epartment of the Interior
f Land Management

Rawlins Field Office — December 2004

DRAFT
Environmental Impact Statement for the Rawlins Resource Management Plan

Volume 1 of 2

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/WY/PL-05/003+1610

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003-1828

In Reply Refer To:

1793 (930)
1610

November 29, 2004

Dear Reader:

The Draft Environmental Impact Statement (DEIS) for the Rawlins Resource Management Plan (RMP) is submitted for your review and comment. The Rawlins Field Office (RFO) planning area includes approximately 11.2 million acres of land in Albany, Carbon, Laramie and Sweetwater counties. Within that area, the RFO administers approximately 3.4 million acres of public land surface and mineral estate, 0.1 million acres of public land surface where the mineral estate is private, and 1.2 million acres of Federal mineral estate where the surface is privately owned or State owned.

This Rawlins RMP DEIS revises the Great Divide Resource Area Record of Decision and Approved Resource Management Plan signed in 1990. The BLM has analyzed the potential impacts of 4 alternatives that have been developed for this purpose. These alternatives have been designed to address land management issues that were identified during the planning process. The environmental consequences of the alternatives have also been analyzed.

Please review the document and direct your written comments to the Rawlins RMP Revision, John Spehar, Team Leader, Rawlins Field Office, P.O. Box 2407, Rawlins, Wyoming 82301-2407. Written comments must include your complete name, address, and phone number. Comments may be submitted electronically to comments@rawlinsrmp.com. Comments submitted electronically must include your complete name and address, and phone number. This information is being requested in the event we need clarification of messages that are not legible or we have questions about your comments. Incomplete comments, or comments from unidentified sources, will not be considered nor included as part of the official comment record. Comments may also be submitted through the Internet by visiting the following website: http://www.rawlinsrmp.com.

If you wish to comment on the DEIS we request that you make your comments as specific as possible. Comments will be more helpful if they include suggested changes, sources, or methodologies. The BLM can best use your comments if they are submitted within 90 days of publication of the Notice. All comments will be given full consideration in the development of the Final EIS.

The BLM will host open houses and public hearings to provide information, answer questions, and take comments. The purpose of an open house is to answer any questions you may have about the DEIS. Public hearings would provide an opportunity for you to make formal public comment orally or in writing on the DEIS. At least 15 days prior to the event, the BLM will announce the date and location of open houses and public meetings in local media and on its website.

Freedom of Information Act Considerations: Public comments submitted for this planning effort, including names and street addresses of respondents, will be available for public review in their entirety after the protest period closes at the Rawlins Field Office during regular business hours (7:45 a.m. to 4:30 p.m.), Monday through Friday, except Federal holidays. Individual respondents may request confidentiality. If you wish to withhold your name or address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your comments. Such requests will be honored to the extent allowed by law. All submissions from organizations or businesses, and from individuals or officials representing organizations or businesses, will be made available for public inspection in their entirety.

Please retain this copy of the draft EIS for future reference as the final EIS may be published in an abbreviated format. A copy of this draft EIS has been sent to affected Federal, State, and local government agencies and those persons who indicated they wish to receive a copy of the draft EIS. Copies of the draft EIS are available for public inspection at the following BLM locations:

Bureau of Land Management
Wyoming State Office
5353 Yellowstone Road
Cheyenne, Wyoming 82009

Bureau of Land Management
Rawlins Field Office
1300 North Third
Rawlins, Wyoming 82301

Thank you for your participation in this planning effort.

Sincerely,

Robert A. Bennett
State Director

RAWLINS

RESOURCE MANAGEMENT PLAN

DRAFT ENVIRONMENTAL IMPACT STATEMENT

BUREAU OF LAND MANAGEMENT
Rawlins Field Office
Rawlins, Wyoming

Prepared by

United States Department of the Interior
Bureau of Land Management
Rawlins Field Office

In cooperation with

The Environmental Protection Agency; the State of Wyoming; Carbon, Albany and Sweetwater Counties, Saratoga-Encampment-Rawlins Conservation District; Medicine Bow Conservation District; Little Snake River Conservation District; and Sweetwater County Conservation District

December 2004

Rawlins Field Office Planning Area Resource Management Plan And Draft Environmental Impact Statement

Lead Agency:

Bureau of Land Management
Rawlins Field Office
Rawlins, Wyoming

Cooperating Agencies:
State of Wyoming
Albany, Carbon and Sweetwater Counties, Wyoming
Little Snake Conservation District
Medicine Bow Conservation District
Saratoga-Encampment-Riverside Conservation District
Sweetwater Conservation District

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Abstract

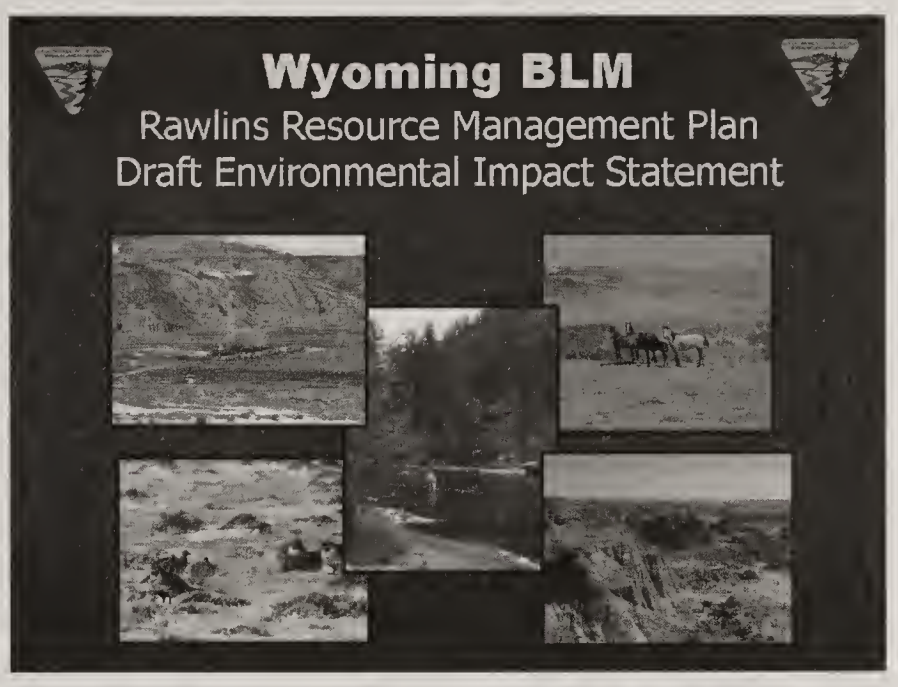
This Environmental Impact Statement (EIS) addresses the comprehensive analysis of alternatives for the planning and management of public lands and resources administered by the Bureau of Land Management (BLM) in southcentral and southwestern Wyoming. The Rawlins Field Office (RFO) includes approximately 11.2 million acres of land in Albany, Carbon, Laramie and Sweetwater counties. Within that area, the RFO administers approximately 3.4 million acres of public land surface and mineral estate, 0.1 million acres of public land surface where the mineral estate is private, and 1.2 million acres of federal mineral estate where the surface is privately owned or state owned. The plan focuses primarily on eight resource management issues: development of energy resources and minerals; special management designations; resource accessibility; wildland-urban interface; special status species; water quality; vegetation management; and recreation, cultural and paleontological resources.

