposal scenario this would reduce employment and income effects by less than one job and less than \$6,000 in labor income from current contributions.

Alternative B would eliminate future land use authorizations on 43 percent (278,800 acres) of the decision area by managing those lands as ROW exclusion areas. In addition, Alternative B would limit the location, extent, and types of new ROW development on 53 percent (342,300 acres) of the decision area by managing those lands as ROW avoidance areas. As a result, the restrictions on ROW development are greater under Alternative B than the other alternatives. Thus, effects on dependent community infrastructure and future development would be greatest under this alternative than the other alternatives. In addition, effects on anticipated levels of revenues received by BLM from ROW leases would also be greatest amongst the alternatives.

The general economic value of special designations and resource protection is discussed under Alternative A.

Table 4-49 displays acreage and administrative designation protecting non-market values for Alternative B. This alternative would provide the most protection among the alternatives. Therefore, Alternative B is estimated to provide the highest non-market economic values among the alternatives.

Alternative C

Economic effects from livestock grazing management, under this alternative, are the same as presented above under Alternative A. Livestock grazing management would not change under this alternative and permitted use would continue providing about 126,000 AUMs annually. On an average annual basis, grazing would support approximately 231 jobs and \$3.3 million in labor income (**Table 4-46** and **Table 4-47**). Under this alternative the important role the LFO plays in the agricultural sector would continue.

Recreation opportunities and visitation play an important role in the analysis area's recreation-related economy: the analysis area is specialized in the Retail trade sector, and the second largest LFO employment contributions are made to the Accommodation and Food Services sector (see the AMS [BLM2018]). These contributions to the analysis area recreation-related economy would continue under this alternative and would be slightly greater than Alternatives A and B with designation of SRMAs for Judith, Lowery, North Moccasins, and Snowies and the designation of ERMAs for Cemetery Road BCA, Crooked Creek BCA, Arrow Creek BCA, and Judith Reservoirs. This would result in 5 percent increase for non-locals on day trips, a 4 percent increase for non-locals staying overnight on BLM-administered lands, and a 2 percent increase for non-locals staying overnight off BLM (**Table 4-48**).

Non-local visitation is important since non-local visitors bring "new money" into the analysis area economy—that is, money that would not otherwise be spent in the area. Effects from non-locals would contribute 73 and \$2.1 million of the jobs and labor income reported in **Table 4-46** and **Table 4-47**. This is about 3 percent more than non-local contributions under Alternative A.

Alternative C is expected to support 20 jobs and \$798,000 in labor income from mineral activity on BLM within the planning area (**Table 4-46** and **Table 4-47**). This includes contributions from oil and gas (production and drilling) in addition to a small contribution from sand, gravel, and clay uses (less than 1 percent of employment and labor income contributions). While the employment and labor income contributions from sand, gravel, and clay are small; the use of these materials is important to analysis area communities for road resurfacing and other needs. These uses would continue under this alternative.

Anticipated oil and gas drilling would be more than under Alternatives A, B, and D, with no acres closed under the moderate oil and gas potential category (and less under all categories) than the other alternatives (see **Table 4-46** and **Table 4-47**); providing 3 jobs and \$155,000 in labor income to the analysis area economy, annually. Effects associated with production would also be more than Alternatives A, B, and D; providing 16 jobs and \$643,000 in labor income to the analysis area economy, annually.

The effects under this alternative are less than Alternative A (under the unconstrained RFD scenario) but some of the decrease is anticipated despite BLM management (as depicted in the discussion of Alternative A above), regardless these decreases would occur relative to Alternative A.

As a result of anticipated decreases in oil and gas production, revenue sharing with local governments would also decrease under Alternative C (from \$48,000 currently to \$41,000). Current employment and labor income contributions from oil and gas related payments are less than 5 percent of contributions depicted in **Table 4-46** and **Table 4-47**. As a result of the decrease in royalties, employment and income would decrease by less than a quarter of a job and \$10,000 in labor income.

Softwood saw timber, poles, posts, fuel wood, and other forest products (biomass and Christmas trees) are removed from the LFO for both commercial and personal use, and would continue to be made available under Alternative C. Under Alternative C, probable sale quantity would be increased to 4.9 MMBF/year (from the allowable cut limit of 3.3 MMBF/year under Alternative A), supporting current levels of demand for forest products and the potential for increased production (average cut currently is around 2-3 MMBF/year; see **Section**

4.3.8). The harvesting and processing of probable sale quantity under this alternative would support 26 jobs and \$2.7 million in local labor income in the analysis area economy, annually (**Table 4-46** and **Table 4-47**).

Under this alternative the BLM would explore opportunities to provide a reliable and sustainable supply of woody biomass (see **Section 4.3.8**), which could help to meet future demands. However, based on recent trends (see the AMS [BLM 2018]), the development of new biomass facilities within the planning area is unlikely (see **Section 4.3.6**).

While the BLM is a small contributor of forest products and employment to the analysis area, these contributions may be more important for individual counties and communities, and would continue under this alternative. In addition, the LFO would continue to provide forest products important for personal and subsistence uses.

Under Alternative C, no lands are identified for disposal, so there would be no affect on current payments associated with PILT resulting from changes in BLM-administered lands.

While PILT attributable to LFO lands is responsible for 95 percent of current employment and labor income contributions associated with payments to counties, the potential decrease in jobs and labor income is very small: under a maximum potential disposal scenario this would reduce employment and income effects by less than one job and less than \$6,000 in labor income from current contributions.

Under Alternative C, the acreage of managed exclusion areas would be less than under Alternative A (2,700 acres). In addition, Alternative C would limit the location, extent, and types of new ROW development on an additional 19 decision area lands (52 percent, or 341,500 acres, of the decision area) by managing these lands as avoidance areas. As a result, effects on dependent community infrastructure and development would be less, under this alternative, than all other Alternatives. In addition, effects on anticipated levels of revenues received by BLM from ROW leases would also be less, under this alternative, than all other Alternatives.

The general economic value of special designations and resource protection is discussed under Alternative A.

Table 4-49 displays acreage and administrative designation protecting non-market values for Alternative C. This alternative would provide the least protection among the alternatives. Therefore, Alternative C is estimated to provide the lowest non-market economic values among alternatives.

Alternative D

Economic effects from livestock grazing management, under this alternative, are the same as presented above under Alternative A. Livestock grazing management would not change under this alternative and permitted use would continue providing about 126,000 AUMs annually. On an average annual basis, grazing would support approximately 231 jobs and \$3.3 million in labor income (**Table 4-46** and **Table 4-47**). Under this alternative the important role the LFO plays in the agricultural sector would continue.

Recreation opportunities and visitation play an important role in the analysis area's recreation-related economy: the analysis area is specialized in the Retail trade sector, and the second largest LFO employment contributions are made to the Accommodation and Food Services sector (see the AMS [BLM 2018]). These contributions to the analysis area recreation-related economy would continue under this alternative and would be slightly greater than the other alternatives with designation of SRMAs for Judith and Lowery and the designation of ERMAs for Judith, North Moccasins, and Snowies. This would result in a 4 percent increase for non-locals on day trips, a 5 percent increase for non-locals staying overnight on BLM, and a 2.5 percent increase for non-locals staying overnight off BLM (**Table 4-48**).

Non-local visitation is important since non-local visitors bring "new money" into the analysis area economy—that is, money that would not otherwise be spent in the area. Effects from non-locals would contribute 74 and \$2.2 million of the jobs and labor income reported in **Table 4-46**. This is about 3 and 4 percent more than Alternative A-non-local employment and labor income contributions.

Alternative D is expected to support 19 jobs and \$759,000 in labor income from mineral activity on BLM within the planning area (**Table 4-46** and **Table 4-47**). This includes contributions from oil and gas (production and

drilling) in addition to small contributions from sand, gravel, and clay uses (less than 1 percent of employment and labor income contributions). While the employment and labor income contributions from sand, gravel, and clay are small; the use of these materials is important to analysis area communities for road resurfacing and other needs. These uses would continue under this alternative.

Anticipated oil and gas drilling would be less under this alternative than under Alternative C but more than Alternative B with 100 acres closed under the moderate oil and gas potential category (and less than Alternative B but more than Alternative C: see **Table 4-46** and **Table 4-47**); providing three jobs and \$148,000 in labor income to the analysis area economy, annually.

Effects associated with production would also be less under this alternative than under Alternative C but more than Alternative B; providing 16 jobs and \$612,000 in labor income to the analysis area economy, annually. Effects under this alternative are less than Alternative A (under the unconstrained RFD scenario) but some of this decrease is anticipated despite BLM management (as depicted in the discussion of Alternative A above); regardless these decreases would occur relative to Alternative A.

As a result of anticipated decreases in oil and gas production, revenue sharing with local governments would also decrease under Alternative D (from \$48,000 currently to \$40,000). Current employment and labor income contributions from oil and gas-related payments are less than 5 percent of contributions depicted in **Table 4-46** and **Table 4-47**. As a result of the decrease in royalties, employment and income would decrease by less than a quarter of a job and \$10,000 in labor income.

Softwood saw timber, poles, posts, fuel wood, and other forest products (biomass and Christmas trees) are removed from the LFO for both commercial and personal use, and would continue to be made available under Alternative D. Under Alternative D, probable sale quantity would be increased to 4.1 MMBF/year (from the allowable cut limit of 3.3 MMBF/year under Alternative A), supporting current levels of demand for forest products and the potential for increased production (average cut currently is around 2-3 MMBF/year; see **Section 4.3.8**). The harvesting and processing of probable sale quantity under this alternative would support 22 jobs and \$2.2 million in local labor income in the analysis area economy, annually (**Table 4-46** and **Table 4-47**).

Under this alternative the BLM would explore opportunities to provide a reliable and sustainable supply of woody biomass (see **Section 4.3.8**), which could help to meet future demands. However, based on recent trends (see the AMS [BLM 2018]), the development of new biomass facilities within the planning area is unlikely (see **Section 4.3.6**).

While BLM is a small contributor of forest products and employment to the analysis area, these contributions may be more important for individual counties and communities, and would continue under this alternative. In addition, the LFO would continue to provide forest products important for personal and subsistence uses.

Under Alternative D, current payments associated with PILT could decrease if lands identified for disposal are conveyed. Alternative C has the same potential, as Alternative B, to decrease the amount of BLM-administered lands by identifying 1 percent (9,800 acres) of the decision area for disposal (see **Section 4.3.5**) which is less than Alternative A. While PILT attributable to LFO lands is responsible for 95 percent of current employment and labor income contributions associated with payments to counties, the potential decrease in jobs and labor income is very small: under a maximum potential disposal scenario this would reduce employment and income effects by less than one job and less than \$6,000 in labor income from current contributions.

Alternative D would manage 0.5 percent more decision area lands than Alternative A (a total of 18,000 acres) as ROW exclusion areas. Compared with Alternative A, Alternative D would limit the location, extent, and types of new ROW development on an additional 11 percent of decision area lands (69 percent, or 446,600 acres, of the decision area) by managing these lands as avoidance areas. As a result, effects on dependent community infrastructure and development would be less, under this alternative, than Alternatives B and C but greater than Alternative A. In addition, effects on anticipated levels of revenues received by BLM from ROW leases would also be less, under this alternative, than Alternatives B and C but greater than Alternative A.

The general economic value of special designations and resource protection is discussed under Alternative A.

Table 4-49 displays acreage and administrative designation protecting non-market values for Alternative D. This alternative would provide more protection than Alternatives A and C and less than Alternative B. Therefore, Alternative D is estimated to provide the less non-market economic values than Alternatives A and C and less than Alternative B.

Social Effects Including Environmental Justice

This section presents the likely social consequences of implementing the alternatives presented in **Chapter 2**. The analysis uses a SoP framework to compare social consequences between alternatives. For the purpose of analysis presented in this section, SoP describes the core values associated with BLM-administered lands in the planning area. The following six SoP values were identified: open space, access, healthy sustainable resources, economic development, customs and cultural interests, and tribal values and interests.

In addition to the SoP values, this social analysis also considers the potential for environmental justice consequences.

Effects Common to All Alternatives

In 1994, President Clinton issued Executive Order 12898 (59 *Federal Register* 32). This order mandates that all federal agencies analyze the potential for their actions to disproportionately affect minority and low-income populations. In the AMS (BLM 2018), the *Social and Economic* section identified several analysis area counties with populations that could present environmental justice issues.

Chouteau County had the highest levels of people and families below poverty, at 21.7 and 16.5 percent, while Petroleum County had the lowest levels of people and families below poverty, at 11.1 and 5.8 percent. Cascade, Chouteau, and Pondera Counties contained at least one poverty rate above the state or national levels. Chouteau and Pondera Counties have higher concentrations of non-Hispanic racial minorities than the state and Cascade County has a higher percentage of Hispanic residents than the state (over the period from 2009-2013).

Cascade, Chouteau, Petroleum, and Pondera Counties are the most likely among the eight counties in the analysis area to face environmental justice issues.

Individuals and families involved in public lands grazing may be characterized as low income. Alternative B would decrease the economic, social, and cultural contribution of grazing on public lands in the LFO. Although private land forage may substitute for public land forage, the cost difference may be prohibitive for ranchers. The reduction in AUMs under Alternative B could lead to a loss of livelihood for some ranchers whose viability depends on LFO forage. However, none of the alternatives are expected to disproportionately affect ethnic or racial groups. Furthermore, under all alternatives, land management actions that could affect tribal interests would be made in consideration of requirements for consultation with tribal governments.

The AMS (2018) defines tribal values and interests as the exercising of traditional practices; such as gathering, hunting, and fishing, and experiencing cultural values, such as sacred sites, spiritual viewsheds and settings, over the unoccupied federal lands as granted by the US government to Native American tribes. The LFO includes numerous natural and cultural resources of importance to tribal members. Under all alternatives, land management decisions would be made in consideration of tribal treaty rights and uses including gathering, hunting, fishing, and practicing tribal cultural activities on public lands administered by the BLM. In addition, tribal governments would be consulted on land management actions and allocations that could affect tribal treaty rights and interests. Effects on tribal interests are discussed at length in **Section 4.5.2**.

Alternative A

Effects on Access Values

As defined in the AMS (BLM 2018), access is “the opportunity or ability for the public to connect to, visit, and use public lands.” In the analysis of social values related to access, two components were identified: (1) the ability to reach public land resources, and (2) the ability to use and enjoy the unique resources provided by the LFO. Dimensions of access are examined using information on areas designated as open, limited, or closed to OHV travel and/or mechanized travel, as presented in the **Section 4.3.4**.

Alternative A would provide the most extensive access to BLM-administered lands via OHV, OSV, or mechanized travel; however, the BLM would not establish routes in travel management areas to support specific resource management decisions and address public needs. Thus, conflicts among the various types of travel modes would be greater under Alternative A than the other alternatives (see **Section 4.3.4**). While providing the most extensive motorized and mechanized access, among the alternatives, would appeal most to residents and visitors who value and rely on motorized and mechanized access, this alternative would be less supportive of access values associated with the ability to use and enjoy unique resources provided by the LFO.

Areas managed to protect wilderness characteristics are a proxy for the emotional connection people have with undeveloped and publicly accessible lands. The preservation of wilderness characteristics also supports the option of present and future generations to enjoy undeveloped public lands. Alternative A would provide less areas managed to protect wilderness character than Alternatives B and D and the same as Alternative C. Thus, this alternative is less supportive of the emotional connection people have with undeveloped accessible values, than Alternatives B and D and the same as Alternative C.

Effects on Customs and Cultural Interests Values

The AMS (BLM 2018) defines customs and cultural interests as a connection to the land based on historical uses and values of traditional importance. The primary customs and cultural interests associated with BLM-administered lands in the LFO were identified as grazing uses and public land access for recreation and other commercial and non-commercial uses. The indicators shown in **Table 4-50**, Customs and Cultural Interests Indicators, by Alternative, captures these values, in addition to the discussion of areas designated as open, limited, or closed to OHV travel and/or mechanized travel (from **Section 4.3.4**).

Alternative A provides the same acreage and forage availability, supporting customs and cultural interests, as Alternatives C and D and more than Alternative B (**Table 4-50**). As a result, this alternative supports community connections to the land, based on historical uses and values of traditional importance, more than Alternative B and the same as Alternatives C and D.

**Table 4-50
Customs and Cultural Interests Indicators, by Alternative**

Customs and Cultural Interests	Alternative A	Alternative B	Alternative C	Alternative D
AUMs	126,042	63,021	126,042	Up to 126,042
Acres available for grazing	636,600	621,200	636,600	636,600

As noted above under *Effects on Access Values*, this alternative provides the most extensive motorized and mechanized access, among the alternatives, and would appeal most to residents and visitors who value and rely on motorized and mechanized access. Thus, this alternative is the most supportive of customs and cultural interests associated with public land access than the other alternatives.

Effects on Economic Development Values

As defined in the AMS (BLM 2018), “economic development” is the opportunity for communities to diversify socially and financially while maintaining or improving their quality of life. Economic development was identified as being either agrarian or tourism/recreation based. As shown in **Table 4-53**, difference in these values between the alternatives are assumed to be similar to the difference in Economic Development that would take place given the alternative.

Alternative A would provide greater potential for economic development than Alternative B but less than Alternatives C and D (**Table 4-51**). The actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities that would be supported under this alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the potential for economic development would be different from the estimates in this analysis. Regardless, economic development values, associated with authorized uses on BLM under this alternative, would be greater than Alternative B but less than Alternatives C and D.

Table 4-51
Economic Development Indicators, by Alternative

Economic Development	Alternative A	Alternative B	Alternative C	Alternative D
Employment	-	420	551	546
<i>(Unconstrained)</i>	540	-	-	-
<i>(Constrained)</i>	516	-	-	-
Labor income (\$000s)	-	\$15,604	\$18,630	\$18,160
<i>(Unconstrained)</i>	\$17,466	-	-	-
<i>(Constrained)</i>	\$16,472	-	-	-

Source: IMPLAN 2012

Potential grazing-related employment and income (231 jobs and \$3.3 million in labor income), and subsequent grazing-related economic development values, would be greater than Alternative B and the same as Alternatives C and D. Potential recreation visitor-related employment and income (90 jobs and \$2.7 million in labor income), and subsequent recreation relative economic development values, would be less than anticipated under the other alternatives.

Effects on Healthy Sustainable Resources Values

The AMS (BLM 2018) defines healthy sustainable resources as a landscape that protects air quality and provides clean water, fish and wildlife habitat, and is a source for agricultural commodity and recreation uses for present and future generations. This value includes many of the elements discussed in the non-market economic values analysis presented under economic environmental consequences. **Table 4-52**, Healthy Sustainable Resources Indicators, by Alternative, displays the indicators and acreages associated with healthy sustainable resources for each alternative.

Table 4-52
Healthy Sustainable Resources Indicators, by Alternative

Healthy Sustainable Resources	Alternative A	Alternative B	Alternative C	Alternative D
ACECs (acres)	22,900	32,000	15,700	26,000
Areas managed to protect wilderness characteristics (acres)	0	202,400	0	100,410
LFO grazing- and recreation-related jobs	322	208	325	325

Alternative A would protect fewer acres through administrative designations, than Alternatives B and D, but it would provide more grazing- and recreation-related jobs compared with Alternative B (grazing- and recreation-related jobs are within 1 percent of Alternatives B and D; **Table 4-52**). For individuals primarily concerned with balancing natural and cultural resource protection with sustainable use, Alternative A would likely be less favored than Alternative D and preferred to Alternative C. In comparison to Alternative B, individuals concerned with balancing natural and cultural resource protection, associated with the Grazing- and Recreation-Related Jobs indicator, would prefer this alternative; however, individuals concerned with balancing natural and cultural resource protection associated with administrative designations would prefer Alternative B.

Effects on Open Space Values

The AMS (BLM 2018), defines open space as areas available to people to practice and/or find emotional, spiritual, and/or beneficial uses. The nature of public lands in a county tends to preserve open space (relative to private ownership). However, several management decisions have been identified as central to the preservation of open space. These management decisions are represented through the indicators: ACEC acres, areas managed to protect wilderness characteristics, acres available for grazing and VRM Class I and Class II acres; where outcome-focused objectives would be protected by maintaining the scenic quality of those lands (for example, there would continue to be limitations on how and where routes are constructed in these areas because any new routes must be constructed to meet the VRM objectives). See **Table 4-53**, Open Space Indicators, by Alternative.

**Table 4-53
Open Space Indicators, by Alternative**

Open Space Indicators (acres)	Alternative A	Alternative B	Alternative C	Alternative D
ACECs	22,900	32,000	15,700	26,000
Areas managed to protect wilderness characteristics	0	202,400	0	100,410
Grazing available	636,600	621,200	636,600	636,600
VRM Class I and Class II	120,700	346,400	16,800	141,200

Alternative A provides less protection of open space than Alternatives B and D but more than Alternative C (**Table 4-53**). Alternative A is less likely to support open space values than Alternative B due to fewer acres in areas managed to protect wilderness characteristics and VRM Class I and Class II. Alternative A is more likely to support open space values than Alternative C due to additional ACEC acres and acres in VRM Class I and Class II. Thus, Alternative A supports less open space values than Alternatives B and D but more than Alternative C.

Alternative B

Effects on Access Values

Alternative B would close the greatest number of acres to motorized, OSV, and mechanized travel. This would reduce access for motorized vehicles, especially in backcountry settings such as lands with wilderness characteristics and certain ACECs (see **Section 4.3.4**). As a result, this alternative would be the least supportive of motorized and mechanized access values associated with the ability to reach public land resources and the ability to use and enjoy unique resources provided by the LFO.