Four alternatives that address each issue have been considered for the Rawlins Resource Management Plan planning area (RMPPA): the No Action Alternative, Alternative 1- Continuation of Existing Management direction; and three action alternatives; Alternative 2 - Emphasis on the Development of Resources; Alternative 3 - Emphasis on Protection of Resources; and Alternative 4 - Preferred Alternative. The No Action Alternative or continuation of existing management direction includes management actions presented in the Great Divide RMP (November 1990) as well as revised direction and policy developed since the completion of the Great Divide RMP. The three action alternatives were developed to present a range of management options. To guide decision making for managing uses and activities within the RMPPA, the BLM's preferred alternative, Alternative 4 is a combination of Alternatives 1, 2, and 3. All alternatives studied in detail focus on allocating resources to a variety of public land uses and prescribing general management actions that would be taken in the future. The impacts that would be expected from implementing each of the alternatives are presented in Chapter 4.

In its final form this document will provide a comprehensive framework for managing and allocating resources on the public lands in the Rawlins Field Office. The Wyoming State Director is the BLM's Authorized Officer for preparing this Draft EIS and subsequently the Final EIS.

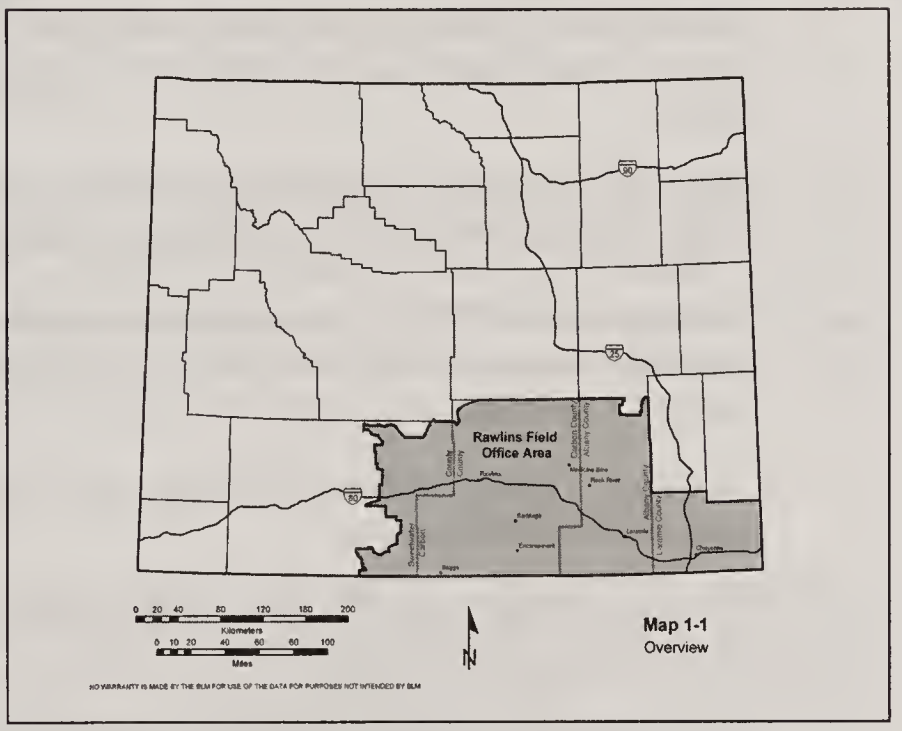
SUMMARY

INTRODUCTION



This Draft Environmental Impact Statement (DEIS) documents the comprehensive analysis of alternatives for the planning and management of public lands and resources administered by the Bureau of Land Management (BLM) Rawlins Field Office (RFO) in Wyoming. The BLM RFO administrative area is located in south-central and southeastern Wyoming. The RFO includes approximately 11.2 million acres of land in Albany, Carbon, Laramie, and Sweetwater Counties.

Within that area, the RFO administers approximately 3.4 million acres of public land surface and mineral estate, 0.1 million acres of public land surface where the mineral estate is state or private, and 1.2 million acres of federal mineral estate where the surface is privately owned or state owned.



The public lands and federal mineral estate within the Rawlins Resource Management Plan Planning Area (RMPPA) are the subject of the planning effort and this associated EIS document. Neither this document nor the RFO's current land use plan applies to lands or minerals within the RMPPA that are administered by federal agencies other than BLM, such as the U.S. Forest Service, the Bureau of Reclamation, and the U.S. Air Force.

This DEIS provides analysis of potential management direction for important resource values and resource uses within the RMPPA, and allocates the use of public lands for multiple-uses. The DEIS also provides management direction for the protection of certain resources while allowing for leasing and development of mineral resources, livestock grazing, and other activities at appropriate levels.

BACKGROUND

The Great Divide RMP, approved by the Wyoming BLM State Director on November 8, 1990, currently covers the public lands included in the Rawlins RMP. The Great Divide RMP provides guidance and direction for management of BLM-administered public land surface and federal mineral estate.

The purpose of the Rawlins RMP Revision and EIS is to replace the existing Great Divide RMP, and to address the deficiencies described in the Great Divide RMP Evaluation (see Section 1.2.3). The Rawlins RMP will provide the overall management direction for the public lands and resources administered by the Rawlins Field Office. Adequate decisions from the Great Divide RMP will be carried forward to the revised plan.

The Great Divide RMP includes five Wilderness Study Areas (WSA)—Encampment River Canyon, Prospect Mountain, Bennett Mountains, Adobe Town, and Ferris Mountains; four Areas of Critical Environmental Concern (ACEC)—Jep Canyon, Como Bluff, Shamrock Hills, and Sand Hills; three Wild Horse Herd Management Areas (HMA)—Adobe Town, Stewart Creek, and Lost Creek; and three Special Recreation Management Areas (SRMA)—Continental Divide National Scenic Trail, North Platte River, and Shirley Mountain Caves. Major land uses include mineral development, wildlife habitat, wild horse use, livestock grazing, and recreation.

ISSUES AND CONFLICTS

The identified issues are based upon the demands, concerns, conflicts and problems involving the use or management of the public lands and resources within the RMPPA. The following planning issues were identified through public scoping and other public outreach efforts. Issues were also identified through an evaluation of the Great Divide RMP completed by the BLM on July 5, 2001. Planning issues and conflicts between various resources and activities addressed in the Rawlins RMP include:

- Energy resource development (i.e., oil & gas, coal, solar, and wind energy) and related transportation network conflicts with other land and resource uses and values (wildlife habitats, recreation values, sensitive vegetation types & sensitive watersheds).
- There are unique areas or sensitive lands and resources in the RMPPA that meet the criteria for protection and management under special management designations. There are also concerns that special management area designations may result in too many restrictions on the use of the public lands.
- Resource accessibility relates to the value or usability of some resources. To be used, resources must be accessible (legally and physically) and manageable.
- New demands are being placed on public lands due to growth in and around some cities, town, and rural subdivisions in the RMPPA. Considerations include balancing development with the desire for open space.
- Attention is needed where development activities may conflict with special status species and their habitat requirements.
- Federal and state requirements for water quality warrant additional attention as the RMP is implemented and updated.
- There are conflicting demands for consumptive (livestock, wildlife, and wild horse grazing and vegetation removal for development activities) and non-consumptive (watershed protection, soil stabilization, wildlife habitat) uses of the vegetation resource.
- Recreation uses and demands are increasing. Certain areas and resources need protection while others need to be considered for more public and recreation uses.

Actions taken under the Great Divide RMP created land use patterns and valid existing rights that influence options for future management. For example, many of the oil and gas resources in the planning area have been leased. The presence of these valid existing rights will affect the management choices available for BLM to consider in developing the Rawlins RMP. Alternatives will address potential stipulations to be attached to new leases or leases to be re-offered if existing leases are relinquished, the availability of unleased lands for future oil and gas leasing, and additional mitigation measures to be considered in reviewing Applications for Permits to Drill.

General Description of the Draft EIS Alternatives

Chapter 2 describes four alternative resource management plans: the No Action Alternative (Alternative 1—Continuation of Existing Management direction) and three action alternatives, Alternative 2 (Emphasis on the Development of Resources), Alternative 3 (Emphasis on Protection of Resources, and Alternative 4 (Conservation Alternative – Preferred Alternative). The No Action Alternative (Continuation on Existing Management) includes direction provided by the Great Divide RMP (November 1990) as well as new direction and policy that have been developed since completion of the Great Divide RMP and resulting amendments to the plan. The three action alternatives were developed to present a range of management options. Each alternative management plan is intended to minimize adverse impacts on cultural and natural resources while providing for compatible resource use and development opportunities, as consistent with current law, regulation, and policy.

No Action Alternative

The No Action Alternative is a continuation of the current management direction. Ongoing programs initiated under existing legislation, regulations, and in the Great Divide RMP would continue. Thus, the No Action Alternative (Alternative 1) describes the current resource and land use management direction in the RMPPA. The No Action Alternative and its impact analysis represent the baseline to which the other management alternatives and their associated analyses are compared. Management actions proposed under the No Action Alternative are presented in Table 2-1.

Alternative 2 (Development of Resources)

Alternative 2 provides expanded opportunities to use and develop resources found within the RMPPA. This alternative emphasizes development and intensive management, while placing less emphasis on environmental protection. Resources would be protected to the extent required by applicable laws and regulations. Development and activities would occur throughout the RMPPA as proposed through management actions consistent with existing BLM guidelines. Management actions proposed under Alternative 2 (Emphasis on the Development of Resources) are presented in Table 2-1.

Alternative 3 (Protection of Resources)

Alternative 3 changes the mix of opportunities to use, develop, and manage resources. The alternative emphasizes: the improvement and protection of habitat for wildlife and sensitive plant and animal species; improvement of riparian areas and water quality; preservation of unique genetic phenotypes in the Lost Creek HMA; increase in designation of ACECs and SMAs; and protection of historic and cultural sites. Development of resources within the RMPPA would occur with intensive management of surface disturbing activities. Management actions proposed under Alternative 3 (Emphasis on Protection of Resources) are presented in Table 2-1.

Alternative 4 (Conservation Alternative-Preferred Alternative)

The Preferred Alternative provides a balance for opportunities to use and develop resources within the RMPPA while ensuring environmental conservation. The preferred alternative provides the guidance that emphasizes neither resource use nor resource protection. This balanced alternative best meets the issues and concerns raised during scoping. The preferred alternative represents the management actions recommended by the Field Manager to the State Director as the actions that best resolve planning issues within the RMPPA and that best promote balanced multiple use objectives. Management actions proposed under the Preferred Alternative are presented in Table 2-1.

Environmental Consequences

The environmental consequences that could result from the management prescriptions of the four alternatives are described in Chapter 4 and are summarized and compared in Table 2-2, Summary of Impacts. These potential consequences are discussed for each resource program, providing an analysis of environmental effects resulting from management of all resources and resource uses. This includes an analysis of cumulative effects, which are defined as the impacts that result from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions.

Overview Of The Preferred Alternative

Key points of the Preferred Alternative are listed below.

Air Quality

BLM would minimize, within the scope of its authority, any emissions that may add to atmospheric deposition, cause violations of air quality standards, or degrade visibility. The Environmental Protection Agency (EPA) would provide oversight responsibility during this process and would approve the State of Wyoming SIP. State standards enforced in the RMPPA would be as strict or stricter than federal standards. Special requirements to alleviate air quality impacts would be considered on a case-by-case basis in processing land use authorizations. BLM would cooperate with the operation of the National Atmospheric Deposition Program (NADP)/National Trends Network atmospheric deposition monitoring site, as well as in the collection of basic climate and meteorological data from remote automatic weather stations.

Cultural Resources

Cultural resources would be identified and protected on a case-by-case basis, according to site-specific needs. Cultural properties eligible for National Register of Historic Places (NRHP) listing would be managed for preservation of cultural and historic values. Where the setting contributes to NRHP eligibility, actions that diminish the visual integrity of the property's significant historic features would not be allowed within ¼ mile of the cultural property or the visual horizon, whichever is closer. Unevaluated portions of the setting would be protected until a cultural inventory is completed.

Fire and Fuels Management

BLM would conduct wildland fire suppression and fuels management activities to first provide for firefighter and public safety. Public lands within the checkerboard or other intermixed landownership areas would be managed to protect private property. This would most often result in fire suppression activities. Wildland fire suppression activities in the remainder of the RMPPA would be managed for AMR. AMRs for SMAs would protect or enhance the relevant and important values for the ACEC or SMA. A high priority for fire management activities would be given to areas identified as:

- communities at risk (as identified in Federal Register, Volume 66, Number 3, 2001)
- industrial interface areas
- areas of high priority resource values within the RMPPA