Alternative B would provide more areas managed to protect wilderness character than the other alternatives; thus, this alternative may appear more supportive of the emotional connection people have with general physical access and undeveloped accessible values. However, as noted above, reduction in access to these areas would temper the emotional value these lands provide for those seeking physical access to these areas. Regardless, the value would be greatest, among the alternatives, for individuals who do not frequently, or ever, visit these lands and value knowing that the lands exist.

Effects on Customs and Cultural Interests Values

Alternative B provides less acreage and forage availability, supporting customs and cultural interests, than the other alternatives (**Table 4-53**). As a result, this alternative supports community connections to the land, based on historical uses and values of traditional importance, less than the other alternatives.

As noted above under *Effects on Access Values*, this alternative would be the least supportive of access values associated with the ability to reach public land resources and the ability to use and enjoy unique resources provided by the LFO. Thus, this alternative is the least supportive of customs and cultural interests associated with public land access than the other alternatives.

Effects on Economic Development Values

Alternative B would provide the least potential for economic development among the alternatives (**Table 4-46**). The actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities that would be supported under this alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the potential for economic development would be different from the estimates in this analysis. Regardless, economic development values, associated with authorized uses on BLM under this alternative, would be less than the other alternatives.

Decreases in grazing-related employment and income under this alternative are responsible for the decrease in potential economic development value under this alternative. Grazing-related employment and income (116 jobs and \$1.7 million in labor income), and subsequent grazing-related economic development values, would be less than the other alternatives. Potential recreation visitor-related employment and income (92 jobs and \$2.8 million

in labor income), and subsequent recreation relative economic development values, would be higher than Alternative A and less than Alternatives C and D.

Effects on Healthy Sustainable Resources Values

Alternative B would protect more acres through administrative designations, than the other alternatives, but it would provide less grazing- and recreation-related jobs than the other alternatives (**Table 4-52**). Individuals concerned with balancing natural and cultural resource protection, associated with the Grazing- and Recreation-Related Jobs indicator, would not prefer this alternative over the other alternatives; however, individuals concerned with balancing natural and cultural resource protection, associated with the administrative designations indicator, would prefer this alternative.

Effects on Open Space Values

Alternative B provides more protection of open space than the other alternatives with higher acreage in ACECs, areas managed to protect wilderness characteristics and VRM Class I and Class II (acreage in ACECs and acres available for grazing are the same as Alternative D; **Table 4-53**). As a result, Alternative B is the most likely to support open space values among the alternatives.

Alternative C

Effects on Access Values

Under alternative C, OHV allocations would be the same as under Alternative A while additional restrictions would be placed on OSV and mechanized travel. Therefore, effects on OHV access would be the same, but OSV and mechanized travel access value would be less than Alternative A (see **Section 4.3.4**). As a result, this alternative would be the less supportive of mechanized and motorized access values associated with the ability to reach public land resources and the ability to use and enjoy OSV and mechanized travel resources, than Alternative A.

Alternative C would provide less areas managed to protect wilderness character than Alternatives B and D and the same as Alternative A. Thus, this alternative is less supportive of general physical access and the emotional connection people have with undeveloped accessible values, than Alternatives B and D and the same as Alternative A.

Effects on Customs and Cultural Interests Values

Effects under this alternative, supporting customs and cultural interests, associated with grazing acreage and forage availability are the same as discussed under Alternative A.

As noted above under *Effects on Access Values*, this alternative would be the less supportive of access values associated with the ability to reach public land resources and the ability to use and enjoy OSV and mechanized travel resources, than Alternative A. Thus, this alternative is the less supportive of customs and cultural interests, associated with public land access, than Alternative A.

Effects on Economic Development Values

Alternative C would provide the greatest potential for economic development among the alternatives (**Table 4-46**). The actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities that would be supported under this alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the potential for economic development would be different from the estimates in this analysis. Regardless, economic development values, associated with authorized uses on BLM under this alternative, would be less than the other alternatives.

Grazing-related employment and income (231 jobs and \$3.3 million in labor income), and subsequent grazing-related economic development values, are the same as Alternatives A and D and greater than Alternative B. Potential recreation visitor-related employment and income (93 jobs and \$2.8 million in labor income), and subsequent recreation relative economic development values, would be higher than Alternatives A and B and less than Alternative D.

Effects on Healthy Sustainable Resources Values

Alternative C would protect the least acres through administrative designations, among the alternatives, but it would provide more grazing- and recreation-related jobs than Alternative B (**Table 4-52**). Individuals concerned with balancing natural and cultural resource protection, associated with the Grazing- and Recreation-Related Jobs indicator, would prefer this alternative over Alternatives A and B; however, individuals concerned with balancing natural and cultural resource protection, associated with the administrative designations indicator, would not prefer this alternative.

Effects on Open Space Values

Alternative C provides less protection of open space than the other alternatives with the least protection of open space: acreage in available grazing are the same as Alternative D and acreage in areas managed to protect wilderness characteristics is the same as Alternative A (**Table 4-53**). As a result, Alternative B is the least likely to support open space values among the alternatives.

Alternative D

Effects on Access Values

Under Alternative D, effects from OHV and OSV allocations would be similar to those under Alternative C with fewer acres limited seasonally; allowing for greater year-round access via OHV and more flexibility for OSV access. Effects from mechanized travel allocations would be similar to those under Alternative C (see **Section 4.3.4**). As a result, this alternative would be the more supportive of motorized and mechanized access values associated with the ability to reach public land resources and the ability to use and enjoy OHV and OSV travel resources, than Alternatives B and C but less than Alternative A.

Alternative D would provide less areas managed to protect wilderness character than Alternative B but more than Alternatives A and B; thus, this alternative would be more supportive of general physical access and the emotional connection people have with undeveloped accessible values than Alternatives A and B and less supportive of these values than Alternative B.

Effects on Customs and Cultural Interests Values

Effects under this alternative, supporting customs and cultural interests, associated with grazing acreage and forage availability are the same as discussed under Alternative A.

As noted above under *Effects on Access Values*, this alternative would be the more supportive of access values associated with the ability to reach public land resources and the ability to use and enjoy OHV and OSV travel resources, than Alternatives B and C but less than Alternative A. Thus, this alternative is the less supportive of customs and cultural interests, associated with public land access, than Alternatives B and C but less than Alternative A.

Effects on Economic Development Values

Alternative D would provide less potential for economic development than Alternative C but more potential than Alternatives A and B (**Table 4-46**). The actual changes in the economy would depend on individuals taking advantage of the resource-related opportunities that would be supported under this alternative. If market conditions or trends in resource use were not conducive to developing some opportunities, the potential for economic development would be different from the estimates in this analysis. Regardless, economic development values, associated with authorized uses on BLM under this alternative, would be less than the other alternatives.

Grazing-related employment and income (231 jobs and \$3.3 million in labor income), and subsequent grazing-related economic development values, are the same as Alternatives A and C and greater than Alternative B. Potential recreation visitor-related employment and income (94 jobs and \$2.8 million in labor income), and subsequent recreation relative economic development values, would be greater than the other alternatives.

Effects on Healthy Sustainable Resources Values

Alternative D would protect fewer acres through administrative designations than Alternative B but more than Alternatives A and C. In addition, alternative D would provide more grazing- and recreation-related jobs compared with Alternative B (**Table 4-52**). For individuals primarily concerned with balancing natural and cultural

resource protection with sustainable use, Alternative D would likely be preferred over Alternatives A and C. In comparison to Alternative B, individuals concerned with balancing natural and cultural resource protection, associated with the Grazing- and Recreation-Related Jobs indicator, would prefer this Alternative; however, individuals concerned with balancing natural and cultural resource protection associated with administrative designations would prefer Alternative B.

Effects on Open Space Values

Alternative D is less likely to support open space values than Alternative B due to fewer acres in areas managed to protect wilderness characteristics and VRM Class I and Class II (**Table 4-53**). Alternative B is more likely to support open space values than Alternatives A and C due to additional ACEC acres, areas managed to protect wilderness characteristics and acres in VRM Class I and Class II. Thus, Alternative D supports less open space values than Alternative B and more than Alternatives A and C.

Cumulative

Past and present levels of employment and labor income associated with other projects, occurring in the area (**Table W-2, Appendix W**) have the potential to accrue alongside the employment and labor income effects under the alternatives, depicted in **Table 4-46** and **Table 4-47**. The direct and indirect effects specific to these projects is unknown; however, past and present economic activity has already been absorbed by the local economy and is represented in the socioeconomic affected environment section presented above. The effects on these sectors, alongside past and present economic activity, are depicted in **Table 4-54**, Annual Employment Contributions to Analysis Area Sectors.

The largest contributions, alongside other sector specific economic activity, are experienced in the Mining, Agriculture and Government sectors (**Table 4-54**). As discussed in the AMS (BLM 2018), the eight-county analysis area is most specialized Agriculture, Health Care and Social Assistance, and Government sectors. While this sector is important to the economic vitality of the eight-county analysis area, the potential LFO effects, under the alternatives represent a relatively small cumulative economic effects on past and current activities. Cumulative economic effects on total employment, across all the alternatives, would constitute less than 1 percent of employment totals in the eight-county analysis area (**Table 4-54**). Consequently, actions under this RMP/EIS would have small cumulative economic effects relative to past and present economic conditions. In addition, cumulative effects from reasonably foreseeable future projects would occur to the eight-county analysis area. The degree to which the economic environment would be affected, as well as the distribution of effects, cannot be determined from the information available. However, the small cumulative economic effect from past and present activities indicates cumulative economic effects related to reasonably foreseeable future activities are likely to be small.

**Table 4-54
Annual Employment Contributions to Analysis Area Sectors**

Category	Total Area Employment	Alternative A	Alternative B	Alternative C	Alternative D
Agriculture	6,621	3.0%	1.5%	3.0%	3.0%
Mining	206	6.3%	4.4%	5.1%	4.9%
Utilities	343	0.4%	0.3%	0.4%	0.4%
Construction	4,414	0.1%	0.1%	0.1%	0.1%
Manufacturing	1,639	0.3%	0.3%	0.5%	0.5%
Wholesale Trade	2,147	0.5%	0.4%	0.5%	0.5%
Transportation and Warehousing	1,857	0.5%	0.3%	0.5%	0.5%
Retail Trade	8,162	0.4%	0.4%	0.5%	0.5%
Information	1,101	0.3%	0.2%	0.3%	0.3%
Finance and Insurance	3,456	0.3%	0.2%	0.3%	0.3%
Real Estate and Rental and Leasing	1,694	0.8%	0.5%	0.8%	0.8%

Category	Total Area Employment	Alternative A	Alternative B	Alternative C	Alternative D
Prof, Scientific, and Tech Services	2,646	0.4%	0.3%	0.4%	0.4%
Management of Companies	178	0.5%	0.4%	0.5%	0.5%
Administration, Waste Management, and Removal Services	2,175	0.3%	0.2%	0.3%	0.3%
Educational Services	861	0.2%	0.2%	0.2%	0.2%
Health Care and Social Assistance	9,050	0.2%	0.2%	0.2%	0.2%
Arts, Entertainment, and Recreation	1,902	0.8%	0.8%	0.8%	0.8%
Accommodation and Food Services	5,316	0.9%	0.9%	0.9%	0.9%
Other Services	4,068	0.3%	0.3%	0.3%	0.3%
Government	12,743	1.0%	1.0%	1.0%	1.0%
Totals¹	70,578	0.8%	0.6%	0.8%	0.8%

¹Totals may not reflect the sum, due to rounding.

4.5.2 Tribal Interests

Effects Common to All Alternatives

Trees, shrubs, and plants or their fruits and seeds are traditionally used by tribes for subsistence, clothing, basketry, shelter, utilitarian items, and medicines. Under all alternatives, effects would include removal, damage, or contamination of these resources, thereby making them unavailable for subsistence or traditional use. On the other hand, while there may be short-term effects from vegetation treatments, the long-term effects, such as reduction or elimination of noxious weeds and building healthier plant communities, would allow for proliferation of important plant species.

Protecting cultural resources and some vegetation communities (which can have special significance in Native American cultures) across alternatives would provide protections to traditional use areas and tribal sensitive sites. **Section 4.2.4** contains an analysis of effects on vegetation communities, including those that may be important to Native American cultures. Continuing to consult and cooperate with Native American tribes would allow the BLM to continually compile information on traditional cultural properties, sacred sites, and cultural landscapes, allowing better future management and protections of these sensitive areas.

Under all alternatives, vegetation treatment actions may be unable to avoid plants identified by tribes as being important in traditional subsistence, religious, or other cultural practices. Types of effects would be the same as or similar to those described above in **Appendix W**.

Wildfire could result in direct disturbance or loss of tribal resources through the destruction or modification of structures, features, artifacts, rock art sites, cultural use areas, and culturally modified trees (Tratebas et al. 2004; Greer and Greer 2001; Buenger 2003). Organic materials are especially vulnerable to heat damage.

Fire management activities would involve ground-disturbing activities that could also directly affect resources by altering the spatial relationships in archaeological sites or destroying important plant gathering sites. Using fire retardant chemicals could leave dangerous chemical residues on plant resources used in ceremonies or as food sources. Cultural sites exposed by fire or prepared for fire avoidance in prescribed burns are more susceptible to unauthorized collection and vandalism. Rehabilitating burned areas can lead to the subsequent spread of noxious weeds and excessive erosion.

Effects from wildfires would be similar to those from prescribed fire, but prescribed fire is an undertaking subject to project-level analysis and the Section 106 process, including tribal consultation, that would help mitigate any effects prior to the burn.

There are many protective measures, such as special designations, OHV and access restrictions, and protections from surface-disturbing activities. While protecting cultural resources and sensitive Native American resources and sites, they may inhibit Native American cultural uses in these same areas by restricting access to traditional use areas, traditional resources, or sensitive sites.

On the other hand, these measures can protect sensitive Native American resources, sites, and uses by reducing or avoiding erosion, setting intrusions, vandalism, and unauthorized collection of cultural resources.

Excavations have direct destructive effects on cultural resources; the very nature of excavation is to remove in situ cultural artifacts and intact cultural depositions. The trade off, and mitigation for these effects, is recordation of the information in minute detail for future researchers to see, interpret, and further understand the data collected during excavation. Some tribes feel that excavation should be avoided when possible and that the increase in scientific knowledge is less important than leaving the cultural resources alone. Compliance with Section 106 would result in cooperation between the BLM and the tribes to determine the best options if excavation or treatment of culturally sensitive resources is required or appropriate.

The concept of managing areas to protect their heritage values at the landscape level provides protections and focuses management on preservation of rock art localities and traditional use areas by protecting the settings' integrity. Reducing general public access to heritage areas could decrease contact by visitors who could intentionally or accidentally damage resources or sites by collecting surface artifacts, vandalism, or illegally digging into sites.

Management actions in the alternatives include surface use and ground disturbance restrictions, prohibitions on motorized and OHV travel, VRM classifications, and other restrictions on activities that result in surface disturbance, visitor access, and viewshed preservation or intrusions. While the wilderness and WSA designations help preserve and enhance culturally important natural resources, access limitations could result in the decreased ability of Native Americans to use traditional resources and sites. Should the WSA become a designated wilderness area, then these protections would continue into the future.

Protections afforded by the management measures for lands with wilderness characteristics would provide protections for tribal resources. Management measures are surface use and ground disturbance restrictions, prohibitions on motorized and OHV travel, VRM classifications, and other restrictions on incompatible activities. While managing to protect wilderness characteristics would help preserve and enhance culturally important natural resources, there could be effects on Native American access that could limit uses of traditional resources and sites.

Indirect effects from managing for scenic values are introducing visual, atmospheric, or audible elements into an area's setting or changing the character of the physical features in a setting that contribute to its religious or tribal significance.

The magnitude of an effect would depend on the level of management and the VRM classification allocated to an area; the effect would range from none (such as in a VRM Class I area) to possibly allowing extensive modern intrusions (such as in a VRM Class IV area).

The duration of the effect would depend on the length of time needed to restore the setting to its original nature; areas with temporary disturbance and that are restored immediately would have effects lasting a few days to a few years, whereas a newly built modern facility or feature would last for many years and possibly remain permanently. However, as noted above, while visual and aural settings could be restored, it is unlikely that some cultural or sacred uses could be restored, resulting in permanent loss of areas for cultural uses and religious value.

Areas classified as VRM Class I would preserve the existing character of the landscape and would give the highest level of protection to sensitive cultural landscapes. VRM Class II would retain the existing character of the landscape, and the level of change should be very low. Both classifications would limit changes to the landscape to an extent that they provide protections for tribal visual intrusion and setting concerns. However, Class III and Class IV management allows for moderate to intensive modifications of the landscape setting, resulting in the possibility for more intrusions and disturbance to the landscape and viewshed. Areas with these classifications

provide few to no protections, and, if development were to occur in areas with sensitive settings for tribes, there could be increased concerns that may or may not be resolved via tribal consultations.

Developing fluid minerals, coal, nonenergy solid leasable minerals, locatable minerals, mineral materials, transportation systems, transmission lines, communication sites, renewable energy resources, and other land use authorizations can disturb large tracts of land containing many tribally significant locations and landscapes and affect the setting of these areas over a great distance and duration.

Defining areas closed to oil and gas leasing, areas with major constraints (such as NSO stipulations on oil and gas leases), areas with moderate constraints (such as additional restrictive stipulations on leases), areas allocated for withdrawal from mineral entry, and exclusion and avoidance areas for ROWs and other realty actions reduces the potential for these effects on tribally significant areas resulting from discretionary actions. For lands and realty actions, siting land use authorizations along existing corridors or in previously disturbed areas would reduce the likelihood for disturbing tribally significant areas but would not eliminate them.

In areas available for forestry and woodland products, harvesting and transporting trees disturbs the surface by road building, moving equipment in and out, and dragging trees after harvest. This surface-disturbing activity would result in the same effects noted in **Section 4.2.7**. Additionally, areas that have been clear cut or thinned out would have visible scarring and would change the landscape viewshed, which results in a change to the natural scenic qualities of cultural landscapes and sites. There is also the possibility for removing culturally modified trees, but no culturally modified trees are currently known to exist in the planning area.

Recreational use would have the potential for effects on tribal interests from recreation or intentional vandalism or unauthorized collection. Increased use of the Internet by interested individuals to disseminate site location and encourage visitation to sites that are unrecorded or have not been allocated to public use can expose tribal resources to effects.

Actions under all alternatives to protect springs and wetland riparian areas from livestock grazing would help protect water features and sources that may be culturally important to tribes.

Reducing access by closing roads or restricting travel could protect heritage resources; however, decreasing access could restrict tribal members' access to important or significant locations or sites. Allowing authorized tribal members access to various resources by using administrative roads (those closed to the general public, but travel is allowed by authorized personnel) would mitigate this effect. The BLM is continuing to consult with tribes to identify areas that should be made available to tribal members (through administrative access or as part of an open route designation).

In addition to possible access issues, if an action called for surface-disturbing activities (e.g., new road construction or rehabilitation of closed routes), the nature, duration, and magnitude of the effects would be the same as those described for cultural resources.

All alternatives include provisions to retain and acquire lands that contain culturally sensitive areas, to maintain access to resources, to reduce incompatible uses, and to minimize disturbance when authorizing ROWs. Land tenure adjustments and new transportation facilities that allow for better access to public lands could facilitate cultural uses but could also lead to vandalism or unauthorized collection from cultural sites of artifacts that hold value to tribal members.

Developing and operating transportation systems, pipelines, transmission lines, communication sites, renewable energy resources, and other land use authorizations can disturb large tracts of land containing many traditional use areas and sites, affecting viewshed settings over a great distance. Defining exclusion and avoidance areas for ROWs and other realty actions reduces the potential for effects on tribal interests resulting from discretionary actions at those locations. Siting ROWs along existing corridors does not reduce the potential for effects because existing corridors could be affecting viewsheds and tribal concerns may not have been taken into consideration.

Special designation areas are afforded special management measures designed to protect a variety of resource values, including geologic, botanic, historic, cultural, scenic, fish and wildlife resources, and rare or exemplary

natural systems. Protections afforded by the management measures for these special designations would provide additional indirect protections for tribal resources.

Management measures are surface use and ground disturbance restrictions, prohibitions on motorized and OHV travel, VRM classifications, and other restrictions on incompatible activities. Designation may help preserve and enhance important Native American natural resources, but in some instances restrictions could impede Native American access and uses. Designations may attract more recreational use and the potential for inadvertent effects on traditional use areas or other tribal resources. Increased use of the Internet by interested individuals to disseminate site location and encourage visitation to sites that are unrecorded can expose tribal use areas and resources to effects.

Differences in the range of effects between the alternatives is readily seen in the differences of acreage with protections versus the extent of areas with limited or no protections, or in the frequency of actions such as actions done annually or every 10 years. For example, more areas allocated to VRM Class I and Class II, more areas closed to leasing, or more areas allocated as exclusion for ROWs are less likely to have actions that would damage, destroy, or modify significant tribal sites, localities, and landscapes, or impinge on tribal members' use of an area. However, merely stating the acreage differences between alternatives is not an effective measure or gauge of the severity or magnitude of the effect.

As noted above in the *Methods of Analysis*, the effects on areas or resources of tribal interest and the severity of effects is dependent on the perspective and context of the tribe or affected group. In other words, significant effects would be determined by Indian tribes defining what is culturally or spiritually important to them. This meaning is determined through ongoing consultations and can change depending on the specifics of the project, location, and type of anticipated effect.