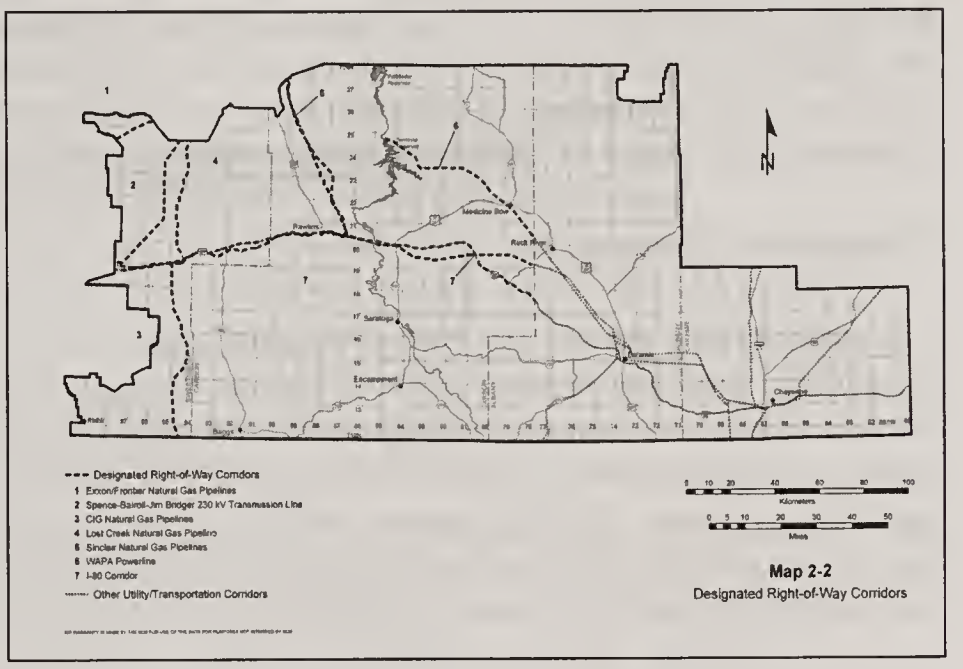
Fuels treatments, including prescribed fire, mechanical, chemical, and biological treatments, would be used to reduce fuels levels and meet other multiple-use resource objectives, including returning fire to its natural ecological role in the ecosystem. Wildland Urban Interfaces and communities at risk would receive priority for fuels reduction. Rehabilitation and restoration efforts would be undertaken to protect and sustain ecosystems, public health, safety, and to help communities protect infrastructure.

Forestry

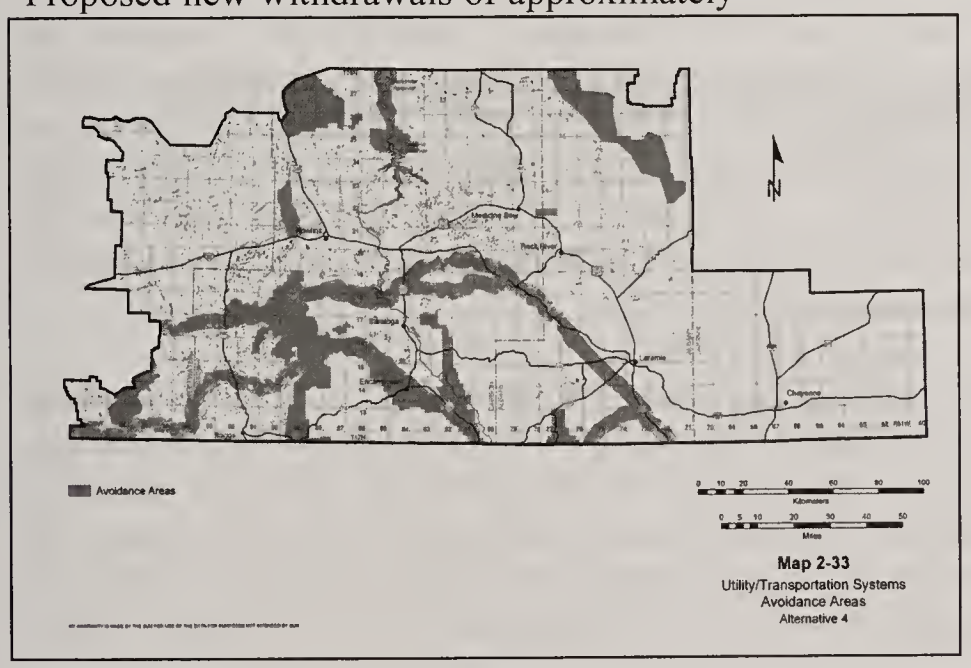
Approximately 19,200 acres of commercial forest would be available for commercial timber harvest. All forest and woodlands in the planning area would be open to non-commercial harvest of minor wood products, such as fuelwood, posts and poles, Christmas trees, and wildings. Forest and woodlands management would also include manipulation of aspen, juniper, and other non-commercial tree species to meet forest health and/or other multiple use objectives. Forests and woodlands would be managed using natural processes, prescribed fire, and chemical, mechanical, and biological treatments.

Lands and Realty

Existing withdrawals in the planning area would remain in place unless it is determined they should be terminated. Such determination (and plan amendment) would be based upon full examination of the issues associated with withdrawal terminations, including the land use, environmental and other factors associated with opening public lands now closed to entry under the public land laws or to mineral location under the mining laws. Where appropriate and necessary to protect other resource values, new withdrawals would be pursued and implemented prior to terminating any existing withdrawals. Proposed new withdrawals of approximately 14,450 acres would be pursued.



Map 2-2
Designated Right-of-Way Corridors



Map 2-33
Utility/Transportation Systems
Avoidance Areas
Alternative 4

All coal classifications protecting federal coal from mineral location on 671,768 acres in the RMPPA would be terminated because the classifications are no longer necessary.

Non-federal lands would be considered for acquisition to meet the objectives of the various resource management programs. The criteria for which lands would be considered for acquisition include in-holdings within WSAs, some SMAs, and HMAs.

46,000 acres of BLM-administered public lands meet the FLPMA criteria and would be available for consideration for disposal. The preferred method of disposal is exchange.

BLM-administered public lands within ¼ mile of the incorporated boundaries of cities and towns would be open to oil and gas leasing with an NSO stipulation and closed to locatable mineral entry and mineral material sales. Existing activities would be intensively managed.

All BLM-administered public lands, except WSAs and some SMAs, would be open to consideration for placement of transportation and utility ROW systems. Each system would be located adjacent to existing facilities, when possible. Existing major transportation and utility ROW routes would be designated corridors. However, major transportation routes within the RMPPA that are located east of the Carbon County-Albany County line would not be considered for ROW corridor designation because of the scattered public land ownership pattern in the area. Mitigation requirements for surface-disturbing and disruptive activities would be applied to activities related to utility/transportation systems to protect important resource values. Sensitive resource values would be avoided. Wind energy development would also be considered outside of avoidance areas.

Certain scattered parcels of land withdrawn for Seminoe Reservoir (2,000 acres) and the Savery-Pothook area (1,205 acres), currently managed by BOR, are being considered for revocation because they are no longer needed for the purpose for which they were withdrawn. BLM determined that the lands are suitable for return to public domain status. When returned to BLM administration, these lands would be managed the same as adjacent public lands.

Livestock Grazing

Current livestock grazing uses would be continued until monitoring indicates an adjustment is necessary. Monitoring would include coordination, consultation, and negotiation with grazing permittees. Requests for changes in season-of-use or kind-of-livestock would be considered on a case-by-case basis, and reviewed to determine range suitability and to evaluate potential impacts to both riparian and upland vegetation and other land resource uses. Grazing systems and range improvements would be designed to achieve and maintain healthy rangelands. New fence construction would be authorized to BLM standards. Existing fences would be modified according to current BLM standards where needed or as older fences are reconstructed.

Livestock grazing would be managed to provide for protection or enhancement of all resource values. The Wyoming Standards for Healthy Rangelands and Guidelines for livestock Grazing Management would be implemented when authorizing livestock grazing use and related activities within the RMPPA. BLM would work closely with operators to determine the most appropriate methods to achieve Standards and desired plant community.

Designated camping areas, wetland/riparian spring exclosures, sensitive plant species exclosures, some cooperative wildlife management areas, coal mines, and some oil and gas production facilities are closed to grazing. Domestic sheep and goats would not be authorized within nine miles of identified wild bighorn sheep habitat unless a natural or topographic feature provides an effective barrier. Conversions from cattle or sheep to domestic bison would not be allowed in areas of blocked federal surface land ownership.

Minerals

Oil and Gas

BLM is integrating the results of the Energy Policy and Conservation Act Inventory into its RMPs. EPCA inventory data is integrated into the Reasonably Foreseeable Development (RFD) scenario that predicts future mineral development within the RMPPA. RMP actions that apply to mineral resource development are evaluated to:

- Clearly present mitigation requirements necessary to reduce impacts of oil and gas operations on other resource.
- Ensure that such mitigation is either statutorily required or scientifically justifiable and is the least restrictive measure necessary to accomplish the desired level of resource protection.
- The mitigation requirements would be monitored to determine if more or less restrictive measures might accomplish the same goal.

Oil and Gas Reasonably Foreseeable Development for the 20 Year Planning Period.

Action	Total
Wells Projected to be Drilled	8,822
Miles of New Oil and Gas Roads	2,676
Acres Disturbed in the Short Term	57,545
Wells Abandoned	1,184
Well Sites Reclaimed	1,066
Miles of Roads Closed (Reclaimed)	500
Acres Disturbed in the Long Term	15,472

Oil and gas opportunity for leasing, exploration and development on 4,578,900 acres of subsurface fluid mineral within the Rawlins RMPPA subject to the following constraints:

Oil and Gas Classifications for Mineral Estate (4.59 million acres).

Classification	Acres
Open to leasing consideration and subject to standard lease form stipulations	853,690
Open to leasing consideration and subject to minor lease constraints such as seasonal restrictions	3,279,670
Open to leasing consideration and subject to major lease constraints such as no surface occupancy	377,590
Closed to leasing	76,950

Oil and Gas Constraints for Mineral Estate in High, Moderate and Low EPCA Gas Potential Areas (3 million acres)

		Closed	No Surface Occupancy
TOTAL		64,630	220,150
TOTAL (%)	High Oil & Gas Potential	1	16
	Moderate Oil & Gas Potential	53	29
	Low Oil & Gas Potential	46	55
Total of all mineral estate having either Closed or NSO constraints		284,780 (10%)	

Oil and gas lease stipulations may be modified or eliminated using the exception, waiver, or modification criteria outlined in this RMP. Stipulations that do not accomplish the desired resource protection would be changed based on monitoring or new scientific data.

All lands open to oil and gas leasing consideration also would be open to geophysical exploration, subject to appropriate resource surveys, surface protection measures, adequate bonding, and adherence to State of Wyoming standards for geophysical operations. Vehicular use for geophysical exploration purposes, including project survey and layout, is subject to OHV designations (see definition of OHV necessary tasks in the glossary.

Oil and Gas Disturbance

Private Wells	Private Acreage	Federal Wells	Federal Acreage	Total # Wells	Total Acreage
5,111	35,400	3,711	22,145	8,822	57,545

Coal

New applications for leasing federal coal are not expected during the 20-year analysis period for this EIS. Existing leases may be developed. The first two steps of the coal screening process (Appendix 8) were completed for federal coal lands in the planning area. Approximately 5,029 acres (containing an estimated 70.1 million tons of surface mineable federal coal) were unsuitable for surface coal mining. Approximately 56,240 acres (containing an estimated 2,388.8 million tons of surface mineable federal coal) were identified as acceptable for further leasing consideration. Applications would be considered on a case-by-case basis and the remaining steps of the coal screening process would be completed.

There are seven existing coal leases that are exempt from the coal screening process that are subject to existing lease terms. Development of existing coal leases within the Carbon Basin would be addressed in the cumulative impact section.

Other Leasables

With the exception of WSAs, the RMPPA would be open to consideration for leasing of oil shale and non-energy leasable minerals.

Locatable Minerals

Approximately 1,572,563 acres would be closed to locatable mineral entry. The remainder of the planning area would be open to locatable mineral entry.

Saleable Minerals

Mineral material sales are discretionary actions. Disposal would be considered on a case-by-case basis. Stipulations to protect important surface values would be based on interdisciplinary review of individual proposals.

OHV Use

The RMPPA is generally open to use of motorized over-the-snow vehicles. Checkerboard lands would remain primarily limited to existing roads and trails. OHV travel in Limited to Designated Areas (LDAs) would remain limited to existing roads and trails until a site specific analysis and transportation plan is completed for each LDA. Those areas that are defined as 'limited' may have seasonal restrictions or travel limitations to either existing or designated roads and trails, or any combination of these. Travel on parcels of public land not having legal public access would remain limited to existing roads and trails.

Off-Highway Vehicle Classifications

Classification	ACRES
Limited to either designated or existing roads and vehicle route	2,201,510
Limited to existing roads and vehicle routes (within checkerboard or other inter-mixed land ownership)	1,285,500
Limited to designated roads and vehicle routes and closed to over-the-snow vehicles	13,180
Seasonally closed to OHV use	14,060
Closed to OHV use	33,500

Motorized vehicle use in the Dune Ponds Cooperative Management Area (3,730 acres) would be limited to existing roads and vehicle routes on vegetated portions of the area and open to vehicle use on active dunes.

The Encampment River Canyon Area (about 6,010 acres) would be closed to motorized vehicle use, including over-the-snow vehicles, December 1 to April 30, to reduce stress on wildlife wintering in the canyon area. The Encampment River Trail would be closed to all types of motorized vehicle use year-round.

The Pennock Mountain (7,770 acres) and Wick Beumee (280 acres) wildlife habitat management areas would be closed to motorized vehicle use and human presence between November 15 and April 30, to reduce stress on wildlife wintering in the area.

OHV use to retrieve big game kills and to access camping sites would be allowed within 300 feet of existing roads and vehicle routes, except where roads and vehicle routes are closed.

Paleontology

Paleontological resources would be managed to protect their important scientific values. Area closures, restrictions or other mitigation requirements for the protection of paleontological values would be determined on a case-by-case basis. Collecting of scientifically significant vertebrate fossils by qualified paleontologists would be allowed by permit only. The paleontological and historical values for which the Como Bluff area was designated a National Natural Landmark would be protected.

Recreation Resources

Existing recreation sites would be maintained or improved to assure continued availability and use to the recreating public. Additional recreation sites would be considered for development based on demand and available opportunities. Developed and undeveloped recreation sites and the surrounding ¼-mile area (17,590 acres) would be open to oil and gas leasing with an NSO stipulation.