Cumulative

The types of effects on tribal resources that have occurred in the past are destruction of the cultural sites, destruction or damage to traditional cultural properties, loss of integrity to these areas due to physical or other disturbances, loss of setting, degradation from natural processes such as fire, incremental disturbance from use or access, and effects from vandalism and unauthorized collection. Loss of access to traditional cultural properties has not been specifically identified through consultation but is possible.

Current and future trends in the planning area are ongoing mineral development, land use authorizations, grazing, increase in recreational demand, invasive species, erosion, wildfire, forest disease and insects, drought, and climate variability. These would continue to affect heritage resources and landscapes through loss or disturbance of resources that are not or cannot be protected, changes in setting, pressure from incremental use, loss of access for Native Americans to resources, and theft or vandalism of cultural resources.

Actions related to mineral development, land use authorizations, recreation, grazing, vegetation treatment, and wildfire have had past effects and are expected to continue to affect heritage resources. Increased frequency of wildfire due to drought, climate variability, and forest health may lead to additional direct loss of heritage and subsistence resources.

For actions that could affect cultural resources on federal land or actions that are funded, licensed, or permitted by the federal government, government-to-government consultation is required. Considering the effects of undertakings on tribal heritage resources would be required, and the BLM would attempt to resolve all or most of the adverse effects. Agency actions using federal funds or needing a federal permit require tribal consultation. Effects would be avoided or mitigated in many of the regional actions. Some effects would be unavoidable. Measures are in place to identify threats to resources and to prioritize management actions, but some effects on known or unknown Native American resources resulting from activities such as natural processes, wildfire, grazing, dispersed recreation, recreational use, and vandalism can go unnoticed and may not be mitigated. Mitigation could preclude other desirable management options and future uses. Development or actions on lands that are not protected by federal or other cultural resource statutes and regulatory protections could lead to loss of these resources and the regional heritage and knowledge that they contain.

Decisions from this RMP would have effects that, when combined with other past, present, and reasonably foreseeable actions, could produce cumulative effects of the types described above on religious, traditional, or other sensitive Native American resources. Cumulative effects would result from the destruction and loss of known and unrecorded resources and unanticipated discoveries. The continued documentation of tribal heritage resources from consultation and the ethno-history report has resulted in additional information to expand and explain the area's Native American history.

4.6 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects on air quality would result from surface-disturbing activities (e.g., construction of well pads and roads, pipelines and power lines, mining, wind energy development, and vegetation treatments), OHV use, fire and fuels management, some recreational activities, and operation and maintenance of existing facilities and infrastructure in the planning area. These activities would release fugitive dust, exhaust emissions, and smoke into the atmosphere, thereby adversely affecting air quality. In addition, these activities would release CO₂, CH₄, and other GHGs into the atmosphere.

Surface-disturbing activities, motorized vehicle use and recreation, fire and fuels management, inappropriate grazing practices, and the operation and maintenance of existing facilities and infrastructure in the planning area would contribute to soil erosion and soil compaction, sediment loading of water bodies, and the potential spread of invasive species. Invasive species would continue to spread via the wind, in water courses, and by attaching to livestock, wildlife, humans, and vehicles. The continued presence of invasive species in the planning area is considered an unavoidable effect.

Surface-disturbing activities and the development of mineral, energy, and other facilities in the planning area are expected to cause the unavoidable degradation, loss, and fragmentation of habitats, and, therefore, would unavoidably affect wildlife that depends on these habitats.

Motorized vehicle use and recreational activities, fire and fuels management, inappropriate grazing practices, and the operation and maintenance of existing facilities and infrastructure in the planning area would contribute to the unavoidable degradation, loss, and fragmentation of habitats. Protection of some resource values (e.g., wildlife, special status species, cultural, cave and karst, and paleontological resources) would adversely affect the development of minerals and renewable energy. Conversely, the development of minerals and renewable energy would adversely affect the distribution of some wildlife, special status species, and vegetation communities.

Surface-disturbing activities and development for resource uses would change the landscape, scenic quality, and setting in the decision area. Surface-disturbing activities, motorized vehicle use, theft and vandalism, and natural processes (e.g., erosion) would adversely affect cultural and paleontological resources in the decision area.

Recreational activities would result in unavoidable adverse effects. Portions of the decision area with intense recreational use would continue to experience scarring, increased soil erosion or compaction, and loss of vegetation. Although these latter effects are unavoidable, if they are concentrated in areas already disturbed, this would reduce the spread of effects from increased visitation to more remote or less frequented areas. However, changes in the amount of recreational visitation and patterns of use could also result in increased conflicts between users, unanticipated changes in resource conditions, vandalism, and illegal collection of cultural and paleontological resources.

Although mitigation measures could be implemented for scientific data recovery of cultural or paleontological resources, the effects on areas of any excavation would not be mitigable. The number of sites anticipated to be inadvertently damaged is unknown but is directly proportional to the acreage disturbed. Natural processes, such as erosion and natural decay or deterioration, could also result in unmitigated damage to cultural or paleontological resources.

Conflicts between recreational users are unavoidable adverse effects. As recreation demands increase, recreation use would disperse to other parts of the decision area, which could create conflicts with previous users of those areas. Unavoidable adverse effects would occur even though alternative use areas for effected activities could be provided.

Additional soil erosion would result from any facility developments, including recreation sites, livestock water and other range improvements, and utility and road facilities that are not properly restored even after mitigation measures are applied. Large-scale, stand-replacing wildfires are expected to occur in the planning area over the life of the RMP; these would quickly change both the habitat value for biological resources, resulting in the decline of habitat quality and the scenic quality of the landscape, without regard to visual objectives.

In addition, unavoidable adverse effects would result from implementing proposed restrictions on travel management, and energy and mineral resource development, including renewable energy development and other resource uses to protect sensitive resources and other values. These restrictions would lessen the ability of operators, permittees, individuals, and groups to use public lands and could increase operating costs.

4.7 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Each alternative contains a range of management actions that may lead to future irreversible and irretrievable commitments of those resources, once a decision is made. Decisions made in the selected plan serve to guide future actions and subsequent site-specific decisions. Following the signing of the ROD for the Lewistown RMP revision, implementation plans would be developed and implemented by the BLM. Decisions in these implementation plans require appropriate project-specific planning and NEPA analysis, and constitute BLM's final approval authorizing on-the-ground activities to proceed. Assuming subsequent implementation decisions authorize activity- or project-specific plans, irreversible and irretrievable commitment of resources would occur. For most resources, the RMP would provide objectives for management and guidance for future implementation-level decisions to minimize the potential for irreversible and irretrievable commitments of resources.

This section identifies the irreversible and irretrievable effects on resources and resource uses that may occur as a result of implementing one of the four alternatives. The exact nature and extent of any irreversible and irretrievable commitment of resources cannot be defined due to uncertainties about location, scale, timing, and rate of implementation, and the relationship to other actions and the effectiveness of mitigation measures throughout the life of this plan.

The air quality resource in the planning area is not irreversible or irretrievable; however, committed actions that consume Prevention of Significant Determination (PSD) increment would use up available PSD increment for other proposed sources. For this EIS, there are no actions by BLM that would require PSD permitting.

Implementing the RMP management actions would result in surface-disturbing activities, including dispersed recreation, mineral and energy development, and ROW development, which results in a commitment to the loss of irreversible or irretrievable resources. Mineral extraction or sale eliminates a non-renewable resource, thereby resulting in irreversible and irretrievable commitment of the resource. The associated surface disturbance from energy development is reclaimed after the resource is removed. However, surface disturbances from gas storage, ROWs for roads used for recreation and public or personal access, wind development, and recreational development are generally a permanent encumbrance of the land.

High intensity wildfire can also result in large-scale surface disturbance. Although new soil can develop, soil development is a slow process in many parts of the planning area. Soil erosion or the loss of productivity and soil structure might be considered irreversible commitments of resources. Surface-disturbing activities, therefore, would remove vegetation and accelerate erosion that would contribute to irreversible soil loss; however, management actions and BMPs are intended to reduce the magnitude of these effects and restore some of the soil and vegetation lost. High intensity wildfire and construction of roads, well pads, and other transportation infrastructure improvements can also create an irretrievable loss of wildlife habitat.

Depletion of surface water from watersheds may result in an irretrievable commitment of water that would otherwise have contributed to major river systems, including the Missouri River. Produced water from oil and gas wells in the planning area may be an irretrievable commitment of groundwater, depending on its use, once it reaches the surface. Increases in sediment, salinity, and nonpoint source pollution that result from surface-disturbing activities could result in degradation of water quality and an irretrievable loss of water utility.

Laws protecting cultural and paleontological resources would provide for mitigation of irreversible and irretrievable effects on cultural resources from permitted activity.

4.8 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

Regardless of which alternative is selected, management activities would result in various short-term adverse effects, such as increased localized soil erosion, localized smoke that could affect air quality, or damage to wildlife habitat. Other short-term effects could improve long-term productivity and provide beneficial effects.

Short-term effects associated with travel management could result in long-term effects on recreation and wildlife movement and wildlife habitats. Alternatively, short-term effects, such as vegetation treatments, would beneficially affect long-term productivity for wildlife and rangeland management by increasing available forage or by improving wildlife habitats. Short-term effects of wildfire management and vegetation treatments would result in long-term improvements for scenic quality.

Management actions and BMPs would minimize the effect of short-term uses and reverse the change during the long term. However, BLM-administered lands are managed to foster multiple uses, and some long-term productivity effects might occur regardless of management approach.

This page intentionally left blank.

References

EXECUTIVE SUMMARY

BLM (United States Department of Interior, Bureau of Land Management). 1984. Record of Decision for the Final Environmental Impact Statement, Headwaters Resource Management Plan. Butte and Lewistown Districts. July 1984.

_____. 1994. Record of Decision and Resource Management Plan Summary, Judith-Valley-Phillips Resource Management Plan and Environmental Impact Statement. Lewistown District Office, Lewistown, Montana. September 1994.

_____. 2014. Lewistown RMP Revised Scoping Report. Lewistown and Butte Field Offices. Lewistown, Montana. August 2014.

BLM (US Department of the Interior, Bureau of Land Management) GIS (Geographic Information System). 2015a. Data for introduction, alternatives, and impact analysis created September 2014 to December 2015. Lewistown Field Office, Lewistown, Montana.

CHAPTER I, INTRODUCTION

BLM (United States Department of Interior, Bureau of Land Management). 1984. Record of Decision for the Final Environmental Impact Statement, Headwaters Resource Management Plan. Butte and Lewistown Districts. July 1984.

_____. 1994. Record of Decision and Resource Management Plan Summary, Judith-Valley-Phillips Resource Management Plan and Environmental Impact Statement. Lewistown District Office, Lewistown, Montana. September 1994.

_____. 2001. National Management Strategy for Motorized Off-highway Vehicle Use. Washington, DC. January 2001.

_____. 2007. Record of Decision for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement. Washington Office. Washington, DC.

_____. 2010. Final Wild and Scenic River Eligibility Report. Lewistown Field Office. Lewistown, Montana. June 2010.

_____. 2014. Lewistown RMP Revised Scoping Report. Lewistown and Butte Field Offices. Lewistown, Montana. August 2014.

_____. 2015. Wild and Scenic Rivers Eligibility Report, Lewistown Field Office. Lewistown, Montana. January 2015.

- _____. 2016. Record of Decision for Final Programmatic Environmental Impact Statement for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Land in 17 Western States. Washington Office. Washington, DC.
- BLM (US Department of the Interior, Bureau of Land Management) GIS (Geographic Information System). 2015. Data for introduction, alternatives, and impact analysis created September 2014 to December 2015. Lewistown Field Office, Lewistown, Montana.
- DNRC (Montana Department of Natural Resources and Conservation). 2014. Montana State Water Plan: A Watershed Approach to the 2015 Montana State Water Plan. Helena, Montana. December 5, 2014.
- Federal Lands Hunting, Fishing, and Shooting Sports Roundtable. 2006. Memorandum of Understanding. August 2006.
- NWCG (National Wildfire Coordinating Group). 2014. Interagency Prescribed Fire Planning and Implementation Procedures Guide (PMS 484). April 2014.

CHAPTER 2, ALTERNATIVES

- Avian Power Line Interaction Committee. 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, DC.
- BLM (United States Department of Interior, Bureau of Land Management). 1984. Headwaters Resource Management Plan/Environmental Impact Statement Record of Decision. Butte and Lewistown Districts. Lewistown, Montana. July 1984.
- _____. 1986. Handbook H-8410-1—Visual Resource Inventory. Rel. 8-28. Washington, DC. January 17, 1986.
- _____. 1987. Interagency Rocky Mountain Front Wildlife Monitoring/Evaluation Program; Management Guidelines for Selected Species, Rocky Mountain Front Studies. Billings, Montana. September 1987.
- _____. 1992. Judith Valley Phillips Final Resource Management Plan and Environmental Impact Statement. October 1992.
- _____. 1994. Approved Judith Resource Area Resource Management Plan. Lewistown District, Lewistown, Montana. September 1994.
- _____. 1997. Record of Decision: Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Montana, North Dakota and South Dakota. Montana State Office, Billings. August 1997.
- _____. 2003a. Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota. Montana State Office, Billings. June 2003.

-
- _____. 2003b. Fire/Fuels management plan environmental assessment/plan amendment for the Montana/Dakotas. Montana State Office, Billings.
- _____. 2004. Manual 8110—Identifying and Evaluating Cultural Resources. Rel 8-73. Washington, DC. December 3, 2004. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.15876.File.dat/8110.pdf.
- _____. 2005. Record of Decision: Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments. Washington, DC. December 15, 2005.
- _____. 2012a. Manual 6330—Management of Wilderness Study Areas. Rel. 6-134. Washington, DC. July 13, 2012. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.31915.File.dat/6330.pdf.
- _____. 2012b. Manual 6310—Conducting Wilderness Characteristics Inventory on BLM Lands. Rel. 6-129. Washington, DC. March 15, 2012. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.38337.File.dat/6310.pdf.
- _____. 2012c. Manual 6320—Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process. Rel. 6-130. Washington, DC. March 15, 2012. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.52465.File.dat/6320.pdf.
- _____. 2012d. Manual 9115—Primitive Roads. Rel. 9-391. Washington, DC. March 6, 2012. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.3098.File.dat/9115.pdf.
- _____. 2012e. Manual 6400—Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management. Rel. 6-136. Washington, DC. July 13, 2012. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.76771.File.dat/6400.pdf.
- _____. 2014a. Bureau of Land Management Technical Protocol for the Collection, Study, and Conservation of Seeds from Native Plant Species for Seeds of Success. Internet website: http://www.blm.gov/wo/st/en/prog/more/fish__wildlife_and/plants/seeds_of_success/protocol.html. Updated January 3, 2014.
- _____. 2014c. Final Visual Resource Inventory: Lewistown Field Office, Appendix H, National Trails Visibility Analysis. Lewistown Field Office, Lewistown, Montana. Prepared by Logan Simpson Design, Inc. April 2014.
- _____. 2015a. Record of Decision and Greater Sage-Grouse Approved Resource Management Plan Amendment for the Lewistown Field Office. Washington, DC. September 2015.
- _____. 2015b. Lewistown Field Office Greater Sage-Grouse Proposed Resource Management Plan Amendment/Final Environmental Impact Statement. Lewistown Field Office, Lewistown, Montana. June 2015.

- _____. 2015c. Manual 7240—Water Quality. Rel 7-111. Washington, DC. April 9, 2015. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.55157.File.dat/7240.pdf.
- _____. 2015d. Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region, Including the Greater Sage-Grouse Sub-Regions of Lewistown, North Dakota, Northwest Colorado, Wyoming, and the Approved Resource Management Plans for Billings, Buffalo, Cody, HiLine, Miles City, Pompeys Pillar National Monument, South Dakota, Worland. Washington, DC. September 2015.
- _____. 2015e. Manual 9113—Roads. Rel 9-405. Washington, DC. May 4, 2015. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.91393.File.dat/MS%209113_.pdf.
- DNRC (Montana Department of Natural Resources). 2006. Best Management Practices for Forestry in Montana. Internet website: <http://dnrc.mt.gov/divisions/forestry/forestry-assistance/forest-practices/best-management-practices-bmp-2>. January 2006.
- DOI (US Department of the Interior). 2008. Department of the Interior Bison Conservation Initiative. Assistant Secretary for Fish and Wildlife and Parks, US Department of the Interior. Washington, DC. October 28, 2008.
- MFWP (Montana Fish, Wildlife, & Parks). 2015. Montana's State Wildlife Action Plan. 2015. Helena, Montana.
- _____. 2016. Montana's White-Nose Syndrome Prevention and Response Guidelines. Helena, Montana. April 2016. Internet website: ftp://nris.mt.gov/public/Maxell/MT_WNS_Response_Guidelines/MT_WNS_Response_Guidelines_Updated_20160415.pdf.
- Olendorff, R. R., A. D. Miller, and R. N. Lehman. 1981. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1981. Raptor research report no. 4, Raptor Research Foundation, University of Minnesota, St. Paul.
- USFWS (US Fish and Wildlife Service). 1993. Grizzly bear recovery plan. Missoula, Montana.

CHAPTER 3, AFFECTED ENVIRONMENT

- BLM (United States Department of Interior, Bureau of Land Management). 2011. Manual 1626—Travel and Transportation. Rel. I-1731. Washington, DC. July 14, 2011. Internet website: <https://www.ntc.blm.gov/krc/uploads/750/1626%20-%20TTM%20Planning%20Manual.pdf>.
- _____. 2012a. Northwestern Plains Rapid Ecoregional Assessment. Final Memorandum II-3-C Northwestern Plains Rapid Ecoregional Assessment. Internet website: http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas/nwplains.html.
- _____. 2012b. Middle Rockies Rapid Ecological Assessment. Final Memorandum II-3-C Middle Rockies Rapid Ecoregional Assessment. Internet website: http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas/midrockies.html.

- _____. 2012c. Recreation Management Information System (RMIS), a BLM recreation database. Data from Fiscal Year 2012. Lewistown Field Office, Lewistown, Montana. Unpublished data.
- _____. 2018. Analysis of the Management Situation. Lewistown Resource Management Plan Revision and Environmental Impact Statement. Lewistown Field Office, Lewistown, Montana. September 2014. Internet website: <https://go.usa.gov/xUPsP>.
- Hanna, R. R. 2009. Class I overview of the BLM Lewistown resource management plan area: including portions of Blaine, Cascade, Chouteau, Fergus, Judith Basin, Lewis and Clark, Meagher, Petroleum, Phillips, Pondera, and Teton Counties, Montana. Vols. 1 and 2. Prepared for the Bureau of Land Management.
- Montana Climate Change Advisory Committee. 2007. Montana Climate Change Action Plan, Final Report of the Governor's Climate Change Advisory Committee. Helena, Montana. November 2007.
- Western Regional Climate Center. 2012. Montana Precipitation (in.). Chart of precipitation between 1890 and 2015. Created October 8, 2012. Internet website <http://www.wrcc.dri.edu/>.
- _____. 2013. Climate of Montana. Internet website: <http://www.wrcc.dri.edu/narratives/montana/>.

CHAPTER 4, ENVIRONMENTAL CONSEQUENCES

- APLIC (Avian Power Line Interaction Committee). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, DC.
- Bachelet, R., R. P. Neilson, J. M. Lenihan, and R. J. Drapek. 2001. "Climate change impacts on vegetation distribution and carbon budget in the United States." *Ecosystems* (4)3:163-185.
- Bear, E. A., T. E. McMahon, and A. V. Zale. 2007. "Comparative thermal requirements of westslope cutthroat trout and rainbow trout: Implications for species interactions and development of thermal protection standards." *Transaction of the American Fisheries Society* 136:1113-1121.
- Behnke, R. J. 1979. Monograph of the Native Trout of the Genus *Salmo* of Western North America. US Department of Agriculture, Forest Service, Rocky Mountain Region, Lakewood, Colorado.
- Birdsall, J. L., W. McCaughey, and J. B. Runyon. 2012. "Roads impact the distribution of noxious weeds more than restoration treatments in a lodgepole pine forest in Montana, USA." *Restoration Ecology* 20:517-523.
- Bisson, P. A., R. E. Bilby, M. D. Bryant, C. A. Dolloff, G. B. Grette, R. A. House, M. L. Murphy, et al. 1987. "Large woody debris in forested streams in the Pacific Northwest: past, present and future." In: *Streamside Management Forestry and Fishery Interactions* (E. O. Salo and T. W. Cundy, editors). University of Washington, Institute for Forest Resources, Contribution 57, Seattle, Washington. Pp. 143-190.