Developed and undeveloped recreation sites (9,660 acres) would be closed to locatable mineral entry, mineral material disposal, and operation of the public land laws, including sale. Within the ¼ mile surrounding these sites (7,930 acres), surface-disturbing activities would be intensively managed. Above ground facilities would be avoided.

The entire RMPPA would be open to dispersed recreation with the exception of specific areas that must be excluded to protect public health and safety or special resource values.

The west end of the Ferris Mountains (5,270 acres) would be closed to oil and gas leasing, locatable mineral entry, mineral material disposal, operation of the public land laws, and managed as VRM Class II in order to preserve naturalness and opportunities for primitive, unconfined recreation. Surface-disturbing activities would be intensively managed within the Adobe Town fringe (31,510 acres) and the area would be designated as VRM Class II to retain scenic quality of the area.

Special Management Areas

Wilderness Study Areas (Encampment River Canyon, Prospect Mountain, Bennett Mountains, Adobe Town, and Ferris Mountains) are closed to all mineral development. Existing mining claims must meet the "non-impairment mandate" for WSAs. WSAs are managed according to the Interim Management Policy for Lands Under Wilderness Review, until Congress makes decisions on WSAs. OHV use within the Adobe Town WSA would be limited to

designated roads and vehicle routes. All other WSAs would be closed to OHV use.

ACECs (Sand Hills/JO Ranch, Blowout Penstemon, and Shirley Mountain Bat Cave) and Special Recreation Management Areas (Continental Divide National Scenic Trail, North Platte River, and the Rawlins OHV Area) would be managed to protect their intrinsic values which include unique, stabilized sand dune vegetation communities and wildlife habitat and habitat for an endangered plant and a cave system utilized by a variety of bat species. Management actions have been tailored to the specific needs of the above-mentioned areas and the resources present.

Special Management Areas

SMA	ACRES	PURPOSE
WSAs	67,730	To protect wilderness characteristics, WSAs managed to meet the non-impairment mandates of FLPMA - Manage lands in a manner so as to not impair the suitability of such areas for preservation as wilderness.
ACECs	16,960	To protect a unique vegetation complex and wildlife habitat and maintain balanced recreational opportunities Protect habitat for the endangered Blowout Penstemon Protect cave system utilized as habitat by a variety of bat species
WHMAs	160,710	To maintain the cooperative management of a variety of wildlife habitats while providing for other compatible multiple uses
SRMAs	5,060	To promote recreational values and enhance opportunities for public use
NNLs	2,660	To protect the geologic and paleontologic values for which the areas were designated

Surface-disturbing activities in Wildlife Habitat Management Areas (WHMAs) would be intensively managed to protect their intrinsic wildlife values. The majority of the WHMAs contain private land purchased by the Wyoming Game and Fish Department as well as federal lands and are managed jointly by the WGFD and the BLM. In some cases, seasonal closures to OHV use and human activity would protect unique habitats and big game crucial winter ranges.

Lands totaling 800 acres in the Big Hollow NNL and 160 acres in the Sand Creek NNL would be considered for disposal to individuals, organizations, agencies, or institutions that would manage these areas in accordance with their NNL status. Como Bluff NNL (1,700 acres) would be managed to protect the paleontological and historical values for which it was designated an NNL.

The Encampment River Potential WSR would be managed to maintain or enhance the outstanding remarkable values and classification. This WSR falls entirely within the Encampment River WSA, which limits consideration of developed recreation features.

Transportation and Access

The public land transportation system would be maintained or modified to provide for public health and safety and adequate access to public lands. Consistent with Wyoming BLM access policy, existing access would be maintained or expanded, new access would be pursued, and excess access facilities would be abandoned following consultation with local governments and interested parties.

Vegetation

The Wyoming Standards for Healthy Rangelands (Standards) apply to all resource uses on BLM-administered public lands. These standards are the minimum acceptable conditions for the health, productivity, and sustainability of the rangeland. The standards direct the management of public lands and focus implementation toward the maintenance or attainment of healthy rangelands. Rangeland areas would be managed to achieve desired plant community.

Populations of special status species would be fenced to protect them from grazing, trailing, or other disturbance. Known populations of special status plant species would be closed to locatable mineral entry and operation of the public land laws, including sale. Intensive management actions would be taken to protect unique plant communities. Unique plant communities would be closed to mineral material sales.

The fenced Gibben's beardtongue (Penstemon gibbensii) site (approximately 15 acres) would be maintained to protect the population from disturbance. Surface-disturbing activities would be intensively managed in mesic or wet meadows of floodplain areas in Laramie County, Wyoming, that contain habitat for the Colorado butterfly plant.

Aspen stands would be managed to increase distribution and improve seral structure.

Informal conferencing and consultation with the U.S. Fish and Wildlife Service would occur for authorized activities that would potentially affect the habitat for endangered, threatened, proposed, and candidate plant species within the Rawlins Field Office.

Visual Resources

Visual Resource Management would maintain scenic value by managing impacts and intrusions through mitigation.

Visual Resource Management Classes (Acres)

CLASS I	CLASS II	CLASS III	CLASS IV
67,730	589,530	2,275,080	619,140

Water Quality, Watershed and Soils Management

Activities that would cause new water depletion within the Colorado River system would comply with the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. Activities that cause existing or new water depletion within the North Platte River system would comply with Intra-Service Consultations covering the recovery of endangered species in the Platte River. Intensive management of surface disturbing activities would be implemented in watersheds contributing to water bodies listed on the State's 303d list of water bodies with water quality impairments or threats.

Surface discharge of produced water would not be allowed in the Colorado River Basin. Existing methods of produced water disposal in the Colorado River Basin, approved under existing land use plan decisions, would be allowed to continue as long as they do not exceed approved water quality or quantity limits.

Surface-disturbing activities would be avoided in; 1) identified 100-year flood plains, 2) areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas, and 3) areas 100 feet from the inner gorge of ephemeral channels.

Wild Horses

Periodic, (not annual) gathers will be the primary tool for population management in the Adobe Town, Lost Creek, and Stewart Creek HMAs. Appendix 12 contains a detailed description of the development, application, and interpretation of AMLs for the Rawlins HMAs.

AMLs in the HMAs would remain at: Adobe Town HMA - 700 adults; Lost Creek - 70 adults; and Stewart Creek – 150 adults. These AML levels were established in 1994 by extensive monitoring and evaluation (Map 2-21 and Appendix 11).

Through genetic testing and analysis, document the total extent of the "New World Iberian" (Spanish) genotype within the meta-population that includes the Lost Creek HMA. Implement the necessary management practices (including adjustment of the AML) to achieve the goal of maintaining the "New World Iberian" traits.

Wildlife and Fisheries

BLM would cooperate with the WGFD and FWS in considering and planning for the introduction, transplant, re-establishment, augmentation, and/or stocking of all wildlife and fish species regardless of threatened or endangered status.