- BLM (United States Department of Interior, Bureau of Land Management). 1997. Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management for Montana and the Dakotas. Montana State Office, Billings.
- _____. 2010. Climate Change Supplementary Information Report: Montana, North Dakota and South Dakota. Internet website: http://www.blm.gov/style/medialib/blm/mt/blm_programs/energy/oil_and_gas/leasing/eas.Par.26526.File.dat/SIRupdate.pdf.
- _____. 2012a. Manual 6330—Management of Wilderness Study Areas. Rel 6-134. Washington, DC. July 13, 2012. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.31915.File.dat/6330.pdf.
- _____. 2012b. Manual 6280—Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation. Rel. 6-139. Washington, DC. September 14, 2012. Internet website: [https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.1039.File.dat/M6280%20NSHT%20Management_Final_091212%20\(2\).pdf](https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.1039.File.dat/M6280%20NSHT%20Management_Final_091212%20(2).pdf). Pp. 18-20.
- _____. 2014. Handbook H-2930-1—Recreation Permit and Fee Administration Rel. 2-300. Washington, DC. November 17, 2014. Internet website: [https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.16535.File.dat/H_2930_1_FINAL\(1\).pdf](https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.16535.File.dat/H_2930_1_FINAL(1).pdf).
- _____. 2015a. Lewistown Field Office Greater Sage-Grouse Proposed Resource Management Plan Amendment and Final Environmental Impact Statement. BLM/MT/PL-15/009+1610. DOI-BLM-MT-L060-2013-0032-EIS. Lewistown, Montana. June 2015.
- _____. 2015b. Bureau of Land Management. Data request in support of the Lewistown Field Office RMP. Provided by Dan Brunkhorst, with support from LFO interdisciplinary team. Lewistown, Montana.
- _____. 2016. *Lewistown Field Office Resource Management Plan Air Resources Technical Support Document*, Montana State Office, Billings. January.
- BLM (US Department of the Interior, Bureau of Land Management) GIS (Geographic Information System). 2015a. Data for introduction, alternatives, and impact analysis created September 2014 to December 2015, edited May 2016 and June to August 2018. Lewistown Field Office, Lewistown, Montana.
- Bragg, D. C., J. L. Kershner, and D. W. Roberts. 2000. Modeling Large Woody Debris Recruitment for Small Streams of the Central Rocky Mountains. US Department of Agriculture, Forest Service General Technical Report RMRS-55.
- Bramblett, R. G., T. R. Johnson, A. V. Zale, and D. G. Heggem. 2005. "Development and evaluation of a fish assemblage index of biotic integrity for northwestern great plains streams." *Transactions of the American Fisheries Society* 1345:624-640.

- Buenger, Brent A. 2003. "The impact of wildland and prescribed fire on archaeological resources." Doctoral dissertation, University of Kansas, Department of Anthropology.
- DOI (US Department of the Interior). 2015. Payments and Acreage by State/County. Internet website: <https://www.nbc.gov/pilt/>.
- Dunham, J. B., M. K. Young, R. E. Gresswell, and B. E. Rieman. 2003. "Impacts of fire on fish populations: Landscape perspectives on persistence of native fishes and nonnative fish invasions." *Forest Ecology and Management* 178:183-196.
- Elliot, W. J., D. Page-Dumroese, and P. R. Robichaud. 1999. "The impacts of forest management on erosion and soil productivity." *Proceedings of the Symposium on Soil Quality and Erosion Interaction*. Keystone, Colorado. July 7, 1996.
- EPA (US Environmental Protection Agency). 2015a. National Emission Inventory (NEI), Version 2 (released March 4, 2015). Internet website: <http://www3.epa.gov/ttnchie1/net/2011inventory.html>.
- _____. 2015b. Inventory of US Greenhouse Gas Emissions and Sink: 1990-2013. April 15, 2015. Internet website: <http://www3.epa.gov/ttnchie1/net2011inventory.html>.
- Farmer, A. M. 1993. "The impacts of dust on vegetation—A review." *Environmental Pollution* 79:63-75.
- Fisher, I. J., D. J. Pain, and V. G. Thomas. 2006. "A review of lead poisoning from ammunition sources in terrestrial birds." *Biological Conservation* 131:421-432.
- Forest Service (US Department of Agriculture, Forest Service). 1980. Workshop Proceedings: Management of Western Forests and Grasslands for Nongame Birds. General Technical Report INT-GTR-86. Ogden, Utah. Intermountain Research Station.
- _____. 2007. Northern Rockies Lynx Management Direction Record of Decision. Missoula, Montana. March 2007.
- Greer, Mavis, and John Greer. 2001. "Fire and rock art in the Helena National Forest." Paper presented at the 59th Annual Meeting of the Plains Anthropological Society. Lincoln, Nebraska. November 2001.
- Hubbard, R. K., G. L. Newton, and G. M. Hill, G. M. 2004. Water quality and the grazing animal. Southeast Watershed Research Laboratory, USDA-ARS. Internet website: <http://www.pcwp.tamu.edu/docs/lshs/end-notes/water%20quality%20and%20the%20grazing%20animal-1848737563/water%20quality%20and%20the%20grazing%20animal.pdf>.
- IMPLAN. 2012. Minnesota IMPLAN Group. Data for purchase and additional information. Internet website: <http://www.implan.com>.

- IPCC (Intergovernmental Panel on Climate Change) 2014. Climate Change 2014 Mitigation of Climate Change: Trends in Stocks and Flows of GHGs and Their Drivers. Presentation in Bonn, Germany on June 6-8, 2014. Internet website: https://www.ipcc.ch/pdf/unfccc/sbsta40/SED/I_blanco_sed3.pdf.
- Isaak, D. J., C. H. Luce, B. E. Rieman, D. E. Nagel, E. E. Peterson, D. L. Horan, S. Parkes, and G. L. Chandler. 2010. 'Impacts of climate change and wildfire on stream temperatures and salmonid thermal habitat in a mountain river network.' *Ecological Applications* 20(5):1350-1371.
- Juying, J., Z. Houyuan, J. Yanfeng, W. Ning. 2009. "Research progress on the impacts of soil erosion on vegetation." *Acta Ecologica Sinica* 29:85-91.
- Knapp, Ashleigh. 2006. "Archaeology under fire: The impacts of forest fire on archaeological inquiry." Poster presented at the 64th Plains Anthropological Society Conference. Topeka, Kansas.
- Krausman, P. R., D. E. Naugle, M. R. Frisina, R. Northrup, V. C. Bleich, W. M. Block, and M. C. Wallace. 2009. "Livestock grazing, wildlife habitat, and rangeland values." *Society for Range Management*. October 2009. Pp. 15-19.
- Lendrum P. E., C. R. Anderson, Jr., K. L. Monteith, J. A. Jenks, and R. T. Bowyer. 2013. "Migrating mule deer: Impacts of anthropogenically altered landscapes." *PLoS ONE* 8(5): e64548. doi: 10.1371/journal.pone.0064548.
- Mahlum, S. K., L. A. Eby, M. K. Young, C. G. Clancy, M. Jakober. 2011. "Effects of wildfire on stream temperatures in the Bitterroot River Basin, Montana." *International Journal of Wildland Fire* 20:240-247.
- Metesh, J. 2012. Hydrogeology Related to Exempt Wells in Montana: A Report to the 2010-2012 Water Policy Interim Committee of the Montana legislature: Montana Bureau of Mines and Geology Open-File Report 612. Butte, Montana.
- MFWP (Montana Department of Fish, Wildlife, & Parks). 2010. Montana Bighorn Sheep Conservation Strategy: 2010. Helena, Montana. January 2010.
- Monteith, K. L., V. C. Bleich, T. R. Stephenson, B. M. Pierce, M. Conner, R. W. Klaver, and T. Bowyer. 2011. Timing of seasonal migration in mule deer: impacts of climate, plant phenology, and life-history characteristics. *Ecosphere*. 2(4): Article 47. Internet website: <http://dx.doi.org/10.1890/ES10-00096.1>.
- Muhlfeld, C. C., R. P. Kovach, L. A. Jones, R. Al-Chokhachy, M. C. Boyer, R. F. Leary, W. H Winsor, et al. 2014. "Invasive hybridization in a threatened species is accelerated by climate change." *Nature Climate Change* 4:620-624.
- Nyaupane, Gyan P., Dave D. White, and Megha Budruk. 2006. Motive-based tourist market segmentation: An application to Native American cultural heritage sites in Arizona, USA." *Journal of Heritage Tourism* 1(2):81-99.

- Olness, A., S. J. Smith, E. D. Rhoades, and R. G. Menzel. 1975. "Nutrient and sediment discharge from agricultural watersheds in Oklahoma." *J. Environ. Qual.* 4:331-336.
- Ouren, D. S., C. Melcher, C. P. Melcher, S. C. Stewart, P. D. Ponds, N. R. Sexton, L. Burris, et al. 2007. Environmental Impacts of Off-Highway Vehicles on Bureau of Land Management Lands: A Literature Synthesis, Annotated Bibliographies, Extensive Bibliographies, and Internet Resources: US Geological Survey, Open-File Report 2007-1353.
- Pinter, Teresa L., and Mary L. Kwas. 2005. "Special issue: Archaeology and heritage tourism." *The SAA Archaeological Record* (5)3:9-44.
- Renewable Northwest Project. 2015. Montana's Wind Power Factsheet. The Renewable Northwest Project. Internet website. <http://www.rnp.org/>.
- Rieman, B., R. Gresswell, and J. Rinne. 2012. "Fire and fish: A synthesis of observation and experience." In: "Climate change, forests, fire, water, and fish: Building resilient landscapes, streams, and managers." Gen. Tech. Rep. RMRS-GTR-290. Fort Collins, Colorado: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. Pp. 159-175.
- Robichaud, Peter R.; Joseph W. Wagenbrenner, Robert E. Brown, and Kevin M. Spigel, 2009. Three years of hillslope sediment yields following the Valley Complex fires, western Montana. Res. Pap. RMRS-RP-77. Fort Collins, Colorado: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Rowland, M. M., M. J. Wisdom, B. K. Johnson, and M. A. Penninger. 2004. "Impacts of roads on elk: implications for management in forested ecosystems." Transactions of the 69th North American Wildlife and Natural Resources Conference. Wildlife Management Institute, Washington, DC. Pp. 491-508.
- Salo, E. D., K. F. Higgins, B. D. Patton, K. K. Bakker, W. T. Barker, B. Kreft, and P. E. Nyren. 2004. "Grazing intensity effects on vegetation, livestock and non-game birds in north Dakota mixed-grass prairie." *Proceedings of the North American Prairie Conferences*. Paper 88.
- Smith, Jane Kapler, editor. 2000. Wildland fire in ecosystems: Effects of fire on fauna. Gen. Tech. Rep. RMRS-GTR-42-vol. I. Ogden, Utah: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Tratebas, Alice M., Nicole Villa Cerveny, and Ronald I. Dorn. 2004. "The impacts of fire on rock art: Microscopic evidence reveals the importance of weathering rinds." *Physical Geography* 25(4):313-333.
- Tucker, R. A., and C. B. Marlow. 2006. "The use of prescribed fire for riparian ecosystem rehabilitation." Billings Land Reclamation Symposium, June 4-6, 2006, Billings, Montana, and jointly published by BLRS and ASMR (R. I. Barnhisel, editor). Lexington, Kentucky.

- USGCRP (US Global Climate Change Research Program). 2014. Climate Change Impacts in the United States. May. Internet website: http://s3.amazonaws.com/nca2014/high/NCA3_Climate_Change_Impacts_in_the_United%20States_HighRes.pdf.
- White, R. K., R. W. VanKeuren, L. B. Owens, W. M. Edwards, and R. H. Miller. 1983. Effects of livestock pasturing on non-point surface runoff. Project Summary, Robert S. Kerr Environmental Research Laboratory, Ada, Oklahoma. EPA- 600/S2-83-011. 6p.
- Williams, Jim, and Mike Corfield. 2002. "Construction impacts on in situ preservation of archaeological sites and artifacts." Workshop 4: The conservation of cultural heritage for sustainable development. 5th European Commission Conference Report, Cultural Heritage Research: A Pan-European Challenge. Pp. 279-279. Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences. Internet website: <http://www.cyf-kr.edu.pl/~ncbratas/>.
- Williams, G. P., K. Petteys, C. H. Gammons, and S. R. Parker. 2015. "An investigation of acidic headwater streams in the Judith Mountains, Montana, USA." *Applied Geochemistry* (2015), doi: Internet website: <http://dx.doi.org/10.1016/j.apgeochem.2015.05.012>.
- Wisdom, M. J., A. A. Ager, H. K. Preisler, N. J. Cimon, and B. K. Johnson. 2004. "Impacts of off-road recreation on mule deer and elk." *Transactions of the 69th North American Wildlife and Natural Resources Conference*. Wildlife Management Institute, Washington, DC. Pp. 531-550.
- Womack, J. 2012. "Evaluation of the hydrologic impacts of stock ponds on a prairie watershed." Thesis, Montana State University, Bozeman.

GLOSSARY

- ADNR (Alaska Department of Natural Resources). 2009. Beaufort Sea Areawide Oil and Gas Lease Sale: Final Finding of the Director. November 9, 2009.
- BLM (US Department of the Interior, Bureau of Land Management). 2001. National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands. Washington, DC. January 19, 2001.
- _____. 2003. Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota. Montana State Office, Billings. June 2003.
- _____. 2005a. Handbook H-1601-1—Land Use Planning Handbook. Rel. 1-1693. Washington, DC. March 11, 2005.
- _____. 2005b. Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments – Record of Decision. Washington, DC. December 2005.
- _____. 2008a. BLM Manual 6840—Special Status Species Management. Rel. 6-125. Washington, DC. December 12, 2008.
- _____. 2008b. Handbook H-1790-1—National Environmental Policy Act. Rel. 1-1710. Washington, DC. January 30, 2008.

- _____. 2012a. BLM Manual 6280—Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation. Rel. 6-139. Washington, DC. September 14, 2012.
- _____. 2012b. Manual 6310—Conducting Wilderness Characteristics Inventory on BLM Lands. Rel. 6-129. Washington, DC. March 15, 2012.
- _____. 2012b. BLM Manual 6310—Conducting Wilderness Characteristics Inventory on BLM Lands (Public). Washington, DC. March 15, 2012.
- _____. 2012c. Manual 6400—Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management. Rel. 6-136. Washington, DC. July 13, 2012.
- CEQ (Council on Environmental Quality). 1981. Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations. Washington, DC. March 23, 1981.
- Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished report. Cheyenne, Wyoming.
- Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. Monitoring of Greater Sage-Grouse Habitats and Populations. University of Idaho College of Natural Resources Experiment Station Bulletin, Bulletin 80. University of Idaho, Moscow.
- Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage-grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985.
- USDA and DOI (US Department of Agriculture and US Department of the Interior). 2009. Guidance for Implementation of Federal Wildland Fire Management Policy. Wildland Fire Leadership Council. Internet website: https://www.nifc.gov/policies/policies_documents/GIFWFMP.pdf. February 2009.

This page intentionally left blank.

Glossary

Acquisition. Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, purchase, or donation.

Activity plan. A type of implementation plan (see *Implementation plan*); an activity plan usually describes multiple projects and applies best management practices to meet land use plan objectives. Examples of activity plans include interdisciplinary management plans, habitat management plans, recreation area management plans, and grazing plans.

Actual use. The amount of animal unit months consumed by livestock based on the numbers of livestock and grazing dates submitted by the livestock operator and confirmed by the BLM during periodic field checks.

Adaptive management. A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

Administrative access. Motorized wheeled cross-country travel for lessees and permittees is limited to the administration of a federal lease or permit. Persons or corporations having such a permit or lease could perform administrative functions on public lands within the scope of the permit or lease; however, this would not preclude modifying permits or leases to limit motorized wheeled cross-country travel during further site-specific analysis to meet resource management objectives or standards and guidelines (BLM 2003¹).

Air basin. A land area with generally similar meteorological and geographic conditions throughout. To the extent possible, air basin boundaries are defined along political boundary lines and include both the source and receptor areas.

Air pollution. The addition to the atmosphere of any material that may have a deleterious effect on life on our planet.

Allotment. An area of land in which one or more livestock operators graze their livestock. Allotments generally consist of BLM-administered lands but may include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

Allotment management plan (AMP). A concisely written program of livestock grazing management, including supportive measures if required, designed to attain specific, multiple-use

¹US Department of the Interior, Bureau of Land Management. 2003. Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota. Montana State Office, Billings. June 2003.

management goals in a grazing allotment. An AMP is prepared in consultation with the permittees, lessees, and other affected interests. Livestock grazing is considered in relation to other uses of the range and to renewable resources, such as watershed, vegetation, and wildlife. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system.

Alluvial soil. A soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

Alluvium. Clay, silt, sand, gravel, or other rock materials transported by moving water. Deposited in comparatively recent geologic time as sorted or semi-sorted sediment in rivers, floodplains, lakes, and shores, and in fans at the base of mountain slopes.

Ambient air quality. The state of the atmosphere at ground level as defined by the range of measured or predicted ambient concentrations of all significant pollutants for all averaging periods of interest.

Amendment. The process for considering or making changes in the terms, conditions, and decisions of approved resource management plans or management framework plans. Usually only one or two issues are considered and they involve only a portion of the planning area.

Animal unit month (AUM). The amount of forage necessary for the sustenance of one cow or its equivalent for a period of one month.

Anthropogenic disturbances. Those caused by human actions. Examples are paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities, pipelines, landfills, agricultural conversion, homes, and mines.

Aquatic. Living or growing in or on the water.

Areas of critical environmental concern (ACEC). Special area designation established through the BLM's land use planning process (43 CFR 1610.7-2) where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The level of allowable use within an ACEC is established through the collaborative planning process. Designation of an ACEC allows for resource use limitations in order to protect identified resources or values.

Atmospheric deposition. Air pollution produced when acid chemicals are incorporated into rain, snow, fog, or mist and fall to the earth. Sometimes referred to as acid rain, it comes from sulfur oxides and nitrogen oxides, products of burning coal and other fuels and from certain industrial processes. If the acid chemicals in the air are blown into the area where the weather is wet, the acids can fall to earth in the rain, snow, fog, or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dust or smoke.

Attainment area. A geographic area in which levels of a criteria air pollutant meet the health-based National Ambient Air Quality Standard for that specific pollutant.

Authorized/authorized use. This is an activity (i.e., resource use) occurring on the public lands that is either explicitly or implicitly recognized and legalized by law or regulation. This term may refer to those activities occurring on the public lands for which the BLM, Forest Service, or other appropriate authority (e.g., Congress for RS 2477 rights-of-way, Federal Energy Regulatory Commission for major, interstate rights-of-way), has issued a formal authorization document (e.g., livestock grazing lease/permit, right-of-way grant, coal lease, and oil and gas permit to drill). Formally authorized uses typically involve some type of commercial activity, facility placement, or event. These formally authorized uses are often spatially or temporally limited. Unless constrained or bounded by statute, regulation, or an approved land use plan decision, legal activities involving public enjoyment and use of the public lands (e.g., hiking, camping, and hunting) require no formal BLM or Forest Service authorization.

Avoidance/avoidance area. An area identified through resource management planning to be avoided but may be available for right-of-way location with special stipulations.

Backcountry Conservation Area (BCA). For purposes of this RMP, an area managed as an Extensive Recreation Management Area (ERMA). Targeted activities, experiences, and benefits for a BCA support primitive recreation, primarily associated with big game hunting.

Baseline. The preexisting condition of a defined area or resource that can be quantified by appropriate metrics. During environmental reviews, the baseline is considered the affected environment that exists at the time of the reviews initiation and is used to compare predictions of the effects of the proposed action or a reasonable range of alternatives.

Best management practices (BMPs). A suite of techniques that guide or may be applied to management actions to aide in achieving desired outcomes. BMPs are often developed in conjunction with land use plans, but they are not considered a planning decision unless the plans specify that they are mandatory.

Big game. Indigenous, ungulate (hoofed) wildlife species that are hunted, such as elk, deer, bison, bighorn sheep, and pronghorn antelope.

Biodiversity (biological diversity). The variety of life and its processes, and the interrelationships within and among various levels of ecological organization. Conservation, protection, and restoration of biological species and genetic diversity are needed to sustain the health of existing biological systems. Federal resource management agencies must examine the implications of management actions and development decisions on regional and local biodiversity.

Biologically significant unit (BSU). A BSU for the Lewistown Field Office Greater Sage-Grouse Resource Management Plan Amendment is the summary of all the Priority Habitat Management Areas (PHMA) in a greater sage-grouse population, as delineated in the Conservation Objectives Team report.

Biological soil crust. A complex association between soil particles and cyanobacteria, algae, microfungi, lichens, and bryophytes that live within or atop the uppermost millimeters of soil.

BLM Sensitive Species. Those species that are not federally listed as endangered, threatened, or proposed under the Endangered Species Act, but that are designated by the BLM State Director under 16 USC, Subsection 1536(a)(2), for special management consideration. By national policy, federally listed

candidate species are automatically included as sensitive species. Sensitive species are managed so they will not need to be listed as proposed, threatened, or endangered under the Endangered Species Act.

Candidate species. Taxa for which the US Fish and Wildlife Service has sufficient information on their status and threats to propose the species for listing as endangered or threatened under the Endangered Species Act, but for which issuing a proposed rule is currently prevented by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the Federal Register (BLM 2008²).

Casual use. Activities ordinarily resulting in no or negligible disturbance of the public lands, resources, or improvements. For examples for rights-of-way casual uses see 43 CFR 2801.5. For examples for locatable minerals casual uses see 43 CFR 3809.5.

Categorical exclusion. A category of actions (identified in agency guidance) that do not individually or cumulatively have a significant effect on the human environment, and for which neither an environmental assessment nor an environmental impact statement is required (40 CFR 1508.4), but a limited form of NEPA analysis is performed.

Checkerboard. This term refers to a landownership pattern of alternating sections of federal owned lands with private or State owned lands for 20 miles on either side of a land grant railroad (e.g., Union Pacific and Northern Pacific). On land status maps this alternating ownership is either delineated by color-coding or alphabetic code resulting in a checkerboard visual pattern.

Chemical vegetation treatment. Application of herbicides to control invasive species and noxious weeds and other unwanted vegetation. To meet resource objectives, the preponderance of chemical treatments would be used in areas where cheatgrass or noxious weeds have invaded sagebrush steppe.