Best Management Practices would be applied to surface-disturbing and disruptive activities to maintain or enhance waterfowl species and their habitats.

Impoundments and instream structures would be designed to minimize impacts on special status fish species and their habitats. Road crossings would be designed to simulate natural stream processes.

To protect amphibian species and their habitats, linear crossings, such as pipelines or roads across the above areas, would be considered on a case-by-case basis with intensive management to protect the above areas.

Informal conferencing and consultation with the U.S. Fish and Wildlife Service would occur for authorized activities that potentially affect the habitat for endangered, threatened, proposed, and candidate species within the Rawlins Field Office. The Statewide Programmatic Biological Assessments and Biological Opinions authorized for each species, including all the reasonable and prudent measures and terms and conditions would be implemented for the RMPPA. For example:

- All white-tailed prairie dog towns/complexes greater than 200 acres in size and black-tailed prairie dog towns/complexes greater than 80 acres in size would be avoided, unless appropriate mitigation occurs.

- Where applicable, key linkage riparian travel corridors that may be used by Canada lynx would be enhanced or maintained.
- Fire suppression and forest conversion practices in areas adjacent to Canada lynx habitat would consider the habitat requirements for the lynx.
- Surface-disturbing and other activities located in potential mountain plover habitat are prohibited during the reproductive period of April 10 to July 10 for the protection of breeding and nesting mountain plover.

The RFO would implement recent BLM management direction regarding greater sage-grouse habitat and is consistent with the recent "Wyoming Greater Sage-Grouse Conservation Plan" which was developed by the Wyoming Game and Fish Department with a broad range of stakeholders. The plan proposes to maintain and enhance sage-grouse habitat through an implementation, monitoring, and evaluation approach. Best management practices would be considered to reduce both the direct loss of habitat and disturbance to sage-grouse during the critical breeding and nesting period. Surface disturbing and disruptive activities would not be allowed within ¼ mile of delineated sage-grouse leks. Human activity within ¼ mile of delineated active sage-grouse leks would be avoided between the hours of 6 p.m. and 9 a.m. Surface-disturbing and other activities potentially disruptive to sage-grouse would be avoided in identified nesting and early brood-rearing habitat between March 15 – July 15.

Surface-disturbing and other activities potentially disruptive to nesting raptors would be prohibited within distances and time periods necessary to allow raptors to complete breeding and nesting activities. Distances and time periods vary between ¾ and 1 mile and between February 1 and August 31, respectively, for different raptor species. Facilities requiring a repeated human presence would not be allowed with 825 feet (ferruginous hawks, 1200 feet) of active raptor nests.

Surface-disturbing and other activities potentially disruptive to big game crucial winter range would not be allowed during the period of November 15 to April 30. Surface disturbing and disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months.

Animal damage control (APHIS) activities, including the use of poisons lethal to vertebrate animals, would be considered.

Cooperating Agency Summary

The RFO extended cooperating agency status to the State of Wyoming, other federal agencies, County governments, and various Conservation Districts for the Rawlins RMP planning effort. These agencies were invited to participate because they have jurisdiction by law or could offer special expertise. A list of actively participating cooperators is included below.

- Carbon County
- Albany County
- Sweetwater County
- State of Wyoming
- Saratoga-Encampment-Rawlins Conservation District
- Medicine Bow Conservation District
- Little Snake River Conservation District
- Sweetwater County Conservation District
- U.S. Environmental Protection Agency

Coordination With Native Americans

As part of the scoping process, letters were sent to the Arapaho, Comanche, Crow, Eastern Shoshone, Shoshone-Bannock, and Ute tribes. The letters requested information to be considered in the planning process. As a result of these letters, the BLM received comments from the Ute tribe requesting that the BLM consider and protect cultural resources and sites sensitive to Native Americans in the planning document. Following the scoping process, a second letter was sent to all of the tribes listed above and additionally to the Northern Cheyenne. This letter more specifically requested information regarding any concerns the tribes might have within the RMPPA and presented the opportunity for meetings or field trips with representatives from the tribes. These letters were followed up with telephone calls. The need for the tribes to review and comment on the Draft EIS was also stressed in the letters and during the follow-up telephone calls. The Eastern Shoshone expressed concerns that the BLM consider cultural resources in the planning process and requested that the BLM continue to contact the tribes on a project specific level so that the tribes could provide input to sacred sites that might be impacted at that time.

Public Involvement

Publication of a Notice of Intent (NOI) on February 25, 2002 announced BLM's intention to revise the Great Divide Resource Management Plan. A formal 60-day scoping period began on January 31, 2003 with release of the scoping notice. The notice announced the availability of the Management Situation Analysis (MSA) and invited input on issues, alternatives, and resource data. Public scoping meetings were held in Rock Springs, Rawlins, Baggs, and Laramie, Wyoming, on March 3, 4, 5, and 6, 2003, respectively. During the four scoping meetings, more than 80 people attended. Comments from the public were collected during the scoping meetings and throughout the scoping period through a variety of methods - mail, fax, email, and through the project website. Approximately 26,745 comments were received through the various methods. Comments were categorized by topic for analysis purposes. The category receiving the most comments was "Mining and Oil and Gas Development". A large number of comments expressed a desire for preservation over continued development. A major concern identified in the comments was disruption of big game migration corridors and the degradation of environmentally sensitive areas. The second category receiving the most comments was "Wildlife and Fisheries." A summary of all comments was then compiled and made available as the "Rawlins RMP Scoping Report, May 2003," which can be viewed at: http://www.rawlinsrmp.com.

The Rawlins RMP/EIS project website can be found at http://www.rawlinsrmp.com. The site serves as a virtual repository for documents related to RMP development, including announcements, bulletins, and draft and final documents. These documents were maintained in .pdf format to ensure that they were available to the widest range of users. The Web site also provides the opportunity for the general public to submit comments for consideration as part of the review process for the Rawlins RMP Draft EIS as well as add themselves to the project mailing list to receive periodic newsletters and announcements.

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CHAPTER 1—PURPOSE AND NEED FOR THE PLANNING EFFORT

1.1 INTRODUCTION

This draft Environmental Impact Statement (EIS) documents the comprehensive analysis of alternatives for the planning and management of public lands and resources administered by the Bureau of Land Management (BLM) Rawlins Field Office (RFO) in Wyoming. The BLM RFO administrative area is located in southcentral and southeastern Wyoming (see Map 1-1). The RFO includes approximately 11.2 million acres of land in Albany, Carbon, Laramie, and Sweetwater Counties. Within that area, the RFO administers approximately 3.4 million acres of public land surface and mineral estate, 0.1 million acres of public land surface where the mineral estate is state and private, and 1.2 million acres of federal mineral estate where the surface is privately owned or state owned (see Maps 1-2 and 1-3, and Table 1-1). Map 1-4 shows the location and names of communities and other major geographic features within the RFO.

The public lands and federal mineral estate within the Rawlins Resource Management Planning Area (RMPPA) are the subject of the planning effort and this associated EIS document. Neither this document nor the RFO's current land use plan applies to lands or minerals within the RMPPA that are administered by federal agencies other than BLM, such as the U.S. Forest Service, the Bureau of Reclamation, and the U.S. Air Force.