Clean Air Act of 1963 (as amended). Federal legislation governing air pollution control.

Clean Water Act of 1972 (as amended). Federal legislation governing water pollution control.

Climate change. Any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from the following:

- Natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun
- Natural processes within the climate system (e.g., changes in ocean circulation)
- Human activities that change the atmosphere's composition (e.g., driving motor vehicles) and the land surface (e.g., deforestation, reforestation, urbanization, and desertification).

²US Department of the Interior, Bureau of Land Management. 2008. Manual 6840—Special Status Species Management. Rel. 6-125. Washington, DC. December 12, 2008. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf.

Closed area. Closed area means an area where off-road vehicle (aka OHV) use is prohibited. Use of off-road vehicles in closed areas may be allowed for certain reasons; however, such use shall be made only with the approval of the authorized officer (43 CFR 8340.0-5 [h]).

Collaboration. A cooperative process in which interested parties, often with widely varied interests, work together to seek solutions with broad support for managing public and other lands. Collaboration may take place with any interested parties, whether or not they are a cooperating agency.

Communication site. Sites that include broadcast types of uses (e.g., television, AM/FM radio, cable television, and broadcast translator) and non-broadcast uses (e.g., commercial or private mobile radio service, cellular telephone, microwave, local exchange network, and passive reflector).

Comprehensive trails and travel management (CTTM). The proactive interdisciplinary planning; on-the-ground management and administration of travel networks (both motorized and nonmotorized) to ensure that public access, natural resources, and regulatory needs are considered. It consists of inventory, planning, designation, implementation, education, enforcement, monitoring, easement acquisition, mapping and signing, and other measures necessary to provide access to public lands for a wide variety of uses (including those that are recreational, traditional, casual, agricultural, commercial, and educational; it also includes landing strips).

Condition class (fire regimes). Fire regime condition classes are a measure describing the degree of departure from historical fire regimes, possibly resulting in alterations of key ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings. One or more of the following activities may have caused this departure: fire suppression, timber harvesting, livestock grazing, introduction and establishment of exotic plant species, or introduced insects or disease.

Conformance. A proposed action should be specifically provided for in the land use plan or, if not specifically mentioned, should be clearly consistent with the goals, objectives, or standards of the approved land use plan.

Conservation measures. Measures to conserve, enhance, or restore greater sage-grouse habitat by reducing, eliminating, or minimizing threats to that habitat.

Conservation plan. The recorded decisions of a landowner or operator, cooperating with a conservation district, on how the landowner or operator plans, within practical limits, to use his or her land according to its capability and to treat it according to its needs for maintenance or improvement of the soil, water, animals, plants, and the air.

Conservation strategy. A strategy outlining current activities or threats that are contributing to the decline of a species, along with the actions or strategies needed to reverse or eliminate such a decline or threats. Conservation strategies are generally developed for species of plants and animals that are designated as BLM sensitive species or that have been determined by the US Fish and Wildlife Service or National Oceanographic and Atmospheric Administration-Fisheries to be federal candidates under the Endangered Species Act.

Controlled surface use (CSU). A category of moderate constraint stipulations that allows some use and occupancy of public land while protecting identified resources or values and is applicable to fluid

mineral leasing and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, and construction of wells and pads). CSU areas are open to fluid mineral leasing but the stipulation allows the BLM to require special operational constraints, or the activity can be shifted more than 200 meters (656 feet) to protect the specified resource or value.

Cooperating agency. Assists the lead federal agency in developing an environmental assessment or environmental impact statement. These can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any tribe or federal, state, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality (CEQ). An advisory council to the President, established by the National Environmental Policy Act of 1969. It reviews federal programs to analyze and interpret environmental trends and information.

Criteria pollutant. The US Environmental Protection Agency uses six criteria pollutants as indicators of air quality. It has established for each of them a maximum concentration above which adverse effects on human health may occur. These threshold concentrations are called National Ambient Air Quality Standards. The criteria pollutants are ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead.

Crucial wildlife habitat. The environment essential to plant or animal biodiversity and conservation at the landscape level. Crucial habitats include biological core areas, severe winter range, winter concentration areas, reproduction areas, and movement corridors.

Crucial winter range. That part of the winter range where a high proportion of the species population is located during severe winter conditions.

Cultural resources. Locations of human activity, occupation, or use. Cultural resources include archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and locations of traditional cultural or religious importance to specified social or cultural groups.

Cumulative effects. The direct and indirect effects of a proposed project alternative's incremental impacts when they are added to other past, present, and reasonably foreseeable actions, regardless of who carries out the action.

Decision area. Lands and federal mineral estate within the BLM-administered planning area.

Deferred/deferred use. To set aside, or postpone, a particular resource use or activity on the public lands to a later time. Generally, when this term is used, the period of the deferral is specified. Deferrals sometimes follow the sequence time frame of associated serial actions (e.g., Action B will be deferred until Action A is completed).

Degraded vegetation. An area where the plant community is not complete or is under threat. Examples include missing components such as perennial forbs or cool season grasses, weed infestations, or lack of regeneration of key species, such as sagebrush or cottonwoods trees.

Designated roads and trails. Specific roads and trails identified by the BLM or other agency where some type of motorized or nonmotorized use is appropriate and allowed, either seasonally or yearlong (BLM 2005a).

Desired future condition (DFC). For rangeland vegetation, the condition of rangeland resources on a landscape scale that meet management objectives. It is based on ecological, social, and economic considerations during the land planning process. It is usually expressed as ecological status or management status of vegetation (species composition, habitat diversity, and age and size class of species) and desired soil qualities (soil cover, erosion, and compaction). In a general context, DFC is a portrayal of the land or resource conditions that are expected to result if goals and objectives are fully achieved.

Desired outcomes. A type of land use plan decision expressed as a goal or objective.

Direct impact. Caused by an action or implementation of an alternative; a direct impact take place at the same time and place.

Directional drilling. A drilling technique whereby a well is deliberately deviated from the vertical in order to reach a particular part of the oil- or gas-bearing reservoir. Directional drilling technology enables the driller to steer the drill stem and bit to a desired bottom hole location. Directional wells initially are drilled straight down to a predetermined depth and then are gradually curved at one or more different points to penetrate one or more given target reservoirs. This specialized drilling usually is accomplished with the use of a fluid-driven downhole motor, which turns the drill bit. Directional drilling also allows multiple production and injection wells to be drilled from a single surface location, such as a gravel pad, thus minimizing cost and the surface impact of oil and gas drilling, production, and transportation facilities. It can be used to reach a target beneath an environmentally sensitive area (ADNR 2009³).

Disposal lands. Transfer of public land out of federal ownership to another party through sale, exchange, Recreation and Public Purposes Act of 1926, Desert Land Entry, or other land law statutes.

Disruptive activities. Those public land resource uses or activities that are likely to alter the behavior or displace or cause excessive stress to animal or human populations occurring at a specific location and time. In this context, disruptive activities refers to those actions that alter behavior or displace individuals such that reproductive success is negatively affected or that compromises an individual's physiological ability to cope with environmental stress. This term does not apply to the physical disturbance of the land surface, vegetation, or features. When administered as a land use restriction (e.g., No Disruptive Activities), this term may prohibit or limit the physical presence of sound above ambient levels, light beyond background levels, or the nearness of people and their activities. The term is commonly used in conjunction with protecting wildlife during crucial life stages (e.g., breeding, nesting, and birthing), although it could apply to any resource value on public land. The use of this land use restriction is not intended to prohibit all activity or authorized uses.

³Alaska Department of Natural Resources. 2009. Beaufort Sea Areawide Oil and Gas Lease Sale: Final Finding of the Director. November 9, 2009.

Diversity. The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

Easement. A right afforded a person or agency to make limited use of another's real property for access or other purposes.

Ecological emphasis area. The central and primary area of habitat for a population of a given species or group of species. These areas include corridors, which are strips of land that aid in the movement of species between disconnected emphasis areas of their natural habitat. Emphasis areas may be divided into smaller geographical zones.

Ecological Site. A distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

Eligible river. A river or river segment found to meet criteria in Sections 1(b) and 2(b) of the Wild and Scenic Rivers Act of being free flowing and possessing one or more outstandingly remarkable value.

Emergency stabilization. Planned actions to stabilize and prevent unacceptable degradation of natural and cultural resources, to minimize threats to life or property resulting from the effects of a fire, or to repair, replace, or construct physical improvements necessary to prevent land or resource degradation. Emergency stabilization actions must be taken within one year following wildfire containment.

Endangered species. Any species that is in danger of extinction throughout all or a significant portion of its range (BLM 2008a). Under the Endangered Species Act in the US, endangered is the more protected of two categories; the other is "threatened." Designation as endangered or threatened is determined by US Fish and Wildlife Service as directed by the Endangered Species Act.

Endangered Species Act of 1973 (as amended). Designed to protect critically imperiled species from extinction as a consequence of economic growth and development untempered by adequate concern and conservation. The act is administered by the US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration. Its purpose is to protect species and the ecosystems that they depend on (16 US Code, Sections 1531-1544).

Enhance. The improvement of habitat by increasing missing or modifying unsatisfactory components or attributes of the plant community to meet greater sage-grouse objectives.

Environmental assessment (EA). A concise public document prepared to provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact. An EA includes a brief discussion of the need for the proposal, alternatives considered, environmental impact of the proposed action and alternatives, and a list of agencies and individuals consulted.

Environmental impact statement (EIS). A detailed statement prepared by the responsible official in which a major federal action that significantly affects the quality of the human environment is described, alternatives to the proposed action are provided, and effects are analyzed (BLM 2001⁴).

Evaluation (plan evaluation). The process of reviewing the land use plan and the periodic plan monitoring reports to determine whether the land use plan decisions and National Environmental Policy Act of 1969 analysis are still valid and whether the plan is being implemented.

Exchange. A transaction whereby the federal government receives land or interests in land in exchange for other land or interests in land.

Exclusion area. An area identified through resource management planning that is not available for right-of-way location under any conditions.

Exemplary (vegetation). An area of vegetation that does not show signs of degradation and which may serve as a comparison to illustrate what the vegetation potential is for a given type of environment.

Existing routes. The roads, trails, or ways that are used by motorized vehicles (such as jeeps, all-terrain vehicles, and motorized dirt bikes), mechanized uses (such as mountain bikes, wheelbarrows, and game carts), pedestrians (hikers), and horseback riders and are, to the best of the BLM's knowledge, in existence at the time of resource management plan/environmental impact statement publication.

Exploration. Active drilling and geophysical operations to determine the presence of the mineral resource or the extent of the reservoir or mineral deposit.

Extensive Recreation Management Area (ERMA). Administrative units that require specific management consideration in order to address recreation use, demand, or recreation and visitor services program investments. ERMAs are managed to support and sustain the principal recreation activities and the associated qualities and conditions of the ERMA. ERMA management is commensurate and considered in context with the management of other resources and resource uses (BLM 2014⁵).

Federal Land Policy and Management Act of 1976 (FLPMA). Public Law 94-579, October 21, 1976, often referred to as the BLM's Organic Act, which provides most of its legislated authority, direction policy, and basic management guidance.

Federal mineral estate. Subsurface mineral estate owned by the United States and administered by the BLM. It is the mineral estate underlying BLM-administered land, privately owned lands and state-owned land.

Fire frequency. A general term referring to the recurrence of fire in a given area over time.

⁴US Department of the Interior, Bureau of Land Management. 2001. National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands. Washington, DC. January 19, 2001.

⁵US Department of Interior, Bureau of Land Management. 2014. Handbook H-8320-1—Planning for Recreation and Visitor Services. Rel. 8-85. Washington, DC. August 22, 2014. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.36142.File.dat/H-8320-1%20Recreation%20and%20Visitor%20Services%20Planning.pdf.

Fire management plan (FMP). A plan that identifies and integrates all wild fire management and related activities within the context of approved land/resource management plans. It defines a program to manage wild fires (wildfire and prescribed fire). The plan is supplemented by operational plans including, but not limited to, preparedness plans, preplanned dispatch plans, and prevention plans. FMPs ensure that wild fire management goals and components are coordinated.

Fire Regime Condition Classification System (FRCCS). Measures the extent to which vegetation departs from reference conditions, or how the current vegetation differs from a particular reference condition.

Fire suppression. All work and activities connected with control and fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Fluid minerals. Oil, gas, coal bed natural gas, and geothermal resources.

Forage. All browse and herbaceous foods that are available to grazing animals.

Forage base. The amount of vegetation available for wildlife and livestock use.

Fragile soils. Soils having a shallow depth to bedrock, minimal surface layer of organic material, textures that are more easily detached and eroded, or are on slopes over 35 percent.

Fugitive dust. Significant atmospheric dust arises from the mechanical disturbance of granular material exposed to the air. Dust generated from these open sources is termed fugitive because it is not discharged to the atmosphere in a confined flow stream. Common sources of fugitive dust include unpaved roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations.

General Mining Law of 1872. Provides for claiming and gaining title to locatable minerals on public lands. Also referred to as the General Mining Law or Mining Law.

Geographic information system (GIS). A system of computer hardware, software, data, people, and applications that capture, store, edit, analyze, and display a potentially wide array of geospatial information.

Geophysical exploration. Work to locate deposits of oil and gas resources and to better define the subsurface.

Geothermal energy. Natural heat from within the Earth captured for production of electric power, space heating, or industrial steam.

Goal. A broad statement of a desired outcome; usually not quantifiable and may not have established time frames for achievement.

Grandfathered use. The right to use in a nonconforming manner due to existence prior to the establishment of conforming terms and conditions.

Grant. Any authorization or instrument (e.g., easement, lease, license, or permit) that the BLM issues under Title V of the Federal Land Policy and Management Act (43 USC, Section 1761 et. seq.) and those

authorizations and instruments that the BLM and its predecessors issued for like purposes before October 21, 1976, under the existing statutory authority. It does not include authorizations issued under the Mineral Leasing Act (43 USC, Section 185).

Grazing preference. Grazing preference or preference means a superior or priority position against others for the purpose of receiving a grazing permit or lease. This priority is attached to base property owned or controlled by the permittee or lessee. (43 CFR 4100.0-5)

Grazing relinquishment. The voluntary and permanent surrender by an existing permittee or lessee (with concurrence of any base property lienholder) of their priority (preference) to use livestock forage allocation on public land as well as their permission to use this forage. Relinquishments do not require consent or approval by BLM. The BLM's receipt of a relinquishment is not a decision to close areas to livestock grazing.

Grazing retirement. Ending livestock grazing on a specific area of land.

Grazing system. Scheduled grazing use and non-use of an allotment to reach identified goals or objectives by improving the quality and quantity of vegetation. Include, but are not limited to, developing pastures, utilization levels, grazing rotations, timing and duration of use periods, and necessary range improvements.

Greater sage-grouse general habitat management area (GHMA). Greater sage-grouse-occupied (seasonal or year-round) habitat outside of priority habitat. These areas have been identified by the BLM in coordination with respective state wildlife agencies.

Greater sage-grouse priority habitat management area (PHMA). Areas that have been identified as having the highest conservation value to maintaining sustainable greater sage-grouse populations. These areas would include breeding, late brood-rearing, and winter concentration areas. These areas have been identified by the BLM in coordination with respective state wildlife agencies.

Greenhouse gas (GHG). A gas in an atmosphere that absorbs and emits radiation within the thermal infrared range. This process is the fundamental cause of the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

Groundwater. Water held underground in soil or permeable rock, often feeding springs and wells.

Guidelines. Actions or management practices that may be used to achieve desired outcomes, sometimes expressed as BMPs. Guidelines may be identified during the land use planning process, but they are not considered a land use plan decision unless the plan specifies that they are mandatory. Guidelines for grazing administration must conform to 43 CFR 4180.2.

Habitat. An environment that meets a specific set of physical, biological, temporal, or spatial characteristics that satisfy the requirements of a plant or animal species or group of species for part or all of their life cycle.

Hazardous material. A substance, pollutant, or contaminant that, due to its quantity, concentration, or physical or chemical characteristics, poses a potential hazard to human health and safety or to the environment if released into the workplace or the environment.

High voltage transmission lines. 100 kilovolts and over.

Impact. The effect, influence, alteration, or imprint caused by an action.

Impairment. The degree to which a distance of clear visibility is degraded by human-made pollutants.

Implementation decisions. Decisions that take action to implement land use planning; generally appealable to Interior Board of Land Appeals under 43 CFR 4.410.

Implementation plan. An area- or site-specific plan written to implement decisions made in a land use plan. Implementation plans include both activity plans and project plans.

Indicators. Factors that describe resource condition and change and can help the BLM determine trends over time.

Indirect impact. Result from implementing an action or alternative but usually occurs later in time or is removed in distance and is reasonably certain to occur.

Integrated ranch planning. A planning method that takes a holistic look at all elements of the ranching operations, including strategic and tactical planning, rather than approaching planning as several separate enterprises.

Intermittent stream. A stream that flows only at certain times of the year when it receives water from springs or from some surface sources, such as melting snow in mountainous areas. During the dry season and throughout minor drought periods, these streams will not exhibit flow. Geomorphological characteristics are not well defined and are often inconspicuous. In the absence of external limiting factors, such as pollution and thermal modifications, species are scarce and adapted to the wet and dry conditions of the fluctuating water level.

Invertebrate. An animal lacking a backbone or spinal column, such as insects, snails, and worms. The group includes 97 percent of all animal species.

Key wildlife ecosystems. Specific areas within the geographic area occupied by a species in which are found those physical and biological features essential to the conservation of the species and that may require special management considerations or protection.

Land health condition. A classification for land health that includes these categories: Meeting land health standard(s) and not meeting land health standard(s).

Land tenure adjustments. Land ownership or jurisdictional changes. To improve the manageability of the BLM-administered lands and their usefulness to the public, the BLM has numerous authorities for repositioning lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of

land exchanges but also through land sales, through jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

Land treatment. All methods of artificial range improvement arid soil stabilization, such as reseeding, brush control (chemical and mechanical), pitting, furrowing, and water spreading.

Land use allocation. The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions (BLM 2005⁶).

Land use plan. A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of Federal Land Policy and Management Act; an assimilation of land use plan level decisions developed through the planning process outlined in 43 CFR 1600, regardless of the scale at which the decisions were developed. The term includes both resource management plans and management framework plans (BLM 2005⁷).

Land use plan decision. Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 CFR 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to the Interior Board of Land Appeals.

Large pipelines. Those that are 24 inches in width and over.

Late brood-rearing area. Habitat includes mesic sagebrush and mixed shrub communities, wet meadows, and riparian habitats as well as some agricultural lands (e.g., alfalfa fields).

Leasable minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. These include energy-related mineral resources, such as oil, natural gas, coal, and geothermal, and some nonenergy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

Lease. Section 302 of the Federal Land Policy and Management Act of 1976 provides the BLM with the authority to issue leases for the use, occupancy, and development of public lands. Leases are issued for such purposes as commercial filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, native or introduced species harvesting, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy (if the residential structures are not incidental to the mining operation), and water pipelines and well pumps related to irrigation and non-irrigation facilities. The regulations establishing procedures for processing these leases and permits are found in 43 CFR 2920.

⁶US Department of the Interior, Bureau of Land Management. 2005. Handbook H-1601-1—Land Use Planning Handbook. Rel. 1-1693. Washington, DC. March 11, 2005. Internet website: https://www.blm.gov/style/medialib/blm/ak/aktest/planning/planning_general.Par.65225.File.dat/blm_lup_handbook.pdf.

⁷Ibid.

Lease stipulation. A modification of the terms and conditions on a standard lease form at the time of the lease sale.

Lek. A traditional courtship display area attended by male sage-grouse in or next to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Subdominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks; therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al 2000⁸; Connelly et al. 2003⁹, Connelly, et al. 2004¹⁰). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest.

Lentic. Pertaining to standing water, such as lakes and ponds.

Limited area. Means an area restricted at certain times, in certain areas, and/or to certain vehicular use. These restrictions may be of any type, but can generally be accommodated within the following type of categories: Numbers of vehicles; types of vehicles; time or season of vehicle use; permitted or licensed use only; use on existing roads and trails; use on designated roads and trails (43 CFR 8340.0-5 [g]).

Locatable minerals. Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Long-term effect. The effect could occur for an extended period after implementation of the alternative. The effect could last several years or more.

Lotic. Pertaining to moving water, such as streams or rivers.

Management decision. A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

Master development plans. A set of information common to multiple planned wells, including drilling plans, surface use plans of operations, and plans for future production.

Mechanized transport. Any vehicle, device, or contrivance for moving people or material in or over land, water, snow, or air that has moving parts.

⁸Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage-grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985.

⁹Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. *Monitoring of Greater Sage-Grouse Habitats and Populations*. University of Idaho College of Natural Resources Experiment Station Bulletin, Bulletin 80. University of Idaho, Moscow.

¹⁰Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. *Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats*. Western Association of Fish and Wildlife Agencies. Unpublished report. Cheyenne, Wyoming.

Mineral. Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (such as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained usually from the ground. Under federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and salable (subject to the Materials Act of 1947).

Mineral entry. The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

Mineral estate. The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Mineralize. The process where a substance is converted from an organic substance to an inorganic substance.

Mineral materials. Common varieties of mineral materials, such as soil, sand and gravel, stone, pumice, pumicite, and clay, that are not obtainable under the mining or leasing laws but that can be acquired under the Materials Act of 1947, as amended.

Mining claim. A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, mill site, and tunnel site.

Mining Law of 1872. Provides for claiming and gaining title to locatable minerals on public lands. Also referred to as the General Mining Law or Mining Law.

Mitigation. Specific means, measures, or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can include avoiding the impact altogether by not taking a certain action or parts of an action, minimizing the impact by limiting the degree of magnitude of the action and its implementation, rectifying the impact by repairing, rehabilitating, or restoring the affected environment, reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, and compensating for the impact by replacing or providing substitute resources or environments.

Modification. A change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Depending on the specific modification, the stipulation may or may not apply to all sites within the leasehold to which the restrictive criteria are applied.

Monitoring (plan monitoring). The process of tracking the implementation of land use plan decisions and collecting and assessing data necessary to evaluate the effectiveness of land use planning decisions.

Motorized travel. Moving by means of vehicles that are propelled by motors, such as cars, trucks, off-highway vehicles, motorcycles, snowmobiles, aircraft, and boats.

Motorized vehicles or uses. Vehicles that are motorized, such as jeeps, all-terrain vehicles (e.g., four-wheelers and three-wheelers), trail motorcycles or dirt bikes, and aircraft.

Multiple-use. The management of the public lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (Federal Land Policy and Management Act; BLM 2008¹¹).

Municipal watershed. A watershed area that provides water for use by a municipality as defined by the community and accepted by the State.

National Environmental Policy Act of 1969 (NEPA). Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.

National Historic Trail (NHT). A congressionally designated trail that is an extended, long-distance trail, not necessarily managed as continuous, that follows as closely as possible and practicable the original trails or routes of travel of national historic significance. The purpose of a NHT is the identification and protection of the historic route and the historic remnants and artifacts for public use and enjoyment. A NHT is managed in a manner to protect the nationally significant resources, qualities, values, and associated settings of the areas that such trails may pass through, including the primary use or uses of the trail (BLM 2012¹²).

Native vegetation. Plant species that were found here prior to Euro-American settlement and consequently are in balance with these ecosystems because they have well developed parasites, predators, and pollinators.

Natural processes. Fire, drought, insect and disease outbreaks, flooding, and other events that existed prior to Euro-American settlement and that shaped vegetation composition and structure.

¹¹US Department of the Interior, Bureau of Land Management. 2008. Manual 6840—Special Status Species Management. Rel. 6-125. Washington, DC. December 12, 2008. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf.

¹²US Department of the Interior, Bureau of Land Management. 2012. Manual 6280—Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation. Rel. 6-139. Washington, DC. September 14, 2012. Internet website: [https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.1039.File.dat/M6280%20NSHT%20Management_Final_091212%20\(2\).pdf](https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.1039.File.dat/M6280%20NSHT%20Management_Final_091212%20(2).pdf).

Net conservation gain. The intent of the Lewistown Field Office Greater Sage-Grouse Approved Resource Plan Amendment is to provide a net conservation gain to greater sage-grouse. The BLM would require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This would be required when the BLM undertakes management actions and, consistent with valid existing rights and applicable law, when it authorizes third-party actions that result in habitat loss and degradation within priority habitat (core population areas and core population connectivity corridors). Net conservation gain is achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.

Nonenergy leasable minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. Nonenergy minerals include resources such as phosphate, sodium, potassium, and sulfur.

Nonmotorized travel. Moving by foot, stock or pack animal, nonmotorized boat, ski, or mechanized vehicle, such as a bicycle.

Nonfunctional condition. Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or woody debris to dissipate energies associated with flow events, and thus are not reducing erosion or improving water quality.

No surface occupancy (NSO). A major constraint where use or occupancy of the land surface for fluid mineral exploration or development and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, and construction of wells and pads) are prohibited to protect identified resource values. Areas identified as NSO are open to fluid mineral leasing, but surface occupancy or surface-disturbing activities associated with fluid mineral leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require horizontal drilling from outside the boundaries of the NSO area.

Noxious weeds. A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage, parasitic, a carrier or host of serious insects or disease or nonnative, new, or not common to the United States.

Objective. A description of a desired outcome for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement.

Occupancy. Full-time or part-time residence on public lands. It also means activities that involve residence; the construction, presence, or maintenance of temporary or permanent structures that may be used for such purposes; or the use of a watchman or caretaker to monitor activities. Residences or structures include barriers to access, fences, tents, motor homes, trailers, cabins, houses, buildings, and storage of equipment or supplies (43 CFR 3715.0-5).

Off-highway vehicle (OHV; also off-road vehicle). Any motorized vehicle capable of, or designated for travel on or immediately over land, water or other natural terrain. OHV does not include the following:

- Any nonamphibious registered motorboat
- Any military, fire, emergency, or law enforcement vehicle while being used for emergencies

- Any vehicle whose use is expressly authorized by the authorized officer or otherwise officially approved
- Vehicles in official use
- Any combat or combat support vehicle when used for national defense emergencies (43 CFR 8340.0-5)

Open. Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR 8340.0-5 defines open as it relates to OHV use.

Ozone. A faint blue gas produced in the atmosphere from chemical reactions of burning coal, gasoline, and other fuels and chemicals found in such products as solvents, paints, and hairsprays.

Paleontological resources. The physical remains or other physical evidence of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are important for correlating and dating rock strata and for understanding past environments, environmental change, and the evolution of life.

Particulate matter (PM). One of the six criteria pollutants for which the US Environmental Protection Agency established National Ambient Air Quality Standards. Particulate matter is defined as two categories: fine particulate, with an aerodynamic diameter of 10 micrometers (PM₁₀) or less, and fine particulate, with an aerodynamic diameter of 2.5 micrometers or less (PM_{2.5}).

Perennial stream. One that flows continuously. Perennial streams are generally associated with a water table in the localities that they flow through.

Permitted use. The forage allocated by, or under the guidance of, an applicable land use plan for livestock grazing in an allotment under a permit or lease and expressed in animal unit months (43 CFR 4100.0-5).

Permittee. A person or company permitted to graze livestock on public land.

Physiography. The study and classification of the surface features of the Earth.

Plan of Operations. Required for all mining activity exploration greater than 5 acres or surface disturbance greater than casual use on certain special category lands. Special category lands are described under 43 CFR 3809.11(c), and include such lands as designated ACECs, lands in the National Wilderness Preservation System, and areas closed to OHVs, among others. In addition, a plan of operations is required for activity greater than casual use on lands patented under the Stock Raising Homestead Act with federal minerals, where the operator does not have the written consent of the surface owner (43 CFR 3814). The plan of operations needs to be filed in the BLM field office with jurisdiction over the land involved. It does not need to be on a particular form but must address the information required by 43 CFR 3809.401(b).

Planning area. The planning area comprises all or portions of nine counties in central Montana: Fergus, Petroleum, Chouteau, Judith Basin, Cascade, Teton, Pondera, Meagher, and Lewis and Clark. Within the planning area, landownership is mixed. BLM-administered public lands are next to National Forest

System lands, a national wildlife refuge, lands managed by the US Army Corps of Engineers and the Bureau of Reclamation, and state, private, and tribal lands. In total, the planning area covers 12,906,800 surface acres and 1,196,800 acres of federal mineral estate

Planning criteria. The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision-making, analysis, and data collection during planning. Planning criteria streamlines and simplifies the resource management planning actions.

Planning issues. Concerns, conflicts, and problems with the existing management of public lands. Frequently, issues are based on how land uses affect resources. Some issues are concerned with how land uses can affect other land uses or how the protection of resources affects land uses.

Policy. This is a statement of guiding principles, or procedures, designed and intended to influence planning decisions, operating actions, or other affairs of the BLM. Policies are established interpretations of legislation, executive orders, regulations, or other presidential, secretarial, or management directives.

Potential wind development area. BLM-administered lands in areas open for wind energy development that exhibit wind speeds of 7 meters (23 feet) per second or greater when measured at 120 meters (394 feet).

Prairie Dog Complex Category 1. A minimum of two black-tailed prairie dog complexes sufficient to maintain viable populations of black-footed ferrets. These should be at least 100 kilometers apart, with each encompassing at least 5,000 acres of prairie dogs, but may range up to 12,000 acres, since complexes of this size have occurred in Montana in the recent past. Standards for these complexes will follow the “7K rule” adopted by the Interstate Black-tailed Prairie Dog Conservation Team.

Prairie Dog Complex Category 2. A total of 36,000 acres occupied by black-tailed prairie dogs, composed of at least 20 complexes of at least 1,000 acres or more. These complexes would be defined using the “7K rule” adopted by the Interstate Black-tailed Prairie Dog Conservation Team. Many combinations of complex sizes could be incorporated here, so long as the minimums are met.

Prairie Dog Complex Category 3. Complexes less than 1,000 acres in size, as defined by the “7K rule” adopted by the Interstate Black-tailed Prairie Dog Conservation Team, plus scattered, isolated colonies of any acreage. A major function of black-tailed prairie dog colonies in this category is to ensure continued distribution over 90 percent of the historical range of the species in Montana, and to accommodate distributional needs of associated species.

Prescribed fire. A wild fire originating from a planned ignition to meet specific objectives identified in a written, approved, prescribed fire plan for which National Environmental Policy Act requirements (where applicable) have been met before ignition.

Primitive road. A linear route managed for use by four-wheel drive or high-clearance vehicles. Primitive roads do not normally meet any BLM road design standards.

Primitive route. Any transportation linear feature located within areas that have been identified as having wilderness characteristics and not meeting the wilderness inventory road definition (BLM 2012¹³).

Proper functioning condition (PFC). A term describing stream health that is based on the presence of adequate vegetation, landform and debris to dissipate energy, reduce erosion, and improve water quality.

Public domain. Any or all of those areas of land ceded to the federal government by the original states and other lands that were later acquired by treaty, purchase, or cession and are disposed of only under the authority of Congress.

Public land. Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM without regard to how the United States acquired ownership, except lands on the Outer Continental Shelf and lands held for the benefit of Indians, Aleuts, and Eskimos (BLM 2005¹⁴).

Public lands not designated as recreation management areas. All lands not designated as a SRMA or ERMA.

Range Improvement. An authorized physical modification or treatment which is designed to improve production of forage, to change vegetation composition, to control patterns of use, to provide water, to stabilize soil and water conditions, to restore, protect, and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. The term includes structures, treatment projects, and use of mechanical devices or modifications achieved through mechanical means (43 CFR 4100.0-5).

Range improvement project. An authorized physical modification or treatment which is designed to improve production of forage, to change vegetation composition, to control patterns of use, to provide water, to stabilize soil and water conditions, to restore, protect, or improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. This definition includes, but is not limited to: structures, treatment projects and use of mechanical devices, or modifications achieved through mechanical means.

Raptor. Bird of prey with sharp talons and strongly curved beaks, such as a hawk, owl, falcon, or eagle.

Reasonably foreseeable development (RFD) scenario. The prediction of the type and amount of oil and gas activity that would occur in a given area. The prediction is based on geologic factors, past history of drilling, projected demand for oil and gas, and industry interest.

¹³US Department of the Interior, Bureau of Land Management. 2012. Manual 6310—Conducting Wilderness Characteristics Inventory on BLM Lands. Rel. 6-129. Washington, DC. March 15, 2012. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.38337.File.dat/6310.pdf.

¹⁴US Department of the Interior, Bureau of Land Management. 2005. Handbook H-1601-1—Land Use Planning Handbook. Rel. 1-1693. Washington, DC. March 11, 2005. Internet website: https://www.blm.gov/style/medialib/blm/ak/aktest/planning/planning_general.Par.65225.File.dat/blm_lup_handbook.pdf.

Unconstrained RFD scenario. The baseline RFD scenario. No management prescriptions or restrictions are applied when projecting future activities. Where legislatively imposed restrictions are applied to analyzed lands, those restrictions are considered when projecting future activities.

Constrained RFD scenario. An RFD scenario where management prescriptions or restrictions are considered when projecting future activities under the alternative. Where legislatively imposed restrictions are applied to analyzed lands, those restrictions are considered when projecting future activities.

Reclamation. The suite of actions taken within an area affected by human disturbance, the outcome of which is intended to change the condition of the disturbed area to meet predetermined objectives or make it acceptable for certain defined resources (e.g., wildlife habitat, grazing, and ecosystem function).

Recreation experiences. Psychological outcomes realized either by recreation-tourism participants as a direct result of their on-site leisure engagements and recreation-tourism activity participation or by nonparticipating community residents as a result of their interaction with visitors and guests within their community or interaction with the BLM and other public and private recreation-tourism providers and their actions.

Recreation management area (RMA). Includes SRMAs and ERMAs; see *SRMA* and *ERMA*.

Recreation management zone (RMZ). A subdivision of a recreation management area that further delineates specific recreation opportunities and recreation setting characteristics (BLM 2014¹⁵).

Recreation opportunities. Favorable circumstances enabling visitors' engagement in a leisure activity to realize immediate psychological experiences and attain more lasting, value-added beneficial outcomes.

Recreation settings. The collective distinguishing attributes of landscapes that influence and sometimes actually determine what kinds of recreation opportunities are produced.

Reference state. The state where the functional capacities represented by soil/site stability, hydrologic function, and biotic integrity are performing at an optimum level under the natural disturbance regime. This state usually includes what is often referred to as the potential natural plant community.

Rehabilitate. Returning disturbed lands as near to its pre-disturbed condition as is reasonably practical or as specified in approved permits.

Renewable energy. Energy resources that constantly renew themselves or that are regarded as practically inexhaustible. These include solar, wind, geothermal, hydro, and biomass. Although particular geothermal formations can be depleted, the natural heat in the Earth is a virtually inexhaustible reserve of potential energy.

¹⁵US Department of Interior, Bureau of Land Management. 2014. Handbook H-8320-1—Planning for Recreation and Visitor Services. Rel. 8-85. Washington, DC. August 22, 2014. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.36142.File.dat/H-8320-1%20Recreation%20and%20Visitor%20Services%20Planning.pdf.

Required design feature (RDF). Required for certain activities in all greater sage-grouse habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the National Environmental Policy Act analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable.
- An alternative RDF is determined to provide equal or better protection for greater sage-grouse or its habitat.
- A specific RDF will provide no additional protection to greater sage-grouse or its habitat.

Reserve common allotment. An area designated in the land use plan as available for livestock grazing but reserved as an area available for use as an alternative to grazing in another allotment in order to facilitate rangeland restoration treatments and recovery from natural disturbances, such as drought and wildfire. The reserve common allotment would provide needed flexibility that would help the agency apply temporary rest from grazing where vegetation treatments or management would be most effective.

Resource management plan (RMP). A land use plan prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land use allocations and coordination guidelines for multiple-use, objectives, and actions to be achieved.

Restore/restoration. Implementation of passive or active management actions designed to increase or maintain perennial herbaceous species and landscape cover of sagebrush so that plant communities are more resilient to disturbance and invasive species over the long term. The long-term goal is to create functional, high quality habitat that is occupied by sage-grouse. A short-term goal may be to restore the landform, soils, and hydrology and to increase the percentage of preferred vegetation, seeding of desired species, or treatment of undesired species.

Restriction/restricted use. A limitation or constraint on public land uses and operations. Restrictions can be of any kind, but most commonly apply to certain types of vehicle use, temporal or spatial constraints, or certain authorizations.

Revegetate/revegetation. The process of putting vegetation back in an area where it previously existed, which may or may not simulate natural conditions.

Revision. The process of completely rewriting the land use plan due to changes in the planning area affecting major portions of the plan or the entire plan.

Right-of-way (ROW). Public lands that the BLM authorizes a holder to use or occupy under a grant; examples are roads, pipelines, power lines, and fiber optic lines.

Right-of-way avoidance area. An area identified through resource management planning to be avoided but may be available for ROW location with special stipulations.

Right-of-way exclusion area. An area identified through resource management planning that is not available for ROW location under any conditions.

Riparian area. A form of wetland transition between permanently saturated wetlands and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of permanent surface or subsurface water. Typical riparian areas include lands along, next to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels. Excluded are ephemeral streams or washes that lack vegetation and depend on free water in the soil.

Riparian management zone. Areas where riparian values receive primary emphasis with all activities to the extent possible. Maintaining and restoring quality riparian habitat (including vegetation) is important as habitat for many wildlife species, to maintain water quality, appropriate woody material, and nutrient routing to aquatic habitats, and to maintain appropriate stream channel morphology.

Riparian zone. An area one-quarter-mile wide encompassing riparian and adjacent vegetation.

Road. A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

Rotation. Grazing rotation between pastures in the allotment for the permitted time.

Routes. Multiple roads, trails, and primitive roads; a group or set of roads, trails, and primitive roads that represents less than 100 percent of the BLM transportation system. Generically, components of the transportation system.

Sagebrush focal areas (SFA). Areas identified by the US Fish and Wildlife Service that represent recognized “strongholds” for greater sage-grouse and that have been noted and referenced by the conservation community as having the highest densities of greater sage-grouse and other criteria important for its persistence.

Sale (public land). A method of land disposal pursuant to Section 203 of the Federal Land Policy and Management Act, whereby the United States receives a fair-market payment for the transfer of land from federal ownership. Public lands determined suitable for sale are offered on the initiative of the BLM. The lands must be identified in the RMP. Any lands to be disposed of by sale that are not identified in the current RMP, or that meet the disposal criteria identified in the RMP, require a plan amendment before a sale can occur.

Saturated soils. Occur when the infiltration capacity of the soil is exceeded from above due to rainfall or snowmelt runoff. Soils can also become saturated from groundwater inputs.

Scarification. Shallow loosening of the soil surface.

Scoping process. An early and open public participation process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

Season of use. The time during which livestock grazing is permitted on a given range area, as specified in the grazing lease.

Seeding. A vegetation treatment that includes the application of grass, forb, or shrub seed, either by air or from the ground. In areas of gentle terrain, ground applications of seed are often accomplished with a rangeland drill. Seeding allows the establishment of native species or placeholder species and restoration of disturbed areas to a perennial-dominated cover type, thereby decreasing the risk of subsequent invasion by exotic plant species. Seeding would be used primarily as a follow-up treatment in areas where disturbance or the previously described treatments have removed exotic plant species and their residue.

Segregation, segregative effect. As it pertains to withdrawals, refers to the closure of lands to the operation of all or some of the public land laws and mineral laws. Public land laws authorize some means to dispose of the surface estate, whereas the mineral laws authorize disposal of the subsurface estate. The segregative effect of a withdrawal is stated in the order itself, or it is prescribed by the authority that a withdrawal is made under.

Sensitive soils. Sensitive soils have a high risk of degradation from surface uses, such as the soils poorly suited to reclamation, badlands, soils with severe erosion hazard, soils on steep slopes, and hydric soils. Criteria used to determine soil sensitivity to surface uses are continually adapted as conditions change or new information or technology becomes available.

Short-term effect. Occurs only during or immediately after implementation of an alternative.

Special Recreation Management Area (SRMA). An administrative public lands unit identified in land use plans where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance, or distinctiveness, especially as compared to other areas used for recreation (BLM 2014)¹⁶.

Special recreation permit (SRP). Authorization that allows for recreational uses of public lands and related waters. Issued as a means to control visitor use, protect recreational and natural resources, and provide for the health and safety of visitors. Commercial SRPs are also issued to provide a fair return for the commercial use of public lands.

Special status species. BLM special status species are those listed, candidate, or proposed for listing under the Endangered Species Act and those requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the Endangered Species Act that are designated as BLM sensitive by a BLM State Director. All federally listed candidate species, proposed species, and delisted species in the five years following delisting are conserved as BLM sensitive species.

¹⁶US Department of Interior, Bureau of Land Management. 2014. Handbook H-8320-1—Planning for Recreation and Visitor Services. Rel. 8-85. Washington, DC. August 22, 2014. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.36142.File.dat/H-8320-1%20Recreation%20and%20Visitor%20Services%20Planning.pdf.

Split-estate. The circumstance where the surface of a particular parcel is owned by a different party than the minerals underlying the surface. Split-estates may have any combination of surface/subsurface owners: federal/state, federal/private, state/private, or percentage ownerships. When referring to the split-estate ownership on a particular parcel of land, it is generally necessary to describe the surface/subsurface ownership pattern of the parcel.

Stabilize. The process of stopping further damage from occurring.

Standard. A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards). To be expressed as a desired outcome (goal).

Standard lease terms and conditions. Areas may be open to leasing with no specific management decisions defined in an RMP; however, these areas are subject to lease terms and conditions as defined on the lease form (Form 3100-11, Offer to Lease and Lease for Oil and Gas; and Form 3200-24, Offer to Lease and Lease for Geothermal Resources).

State. An integrated soil and vegetation unit having one or more biological communities that occur on a particular ecological site and that are functionally similar with respect to the three attributes (soil/site stability, hydrologic function, and biotic integrity) under natural disturbance regimes.

Steep slopes. Those that are 30 percent or greater.

Stipulation (general). A term or condition in an agreement or contract.

Stipulation (oil and gas). A provision that modifies standard oil and gas lease terms and conditions in order to protect other resource values or land uses and is attached to and made a part of the lease. Typical lease stipulations are no surface occupancy (NSO), timing limitations (TL), and controlled surface use (CSU). Lease stipulations are developed through the RMP process.

Surface disturbance. Surface-disturbing activities result from land uses and affect soils and vegetation to varying degrees depending on the amount, location, and type of disturbance; soil type; time of year; climate; and surface hydrology. Surface-disturbing activities remove protective vegetative cover and soil crusts and can alter soil physical, chemical, and biological properties, increasing soil susceptibility to water and wind erosion and decreasing its quality and site productivity.

Surface-disturbing activities. An action that alters the vegetation, surface/near surface soil resources, or surface geologic features beyond natural site conditions and on a scale that affects other public land values. Examples of surface-disturbing activities are operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments (e.g., prescribed fire). Surface-disturbing activities may be either authorized or prohibited.

Surface uses. These are all the various activities that may be present on the surface or near-surface (e.g., pipelines) of the public lands. The term does not refer to those subterranean activities (e.g., underground mining) on public lands or federal mineral estate. When administered as a use restriction (e.g., *No Surface Use*), this phrase prohibits all but specified resource uses and activities in a certain area to protect particular sensitive resource values and property. This designation typically applies to small

acreage sensitive resource sites (e.g., plant community study enclosure) and administrative sites (e.g., government ware-yard) where only authorized agency personnel are admitted.

Sustained yield. The achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple uses.

Technically/economically feasible. Actions that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant. It is the BLM's sole responsibility to determine what actions are technically and economically feasible. The BLM will consider whether implementation of the proposed action is likely given past and current practice and technology; this consideration does not necessarily require a cost-benefit analysis or speculation about an applicant's "costs and profit" (CEQ 1981¹⁷; BLM 2008¹⁸).

Temporary/temporary use. The opposite of permanent/permanent use. It is a relative term and has to be considered in the context of the resource values affected and the nature of the resource uses and activities taking place. Generally a temporary activity is considered to be one that is not fixed in place and is of short duration.

Temporary route. Temporary routes are defined as short-term overland roads, primitive roads or trails; authorized or acquired for the development, construction or staging of a project or event that has a finite lifespan.

Terrestrial. Living or growing in or on the land.

Threatened species. Any species that is likely to become endangered in the foreseeable future throughout all or a significant portion of its range (BLM 2008a). Under the Endangered Species Act in the United States, threatened is less protected than endangered. Designation as threatened or endangered is determined by US Fish and Wildlife Service, as directed by the Endangered Species Act.

Timber. Standing trees, downed trees, or logs that are capable of being measured in board feet.

Timing limitation (TL). This stipulation, a moderate constraint, is applicable to fluid mineral leasing, all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, and construction of wells and pads), and other surface-disturbing activities (i.e., those not related to fluid mineral leasing). Areas identified for TL are closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames. This stipulation does not apply to operation and basic maintenance, including associated vehicle travel, unless otherwise specified. Construction, drilling, completions, and other operations considered to be intensive are not allowed. Intensive maintenance, such as workovers on

¹⁷Council on Environmental Quality. 1981. Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations. Washington, DC. March 23, 1981.

¹⁸US Department of the Interior, Bureau of Land Management. 2008. Handbook H-1790-1—National Environmental Policy Act. Rel. 1-1710. Washington, DC. January 30, 2008. Internet website: [https://www.blm.gov/style/medialib/blm/ak/aktest/planning/planning_general.Par.2116.File.dat/Handbook.NEPA.H-1790-1.2k8.01.30\[1\].pdf](https://www.blm.gov/style/medialib/blm/ak/aktest/planning/planning_general.Par.2116.File.dat/Handbook.NEPA.H-1790-1.2k8.01.30[1].pdf).

wells, is not permitted. TLs can overlap spatially with no surface occupancy and controlled surface use, as well as with areas that have no other restrictions.

Total dissolved solids. Salt, or an aggregate of carbonates, bicarbonates, chlorides, sulfates, phosphates, and nitrates of calcium, magnesium, manganese, sodium, potassium, and other cations that form salts.

Total maximum daily load (TMDL). An estimate of the total quantity of pollutants (from all point, nonpoint, and natural sources) that may be allowed into waters without exceeding applicable water quality criteria.

Trail. A linear route managed for human-power (e.g., hiking or bicycling), stock (e.g., horseback riding), or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

Transition. A shift between two states. Transitions are not reversible by simply altering the intensity or direction of factors that produced the change. Instead, they require new inputs such as revegetation or shrub removal. Practices such as these that accelerate succession are often expensive to apply.

Transmission. The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points where it is transformed for delivery to consumers or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer.

Transportation system. The sum of the BLM's recognized inventory of linear features (roads, primitive roads, and trails) formally recognized, designated, and approved as part of the BLM's transportation system.

Travel management areas (TMA). Polygons or delineated areas where a rational approach has been taken to classify areas open, closed or limited, and has identified or designated a network of roads, trails, ways, landing strips, and other routes that provide for public access and travel across the planning area. All designated travel routes within travel management areas should have a clearly identified need and purpose, as well as clearly defined activity types, modes of travel, and seasons or time frames for allowable access or other limitations (BLM 2005¹⁹).

Trespass. Any unauthorized use of public land.

Tribal interests. Native American or Native Alaskan economic rights, such as Indian trust assets, resource uses, access guaranteed by treaty rights, and subsistence uses.

Understory. That portion of a plant community growing underneath the taller plants on the site.

Unitization. Operation of multiple leases as a single lease under a single operator.

¹⁹US Department of the Interior, Bureau of Land Management. 2005. Handbook H-1601-1—Land Use Planning Handbook. Rel. 1-1693. Washington, DC. March 11, 2005. Internet website: https://www.blm.gov/style/medialib/blm/ak/aktest/planning/planning_general.Par.65225.File.dat/blm_lup_handbook.pdf.

Unitized area. A group of contiguous oil and gas lease holdings where the lessee holds an agreement with the federal government so that exploration, drilling, and production of the resource proceeds in the most efficient and economical manner.

Unnecessary or undue degradation. Conditions, activities, or practices that are characterized as follows (43 CFR 3809.5):

- Fail to comply with one or more of the following: the performance standards in 43 CFR 3809.420, the terms and conditions of an approved plan of operations, operations described in a complete notice, and other federal and state laws related to environmental protection and protection of cultural resources
- Are not “reasonably incident” to prospecting, mining, or processing operations, as defined in 43 CFR 3715.0-5
- Fail to attain a stated level of protection or reclamation required by specific laws in areas such as the California Desert Conservation Area, Wild and Scenic Rivers, BLM-administered portions of the National Wilderness System, and BLM-administered National Monuments and National Conservation Areas

Utility corridor. Tract of land varying in width and forming a passageway that various commodities such as oil, gas, and electricity are transported through.

Valid existing rights. Documented legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include fee title ownership, mineral rights, rights-of-way, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.

Vegetation condition class (VCC). Quantifies the amount that current vegetation has departed from the simulated historical vegetation reference conditions. Three condition classes describe low departure (VCC 1), moderate departure (VCC 2), and high departure (VCC 3). VCC is calculated based on changes to species composition, structural stage, and canopy closure.

Vegetation manipulation. Planned alteration of vegetation communities through use of mechanical or chemical means, seeding, or prescribed fire or managed fire to achieve desired resource objectives.

Vegetation treatments. Management practices that change the vegetation structure to a different stage of development. Vegetation treatment methods include managed fire, prescribed fire, chemical or mechanical means, and seeding.

Vegetation type. A plant community with immediately distinguishable characteristics based on and named after the apparent dominant plant species.

Visibility (air quality). A measure of the ability to see and identify objects at different distances.

Visitor day. Twelve visitor hours that may be aggregated by one or more persons in single or multiple visits.

Visual resources. The visible physical features on a landscape, (topography, water, vegetation, animals, structures, and other features) that comprise the scenery of the area.

Watershed. Topographical region or area delineated by water draining to a particular watercourse or body of water.

West Nile virus. Found in temperate and tropical regions of the world and most commonly transmitted by mosquitos. West Nile virus can cause flu-like symptoms in humans and can be lethal to birds, including sage-grouse.

Wild and Scenic Study River. Rivers identified for study by Congress under Section 5(a) of the Wild and Scenic Rivers Act or identified for study by the Secretary of Agriculture or the Secretary of the Interior under Section 5(d)(1) of the Wild and Scenic Rivers Act. These rivers are studied under the provisions of Section 4 of the Wild and Scenic Rivers Act (BLM 2012²⁰).

Eligible river. A river or river segment found to meet criteria found in Sections 1(b) and 2(b) of the Wild and Scenic Rivers Act of being free flowing and possessing one or more outstandingly remarkable value

Suitable river. An eligible river segment found through administrative study to meet the criteria for designation as a component of the National System, as specified in Section 4(a) of the Wild and Scenic Rivers Act

Wildcat well. An exploratory oil well drilled in land not known to be an oil field.

Wilderness. A congressionally designated area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation, that is protected and managed to preserve its natural conditions and that has the following characteristics:

- Generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable
- Has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- Has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition
- May also contain ecological, geological, or other features of scientific, educational, scenic, or historic value

The definition is contained in Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

Wilderness characteristics. Wilderness characteristics attributes are the area's size, its apparent naturalness, and outstanding opportunities for solitude or a primitive and unconfined type of recreation.

²⁰US Department of the Interior, Bureau of Land Management. 2012. Manual 6400—Wild and Scenic Rivers – Policy and Program Direction for Identification, Evaluation, Planning, and Management. Rel. 6-136. Washington, DC. July 13, 2012. Internet website: https://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.76771.File.dat/6400.pdf.

They may also include supplemental values, such as ecological, geological, or other features of scientific, educational, scenic, or historical value. Lands with wilderness characteristics have been inventoried and determined by the BLM to contain wilderness characteristics, as defined in section 2(c) of the Wilderness Act, as follows:

- **Naturalness**—The degree to which an area generally appears to have been affected primarily by the forces of nature with the imprint of people’s work substantially unnoticeable
- **Opportunity**—A situation or condition favorable for attainment of a goal
- **Outstanding**—1. Standing out among others of its kind, conspicuous, prominent; 2. Superior to others of its kind, distinguished, excellent
- **Primitive and Unconfined recreation**—Nonmotorized, nonmechanized (except as provided by law), and undeveloped types of recreational activities
- **Solitude**—The state of being alone or remote from others, isolation; a lonely or secluded place

Wilderness Study Area (WSA). A designation made through the land use planning process of a roadless area found to have wilderness characteristics, as described in Section 2(c) of the Wilderness Act of 1964.

Wild fire. Wild fire is a general term describing any non-structure fire that occurs in the wild. Wild fires are categorized into two distinct types (USDA and DOI 2009²¹):

- **Wild fires**—Unplanned ignitions or prescribed fires that are declared wildfires.
- **Prescribed Fires**—Planned ignitions

Wildland-urban interface (WUI). The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

Wind avoidance area. May be available for locating wind energy ROWs with special stipulations, design features, or mitigation measures that go beyond the standard terms and conditions applied to ROW grants and best management practices. Unlike areas designated as open, avoidance areas contain constraints that may result in substantial restrictions or mitigation measures in order for an applicant to proceed with a wind energy development.

Wind exclusion area. Those that are not available for locating wind energy ROWs under any conditions.

Wind open area. Available for consideration for locating wind ROWs, with standard ROW terms and conditions, less restrictive design features incorporated into the applicant’s plan of development, and

²¹US Department of Agriculture and US Department of the Interior. 2009. Guidance for Implementation of Federal Wildland Fire Management Policy. Wildland Fire Leadership Council. Internet website: https://www.nifc.gov/policies/policies_documents/GIFWFMP.pdf. February 2009.

general BMPs that can be found in the 2005 ROD for Wind Energy Development and Associated Land Use Plan Amendments (BLM 2005²²).

Withdrawal. An action that restricts the use of public land and segregates the land from the operation of some or all of the public land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of public lands to other federal agencies.

Winter concentration areas. Sage-grouse winter habitats that sage-grouse occupy annually and that provide sufficient sagebrush cover and food to support the birds throughout the entire winter (especially periods with above-average snow cover). Many of these areas support several different breeding populations of sage-grouse. Sage-grouse typically show high fidelity for these areas, and loss or fragmentation can result in significant population impacts.

Yearling factor. Adjustments made to grazing permits in which yearlings are the class of livestock. Yearlings were rated at 0.75 animal unit months for these permits, allowing for more yearlings to be run than cattle.

²²US Department of the Interior, Bureau of Land Management. 2005. Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments – Record of Decision. Washington, DC. December 2005.

This page intentionally left blank.

Index

- Abandoned Mine Lands (AML), 3-7
- Acquired lands, 2-33, 2-34, 2-33, 2-34, 2-40, 2-50, 4-82, 4-85, 4-122, 4-123, 4-124, 4-126, 4-127, 4-129, 4-131, 4-132, 4-134, 4-135
- Air quality, 1-7, 1-8, 2-7, 3-1, 4-1, 4-2, 4-3, 4-4, 4-78, 4-204, 4-213, 4-214, 4-215
- Area of Critical Environmental Concern (ACEC), ES-3, 2-2, 2-6, 2-12, 2-26, 2-29, 2-35, 2-35, 2-43, 2-46, 2-50, 2-54, 2-55, 2-54, 2-55, 2-59, 3-6, 4-11, 4-13, 4-15, 4-17, 4-23, 4-24, 4-27, 4-28, 4-30, 4-37, 4-42, 4-46, 4-49, 4-51, 4-57, 4-58, 4-59, 4-61, 4-63, 4-65, 4-67, 4-69, 4-70, 4-72, 4-74, 4-75, 4-81, 4-83, 4-84, 4-86, 4-93, 4-99, 4-106, 4-112, 4-114, 4-116, 4-117, 4-119, 4-120, 4-121, 4-125, 4-128, 4-131, 4-133, 4-136, 4-138, 4-139, 4-140, 4-148, 4-149, 4-150, 4-151, 4-152, 4-154, 4-155, 4-156, 4-157, 4-158, 4-159, 4-160, 4-162, 4-163, 4-164, 4-165, 4-166, 4-167, 4-168, 4-169, 4-170, 4-171, 4-172, 4-173, 4-174, 4-175, 4-176, 4-182, 4-183, 4-184, 4-185, 4-190, 4-191, 4-197, 4-204, 4-205, 4-206, 4-208
- Best Management Practice (BMP), 1-7, 1-8, 1-9, 2-7, 2-8, 2-9, 2-17, 2-23, 2-30, 2-50, 2-53, 4-10, 4-11, 4-13, 4-14, 4-15, 4-16, 4-21, 4-24, 4-27, 4-28, 4-29, 4-32, 4-38, 4-39, 4-40, 4-43, 4-45, 4-46, 4-49, 4-50, 4-53, 4-59, 4-60, 4-65, 4-67, 4-69, 4-70, 4-72, 4-88, 4-97, 4-106, 4-113, 4-130, 4-133, 4-138, 4-150, 4-157, 4-161, 4-163, 4-165, 4-167, 4-174, 4-177, 4-179, 4-214, 4-215
- Birds, migratory, 2-18, 2-20, 4-62
- Birds, waterfowl, 2-15, 2-17, 4-22, 4-39
- Clean Water Act (CWA), 4-24, 4-32
- Coal, 2-5, 3-4, 4-1, 4-2, 4-3, 4-4, 4-5, 4-10, 4-21, 4-37, 4-53, 4-54, 4-58, 4-69, 4-75, 4-78, 4-92, 4-130, 4-186, 4-211
- Communication site, ES-3, ES-4, 2-2, 2-48, 3-5, 4-19, 4-92, 4-150, 4-152, 4-170, 4-211
- Emergency Stabilization and Rehabilitation (ES&R), 2-9, 2-17, 4-47, 4-60, 4-65, 4-66, 4-70, 4-71, 4-163
- Endangered species, 2-17, 2-19, 2-20, 2-37, 2-45, 4-138
- Endangered Species Act (ESA), 1-6
- Environmental justice, 1-5, 4-202
- Extensive Recreation Management Area (ERMA), 2-43, 3-4, 4-12, 4-15, 4-23, 4-28, 4-30, 4-41, 4-48, 4-51, 4-56, 4-61, 4-68, 4-80, 4-82, 4-84, 4-85, 4-91, 4-98, 4-114, 4-115, 4-116, 4-118, 4-131, 4-133, 4-135, 4-137, 4-140, 4-141, 4-142, 4-143, 4-144, 4-145, 4-146, 4-147, 4-152, 4-153, 4-155, 4-158, 4-159, 4-176, 4-197, 4-199, 4-200
- Federal Land Policy and Management Act (FLPMA), ES-2, 1-1, 1-5, 1-7, 2-26, 2-27
- Federal Mineral Estate, ES-1, ES-3, 1-1, 1-2, 1-3, 2-2, 2-21, 2-35, 2-36, 2-37, 2-37, 2-38, 2-51, 4-9, 4-10, 4-25, 4-27, 4-30, 4-106, 4-107, 4-109, 4-111, 4-122, 4-124, 4-125, 4-127, 4-128, 4-151
- Fire, prescribed, 2-13, 2-14, 2-15, 2-25, 2-33, 4-1, 4-3, 4-4, 4-5, 4-18, 4-25, 4-27, 4-29, 4-44, 4-50, 4-79, 4-80, 4-81, 4-83, 4-85, 4-89, 4-115, 4-119, 4-136, 4-163, 4-168, 4-169, 4-174, 4-175, 4-198, 4-209
- Fire, suppression, 2-23, 2-24, 2-24, 4-38, 4-47, 4-55, 4-57, 4-60, 4-66, 4-68, 4-71, 4-76, 4-78, 4-79, 4-80, 4-81, 4-82, 4-83, 4-84, 4-85, 4-86, 4-108, 4-114, 4-116, 4-117, 4-119, 4-131, 4-163, 4-166, 4-168, 4-171, 4-172, 4-176
- Fuel load, 4-40, 4-41, 4-45, 4-46, 4-47, 4-55, 4-78, 4-79, 4-80, 4-81, 4-82, 4-83, 4-84, 4-85, 4-86, 4-161
- Fugitive dust, 2-7, 4-38, 4-42, 4-59, 4-213
- Geothermal, 2-4, 2-50
- Grazing, allotment, 1-5, 2-15, 2-16, 2-39, 2-40, 4-13, 4-15, 4-47, 4-130, 4-131, 4-134, 4-135
- Grazing, management, 1-7, 2-3, 2-8, 2-9, 2-40, 4-30, 4-32, 4-56, 4-130, 4-131, 4-132, 4-133, 4-134, 4-135, 4-136, 4-137, 4-138, 4-152, 4-153, 4-155, 4-156, 4-194, 4-199, 4-200
- Hawk, ferruginous, 4-58, 4-64, 4-74
- Land and Water Conservation Funds (LWCF), 2-50, 2-49, 4-179
- Land Health Condition (LHC), 2-38, 4-131
- Land tenure adjustments, 2-51, 4-88, 4-154, 4-156, 4-211
- Land use, authorizations (LUA), 2-47, 2-56, 4-19, 4-28, 4-30, 4-41, 4-54, 4-56, 4-59, 4-90, 4-92, 4-94, 4-99, 4-106, 4-107, 4-110, 4-112

- 4-122, 4-150, 4-151, 4-152, 4-154, 4-155, 4-156, 4-163, 4-189, 4-190, 4-196, 4-198, 4-211, 4-212
- Leasing, oil and gas, ES-3, 1-3, 2-2, 2-21, 2-35, 4-31, 4-41, 4-45, 4-48, 4-51, 4-87, 4-92, 4-122, 4-124, 4-125, 4-127, 4-131, 4-133, 4-139, 4-211
- Mechanical treatment, 2-25, 2-33, 4-44, 4-47, 4-79
- Microbiotic crust, 3-2, 4-12, 4-13, 4-14, 4-15, 4-16, 4-17, 4-18, 4-25, 4-29, 4-43, 4-59
- Minerals, entry, 2-33, 2-35, 2-37, 2-56, 2-58, 4-9, 4-10, 4-12, 4-14, 4-16, 4-17, 4-18, 4-92, 4-106, 4-107, 4-109, 4-111, 4-114, 4-115, 4-118, 4-121, 4-122, 4-151, 4-165, 4-166, 4-167, 4-168, 4-171, 4-173, 4-211
- Minerals, fluid, ES-2, 1-1, 2-21, 2-23, 2-36, 2-37, 2-37, 2-50, 3-4, 4-1, 4-2, 4-3, 4-4, 4-5, 4-9, 4-10, 4-11, 4-12, 4-16, 4-18, 4-19, 4-21, 4-23, 4-25, 4-27, 4-28, 4-29, 4-30, 4-34, 4-39, 4-41, 4-43, 4-49, 4-50, 4-61, 4-62, 4-63, 4-64, 4-65, 4-66, 4-67, 4-68, 4-69, 4-70, 4-71, 4-72, 4-73, 4-74, 4-82, 4-84, 4-85, 4-88, 4-92, 4-94, 4-97, 4-98, 4-99, 4-102, 4-106, 4-113, 4-114, 4-116, 4-118, 4-119, 4-120, 4-121, 4-123, 4-124, 4-125, 4-126, 4-127, 4-128, 4-129, 4-133, 4-135, 4-136, 4-138, 4-139, 4-141, 4-142, 4-143, 4-145, 4-146, 4-155, 4-156, 4-166, 4-167, 4-168, 4-174, 4-177, 4-179, 4-180, 4-181, 4-182, 4-184, 4-186, 4-187, 4-188, 4-195, 4-196, 4-211
- Minerals, leasable, 2-6, 2-23, 2-35, 3-4, 4-58, 4-80, 4-82, 4-84, 4-85, 4-87, 4-94, 4-99, 4-122, 4-124, 4-126, 4-127, 4-128
- Minerals, locatable, 2-6, 2-37, 2-51, 4-17, 4-19, 4-54, 4-92, 4-122, 4-123, 4-124, 4-126, 4-128, 4-129, 4-211
- Minerals, materials, ES-2, 2-1, 2-6, 2-37, 2-38, 2-37, 2-38, 2-59, 4-92, 4-94, 4-99, 4-103, 4-106, 4-122, 4-123, 4-124, 4-125, 4-126, 4-128, 4-129, 4-166, 4-172, 4-184, 4-185, 4-186, 4-211
- Mining Law of 1872, 2-37
- Mountain biking, 4-147
- National Ambient Air Quality Standards (NAAQS), 2-7
- National Environmental Policy Act of 1969 (NEPA), 1-5, 1-7, 1-8, 4-1, 4-150, 4-153, 4-157, 4-214
- National Historic Trail (NHT), 1-8, 2-26, 2-27, 2-43, 2-55, 2-56, 3-6, 4-141, 4-154, 4-178, 4-179, 4-180, 4-181, 4-186, 4-187
- National Park Service, 4-181
- National Register of Historic Places (NRHP), 2-26, 2-27, 2-28, 4-82, 4-85, 4-153, 4-155, 4-160
- National Wild and Scenic Rivers System (NWSRS), 2-56, 2-57, 3-6, 4-24, 4-27, 4-42, 4-46, 4-57, 4-62, 4-64, 4-65, 4-84, 4-86, 4-93, 4-107, 4-108, 4-110, 4-143, 4-145, 4-152, 4-154, 4-155, 4-156, 4-181, 4-182, 4-183, 4-184, 4-185, 4-187, 4-189, 4-190, 4-191
- No Surface Occupancy (NSO), ES-2, 2-9, 2-10, 2-11, 2-16, 2-21, 2-22, 2-23, 2-27, 2-29, 2-33, 2-36, 2-42, 2-48, 2-56, 2-58, 4-9, 4-11, 4-12, 4-14, 4-16, 4-17, 4-18, 4-19, 4-22, 4-23, 4-25, 4-26, 4-27, 4-28, 4-29, 4-30, 4-34, 4-39, 4-43, 4-48, 4-49, 4-50, 4-51, 4-62, 4-64, 4-66, 4-68, 4-70, 4-71, 4-72, 4-73, 4-92, 4-116, 4-118, 4-119, 4-120, 4-121, 4-123, 4-124, 4-125, 4-126, 4-127, 4-128, 4-129, 4-133, 4-135, 4-136, 4-139, 4-141, 4-142, 4-143, 4-145, 4-146, 4-151, 4-153, 4-155, 4-156, 4-166, 4-168, 4-177, 4-178, 4-179, 4-180, 4-181, 4-182, 4-184, 4-187, 4-211
- Off-highway vehicle (OHV), ES-3, 1-7, 1-8, 2-4, 2-32, 2-44, 2-45, 2-46, 2-45, 2-46, 3-5, 4-8, 4-11, 4-13, 4-15, 4-16, 4-17, 4-18, 4-20, 4-23, 4-24, 4-26, 4-28, 4-32, 4-35, 4-36, 4-41, 4-42, 4-45, 4-52, 4-56, 4-58, 4-59, 4-60, 4-61, 4-62, 4-63, 4-64, 4-71, 4-73, 4-74, 4-80, 4-83, 4-84, 4-86, 4-91, 4-92, 4-94, 4-96, 4-99, 4-113, 4-114, 4-117, 4-119, 4-120, 4-121, 4-131, 4-133, 4-137, 4-139, 4-141, 4-143, 4-144, 4-145, 4-146, 4-147, 4-148, 4-149, 4-150, 4-152, 4-154, 4-155, 4-156, 4-165, 4-166, 4-167, 4-169, 4-172, 4-174, 4-176, 4-177, 4-178, 4-194, 4-202, 4-203, 4-206, 4-207, 4-210, 4-212, 4-213
- Payments in lieu of taxes (PILT), 4-196, 4-198, 4-200, 4-201
- Planning issue, ES-2, 1-4, 1-6
- Particulate matter (PM_{2.5}), 3-1, 4-1, 4-2, 4-3, 4-4, 4-5
- Precious metals, 3-4
- Prime farmland, 3-2
- Probable sale quantity (PSQ), 2-52, 4-48, 4-164, 4-198, 4-199, 4-201

- Proper functioning condition (PFC), 2-8, 2-9, 2-10, 2-15, 2-44, 4-22, 4-27, 4-29, 4-32, 4-39, 4-43, 4-47, 4-48, 4-50, 4-52, 4-55, 4-66, 4-67, 4-134, 4-136
- Proposed RMP, 1-7, 2-3, 2-4, 4-58, 4-69, 4-78, 4-130
- Public access, 2-20, 2-47, 3-5, 4-120, 4-121, 4-143, 4-146, 4-148, 4-149, 4-169, 4-192, 4-210
- Reasonably Foreseeable Development Scenario (RFD), 1-7, 4-14, 4-16, 4-18, 4-19, 4-71, 4-77, 4-94, 4-95, 4-99, 4-100, 4-121, 4-122, 4-124, 4-125, 4-127, 4-128, 4-129, 4-193, 4-195, 4-196, 4-199, 4-201
- Reclamation, ES-1, 1-2, 2-7, 2-9, 2-37, 2-40, 2-53, 4-10, 4-13, 4-15, 4-21, 4-38, 4-42, 4-53, 4-93, 4-106, 4-113, 4-139, 4-165, 4-170, 4-177, 4-179
- Record of Decision (ROD), 1-7, 2-4, 2-21, 2-35, 4-214
- Recreation, dispersed, 2-43, 4-97, 4-141, 4-143, 4-212, 4-214
- Recreation, mechanized, 4-145
- Recreation, motorized, 4-87, 4-139, 4-141, 4-144, 4-146, 4-147
- Recreation, nonmotorized, 4-170, 4-171
- Renewable energy, 1-4, 2-5, 2-8, 2-50, 4-16, 4-19, 4-87, 4-92, 4-106, 4-116, 4-119, 4-132, 4-134, 4-135, 4-137, 4-150, 4-157, 4-160, 4-161, 4-163, 4-176, 4-181, 4-182, 4-184, 4-185, 4-211, 4-213, 4-214
- Research Natural Area (RNA), 2-54, 4-24, 4-152, 4-156, 4-165
- Rights-of-way (ROW), ES-2, 2-5, 2-9, 2-12, 2-16, 2-27, 2-32, 2-47, 2-48, 2-56, 2-57, 2-58, 2-59, 3-5, 4-8, 4-9, 4-11, 4-12, 4-13, 4-14, 4-16, 4-17, 4-18, 4-19, 4-20, 4-21, 4-23, 4-24, 4-25, 4-26, 4-27, 4-28, 4-30, 4-31, 4-32, 4-36, 4-41, 4-42, 4-45, 4-46, 4-48, 4-51, 4-52, 4-54, 4-56, 4-59, 4-60, 4-61, 4-62, 4-63, 4-64, 4-65, 4-67, 4-68, 4-70, 4-71, 4-72, 4-73, 4-74, 4-75, 4-76, 4-77, 4-79, 4-80, 4-82, 4-84, 4-85, 4-86, 4-87, 4-88, 4-92, 4-94, 4-95, 4-96, 4-99, 4-100, 4-104, 4-105, 4-106, 4-108, 4-110, 4-111, 4-112, 4-113, 4-114, 4-116, 4-117, 4-118, 4-119, 4-122, 4-123, 4-124, 4-125, 4-126, 4-127, 4-128, 4-131, 4-132, 4-133, 4-134, 4-135, 4-137, 4-139, 4-141, 4-142, 4-143, 4-144, 4-145, 4-150, 4-151, 4-152, 4-153, 4-154, 4-155, 4-156, 4-157, 4-158, 4-159, 4-160, 4-162, 4-163, 4-164, 4-165, 4-166, 4-167, 4-168, 4-169, 4-170, 4-171, 4-172, 4-173, 4-174, 4-175, 4-176, 4-177, 4-178, 4-179, 4-180, 4-181, 4-182, 4-183, 4-184, 4-185, 4-186, 4-187, 4-188, 4-189, 4-190, 4-191, 4-196, 4-198, 4-200, 4-201, 4-211, 4-212, 4-214
- Sage-grouse, Greater, 1-8, 2-21, 2-44, 4-7, 4-38, 4-52, 4-54, 4-58, 4-59, 4-64, 4-69, 4-73, 4-74, 4-77, 4-78, 4-79, 4-89, 4-130, 4-157, 4-158, 4-159, 4-160
- Sand and gravel, 2-37, 2-38, 4-37, 4-53
- Seeding, 2-7, 2-40, 4-13, 4-42
- Sensitive species, 2-19, 2-20, 2-44, 4-7, 4-80, 4-82, 4-162, 4-170
- Socioeconomics, 3-1, 4-52, 4-208
- Soils, 2-8, 2-9, 2-10, 2-43, 2-44, 2-46, 2-53, 3-2, 4-8, 4-9, 4-10, 4-11, 4-12, 4-13, 4-14, 4-15, 4-16, 4-17, 4-18, 4-19, 4-22, 4-25, 4-29, 4-31, 4-37, 4-38, 4-41, 4-42, 4-43, 4-46, 4-49, 4-62, 4-64, 4-65, 4-69, 4-70, 4-72, 4-74, 4-80, 4-88, 4-89, 4-98, 4-131, 4-134, 4-150, 4-158, 4-162, 4-163, 4-164, 4-165, 4-166, 4-173
- Soils, erodible, 2-44
- Solid leasable minerals, 2-35, 4-92, 4-126, 4-128, 4-129, 4-142, 4-211
- Special Recreation Management Area (SRMA), ES-3, 2-2, 2-42, 2-44, 2-47, 2-50, 3-4, 4-12, 4-17, 4-23, 4-41, 4-48, 4-51, 4-56, 4-66, 4-68, 4-80, 4-82, 4-84, 4-85, 4-86, 4-91, 4-98, 4-119, 4-131, 4-133, 4-135, 4-137, 4-140, 4-142, 4-143, 4-144, 4-145, 4-146, 4-147, 4-148, 4-152, 4-153, 4-155, 4-158, 4-159, 4-176, 4-182, 4-186, 4-199, 4-200
- Special status species, ES-4, 1-8, 2-2, 2-13, 2-17, 2-19, 2-20, 2-38, 2-44, 3-2, 4-27, 4-29, 4-39, 4-44, 4-50, 4-57, 4-58, 4-64, 4-65, 4-69, 4-74, 4-75, 4-77, 4-89, 4-98, 4-106, 4-120, 4-138, 4-192, 4-213
- Split estate, 1-3
- Surface water, 2-10, 2-11, 3-2, 4-22, 4-23, 4-24, 4-25, 4-27, 4-29, 4-30, 4-31, 4-76, 4-90, 4-132, 4-214
- Threatened and endangered species (TES), 2-20
- Timber harvest, ES-3, 2-1, 2-16, 2-15, 4-3, 4-4, 4-11, 4-13, 4-15, 4-17, 4-24, 4-27, 4-28, 4-30, 4-42, 4-46, 4-48, 4-51, 4-56, 4-58, 4-61, 4-63, 4-65, 4-67, 4-68, 4-72, 4-73, 4-74, 4-75, 4-80, 4-82, 4-83, 4-84, 4-85, 4-108, 4-110, 4-112, 4-159, 4-161, 4-162, 4-165, 4-166, 4-170,

- 4-171, 4-172, 4-179, 4-180, 4-184, 4-185, 4-186
- Travel management, 2-43, 2-44, 2-47, 4-30, 4-46, 4-48, 4-51, 4-66, 4-68, 4-70, 4-72, 4-73, 4-75, 4-130, 4-131, 4-135, 4-143, 4-146, 4-147, 4-148, 4-149, 4-156, 4-176, 4-181, 4-203, 4-214, 4-215
- Treatment, chemical, 2-25, 4-89
- Treatment, mechanical, 2-25, 2-33, 4-44, 4-47, 4-79
- Treatment, vegetation, 2-12, 2-16, 2-18, 2-33, 2-33, 2-40, 4-18, 4-39, 4-40, 4-44, 4-45, 4-48, 4-51, 4-77, 4-80, 4-81, 4-83, 4-84, 4-86, 4-89, 4-96, 4-113, 4-115, 4-119, 4-130, 4-137, 4-160, 4-162, 4-164, 4-165, 4-172, 4-209, 4-212, 4-213, 4-215
- Tribal treaty rights, 4-202
- Utility corridor, 3, 2-1, 2-12, 2-16, 2-48, 2-48, 4-22, 4-23, 4-25, 4-28
- Vegetation, invasive species/noxious weed, 2-16, 4-10, 4-15, 4-37, 4-41, 4-42, 4-44, 4-45, 4-48, 4-49, 4-50, 4-209
- Vegetation, ponderosa pine, ES-4, 2-2, 2-13, 2-14, 3-2, 4-37, 4-38, 4-39, 4-40, 4-41, 4-42, 4-43, 4-44, 4-45, 4-46, 4-47, 4-48, 4-49, 4-50, 4-51, 4-58, 4-62, 4-64, 4-67, 4-68, 4-70, 4-72, 4-73, 4-74, 4-75, 4-77, 4-80, 4-81, 4-83, 4-85
- Vegetation, Riparian, ES-3, ES-4, 2-2, 2-10, 2-11, 2-12, 2-15, 2-16, 2-15, 2-16, 2-17, 2-24, 2-24, 2-25, 2-44, 2-48, 2-48, 2-52, 2-53, 3-2, 4-22, 4-23, 4-24, 4-25, 4-26, 4-27, 4-28, 4-29, 4-31, 4-32, 4-33, 4-36, 4-37, 4-38, 4-39, 4-40, 4-42, 4-43, 4-44, 4-45, 4-46, 4-47, 4-48, 4-49, 4-50, 4-51, 4-52, 4-53, 4-55, 4-56, 4-58, 4-59, 4-60, 4-61, 4-62, 4-63, 4-64, 4-65, 4-66, 4-67, 4-68, 4-70, 4-71, 4-72, 4-73, 4-74, 4-75, 4-76, 4-80, 4-82, 4-83, 4-85, 4-88, 4-131, 4-132, 4-134, 4-136, 4-150, 4-162, 4-182, 4-183, 4-188, 4-190, 4-211
- Vegetation, Sagebrush, ES-4, 2-1, 2-2, 2-12, 2-13, 2-24, 2-24, 2-25, 3-2, 4-33, 4-35, 4-36, 4-37, 4-38, 4-39, 4-40, 4-41, 4-42, 4-43, 4-44, 4-45, 4-46, 4-47, 4-48, 4-49, 4-50, 4-51, 4-52, 4-53, 4-54, 4-58, 4-62, 4-63, 4-64, 4-67, 4-68, 4-70, 4-72, 4-73, 4-74, 4-75, 4-78, 4-132, 4-162
- Vegetation, wetlands, ES-3, ES-4, 2-2, 2-10, 2-11, 2-12, 2-15, 2-16, 2-17, 3-2, 4-22, 4-23, 4-24, 4-25, 4-26, 4-27, 4-28, 4-29, 4-32, 4-33, 4-36, 4-37, 4-38, 4-39, 4-40, 4-42, 4-43, 4-44, 4-45, 4-46, 4-47, 4-48, 4-49, 4-50, 4-51, 4-52, 4-53, 4-55, 4-56, 4-58, 4-59, 4-60, 4-61, 4-62, 4-63, 4-64, 4-67, 4-68, 4-70, 4-72, 4-73, 4-74, 4-75, 4-78, 4-132, 4-162
- Viewshed, 4-92, 4-113, 4-179, 4-187, 4-210, 4-211
- Visual Resource Inventory (VRI), 2-29, 2-56, 3-6, 4-101, 4-102, 4-103, 4-104, 4-105, 4-106, 4-107, 4-108, 4-109, 4-110, 4-111, 4-112
- Visual Resource Management (VRM), 1-4, 2-29, 2-30, 2-32, 2-56, 2-57, 2-59, 3-3, 4-12, 4-14, 4-15, 4-16, 4-17, 4-22, 4-25, 4-27, 4-29, 4-33, 4-40, 4-45, 4-48, 4-50, 4-57, 4-68, 4-73, 4-80, 4-81, 4-82, 4-84, 4-85, 4-86, 4-90, 4-92, 4-93, 4-94, 4-95, 4-99, 4-101, 4-102, 4-103, 4-104, 4-105, 4-106, 4-107, 4-108, 4-109, 4-110, 4-111, 4-112, 4-113, 4-114, 4-115, 4-116, 4-118, 4-131, 4-133, 4-134, 4-135, 4-136, 4-139, 4-140, 4-141, 4-142, 4-143, 4-144, 4-145, 4-151, 4-153, 4-155, 4-156, 4-158, 4-159, 4-160, 4-162, 4-163, 4-164, 4-169, 4-170, 4-172, 4-173, 4-174, 4-175, 4-176, 4-177, 4-178, 4-179, 4-180, 4-181, 4-182, 4-183, 4-184, 4-185, 4-186, 4-187, 4-188, 4-190, 4-191, 4-204, 4-205, 4-206, 4-208, 4-210, 4-212
- Water quality, ES-3, 1-8, 2-2, 2-10, 2-11, 2-15, 2-43, 2-44, 2-57, 2-58, 4-6, 4-21, 4-22, 4-23, 4-24, 4-25, 4-26, 4-27, 4-28, 4-29, 4-30, 4-31, 4-32, 4-39, 4-53, 4-54, 4-56, 4-57, 4-59, 4-60, 4-61, 4-66, 4-71, 4-72, 4-76, 4-98, 4-131, 4-150, 4-162, 4-170, 4-171, 4-182, 4-183, 4-188, 4-189, 4-190, 4-214
- Water, groundwater, 2-10, 2-11, 3-2, 4-21, 4-22, 4-23, 4-24, 4-25, 4-28, 4-29, 4-30, 4-31, 4-32, 4-40, 4-43, 4-56, 4-76, 4-120, 4-154, 4-156, 4-170, 4-171, 4-214
- Water, rights, 2-11, 2-11, 4-189, 4-192
- Water, surface water, 2-10, 2-11, 3-2, 4-22, 4-23, 4-24, 4-25, 4-27, 4-29, 4-30, 4-31, 4-76, 4-90, 4-132, 4-214
- Watershed, 2-3, 2-10, 2-11, 2-11, 2-15, 2-19, 2-39, 2-40, 2-41, 2-43, 2-44, 4-13, 4-17, 4-21, 4-22, 4-24, 4-25, 4-26, 4-27, 4-28, 4-29, 4-30, 4-31, 4-32, 4-38, 4-39, 4-43, 4-46, 4-48, 4-49, 4-52, 4-53, 4-57, 4-60, 4-61, 4-62, 4-64, 4-65, 4-66, 4-67, 4-70, 4-72, 4-75, 4-82, 4-88, 4-130, 4-132, 4-135, 4-149, 4-154, 4-156,

- 4-161, 4-165, 4-166, 4-170, 4-171, 4-174,
4-185, 4-214
- Wild and Scenic River, 1-6, 2-6, 2-56, 2-57,
2-56, 3-6, 4-24, 4-181, 4-186
- Wilderness Characteristics, ES-3, 2-2, 2-4, 2-6,
2-30, 2-31, 2-32, 2-33, 2-32, 2-33, 2-34, 2-33,
2-34, 2-43, 2-44, 2-46, 2-58, 3-3, 4-13, 4-15,
4-16, 4-17, 4-25, 4-41, 4-45, 4-50, 4-60, 4-62,
4-64, 4-71, 4-73, 4-74, 4-80, 4-83, 4-84, 4-86,
4-93, 4-94, 4-95, 4-99, 4-100, 4-106, 4-107,
4-109, 4-110, 4-113, 4-114, 4-115, 4-116,
4-117, 4-118, 4-119, 4-121, 4-125, 4-128,
4-131, 4-133, 4-135, 4-136, 4-138, 4-139,
4-141, 4-143, 4-145, 4-148, 4-158, 4-159,
4-163, 4-164, 4-183, 4-189, 4-190, 4-192,
4-197, 4-203, 4-204, 4-205, 4-206, 4-207,
4-208, 4-210
- Wilderness Study Area (WSA), 1-7, 2-4, 2-6,
2-12, 2-25, 2-30, 2-35, 2-36, 2-43, 2-44, 2-46,
2-58, 2-59, 3-6, 4-11, 4-21, 4-24, 4-37, 4-53,
4-54, 4-78, 4-93, 4-98, 4-99, 4-105, 4-106,
4-121, 4-122, 4-123, 4-125, 4-126, 4-127,
4-130, 4-139, 4-140, 4-143, 4-148, 4-149,
4-151, 4-158, 4-159, 4-161, 4-173, 4-174,
4-192, 4-210
- Winter range, big game, 2-17, 2-18, 2-44, 2-45,
3-4, 4-39, 4-44, 4-47, 4-50, 4-58, 4-63, 4-139,
4-147, 4-151
- Withdrawal, 1-4, 2-1, 2-6, 2-28, 2-29, 2-33,
2-35, 2-36, 2-37, 2-49, 2-51, 2-56, 3-5, 4-9,
4-10, 4-14, 4-16, 4-17, 4-24, 4-31, 4-92,
4-107, 4-109, 4-111, 4-114, 4-115, 4-118,
4-121, 4-122, 4-123, 4-124, 4-126, 4-128,
4-129, 4-151, 4-156, 4-161, 4-166, 4-167,
4-168, 4-170, 4-171, 4-190, 4-191, 4-211

This page intentionally left blank.