This draft EIS provides analysis of potential management direction for important resource values and resource uses within the RMPPA and allocates the use of public lands for multiple uses. The draft EIS also provides management direction for the protection of certain resources while allowing for leasing and development of mineral resources, livestock grazing, and other activities at appropriate levels.

1.1.1 Reader's Guide

The National Environmental Policy Act (NEPA) requires that an EIS be prepared for any federal actions that may significantly affect the human environment. The preparation and adoption of a Resource Management Plan (RMP) by BLM is such a federal action. This section describes ways to find information in, and related to, this document and provides an overview of the EIS process.

Table 1-1. Land and Minerals Ownership and Administrative Jurisdiction Within the Rawlins RMPPA

Jurisdiction	Acres[1]
Areas the Rawlins RMP decision will cover:	
A. Federal land/federal minerals[2]	3,425,270
B. Federal land/nonfederal minerals[3]	126,220
C. Nonfederal land/federal minerals[4]	1,247,130
Total BLM-administered federal land surface to be covered by RMP decisions	3,551,480
Total BLM-administered federal mineral estate to be covered by RMP decisions	4,672,160
Areas the Rawlins RMP decisions WILL NOT cover:	
D. FS land/federal minerals[5]	971,990
E. USBOR land/federal minerals[5]	32,830
F. USFWS land/federal minerals[5]	6,410
Total BLM-administered federal mineral estate that WILL NOT be covered by RMP decisions	1,011,230
Other lands that WILL NOT be covered by RMP decisions:	
G. Department of Defense land	6,030
H. Private land/private minerals and state lands/state minerals[6]	5,309,520
Total land surface area in the Rawlins RMP planning area (all ownerships)[1]	11,211,490

[1]Because of land surface and mineral ownership overlaps and administrative responsibility overlaps, acreage figures are not additive. For the purpose of the Rawlins RMP, where one or more of the mineral resource categories are federally owned, the acres are listed as if all minerals in the area were federally owned. Where mixed minerals ownership occurs (for example, privately owned oil and gas, overlapping with federally owned coal in the same area), minerals planning and management decisions in the RMP will pertain only to the federally owned minerals.

[2]In areas where the federal land surface and federal mineral estate are both administered by the BLM, the RMP will include planning and management decisions for both the land surface and the mineral estate.

[3]In areas where the federal land surface is administered by the BLM, and the minerals are privately owned or owned by the State of Wyoming or local governments, the RMP will include planning and management decisions for only the BLM-administered federal land surface. Although these surface management decisions may have some effect on the ability to manage and develop the nonfederally owned minerals, the RMP planning and management decisions will not pertain to the nonfederal mineral estate. At the same time, surface and minerals management actions and development activities anticipated in these areas will be taken into account for purposes of cumulative impact analysis in the Rawlins RMP EIS.

[4]In areas where the land surface is privately owned or owned by the State of Wyoming or local governments, and the minerals are Federally owned, the RMP will include planning and management decisions for only the BLM-administered Federal mineral estate. While the land and resource uses and values on the nonfederal surface will be taken into account and will affect development of the Federal mineral planning and management decisions, these decisions will not pertain to the state and privately owned land surface. At the same time, surface and minerals management actions and development activities anticipated in these areas will be taken into account for purposes of cumulative impact analysis in the Rawlins RMP EIS.

[5]In areas where the federal land surface is administered by the United States Forest Service (USFS), the United States Bureau of Reclamation (USBOR), or the United States Fish and Wildlife Service (USFWS) and the federal mineral estate is administered by the BLM, the land surface planning and management decisions are the responsibility of these "other" federal or state surface management agencies. Any BLM administrative responsibilities within these areas (for example, actions concerning the federal mineral estate) are handled case by case and are guided by the other surface management agencies' policies, procedures, and plans. At the same time, surface and minerals management actions and development activities anticipated in these areas will be taken into account for purposes of cumulative impact analysis in the Rawlins RMP EIS.

It is also important to note that, while other BLM responsibilities include surface management of certain federal lands withdrawn for purposes of the USBOR, they are carried out in accordance with an interagency agreement between the two agencies. Administrative jurisdiction (including land use planning) for these lands lies with the USBOR.

[6]The Rawlins RMP will not include any planning and management decisions for areas where the land surface and minerals are both privately owned or owned by the State of Wyoming or local governments.

Reader's Guide To This Document

Much of the organization of this draft EIS is dictated by federal regulations implementing NEPA. These regulations are codified in Title 40 Code of Federal Regulations (CFR) Parts 1500–1508 (40 CFR 1500–1508). This draft EIS contains the following major chapter headings and information:

Chapter 1, Purpose and Need for the Planning Effort—Presents an introduction to the draft EIS; the purpose and need to which BLM is responding; an overview of the BLM planning process; statutes (laws), limitations, and guidelines BLM must adhere to in preparing an RMP; and describes the relationship of this draft EIS to other plans.

Chapter 2, Description of the Alternatives—Describes how the alternatives were developed, management guidance common to all alternatives, and alternatives considered but eliminated from further consideration. It also presents specific management actions proposed under the alternatives, and a comparative summary of the impacts of the alternatives that have been analyzed in detail.

Chapter 3, Affected Environment—Describes the RMPPA and the existing environmental conditions that would be affected by the alternatives.

Chapter 4, Environmental Consequences—Describes the impacts of the alternatives. This section forms the scientific and analytic basis for the comparison of impacts presented in Section 2. This section also describes cumulative impacts, any irreversible or irretrievable commitment of resources, and the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.

Chapter 5, Consultation and Coordination—Describes the overall EIS scoping process and other past and planned agency consultation and public involvement activities. A list of agencies, organizations, and individuals who were sent the draft EIS is also presented.

Chapter 6, List of Preparers—Presents the names and qualifications of the persons responsible for preparing this draft EIS.

List of Abbreviations and Acronyms—Provides an alphabetized list of abbreviations and acronyms used in this draft EIS.

Glossary—Provides an alphabetized list of definitions of terms used in this draft EIS.

References—Provides full citation information for all references cited in the document. Most cited documents are reasonably available from other public sources such as libraries or the Internet, and many of the cited documents are available for public review at the BLM Rawlins Field Office.

Appendices—Include additional supporting documents that substantiate analysis or provide other information directly relevant to the EIS.

Readers Guide to the EIS Process

The process for preparing an EIS is determined by the federal regulations implementing NEPA (40 CFR 1500–1508). The major steps in the EIS process are described below (see Table 1-2).

Notice of Intent (NOI)—BLM published an NOI in the *Federal Register* on February 25, 2002, to announce its intention to revise the Rawlins RMP, formerly called the Great Divide RMP. The NOI

explained that the RMP was renamed to be consistent with current organizational structure and naming of BLM land use plans in Wyoming.

Scoping Period—The official 60-day scoping period began February 3, 2003, with the availability of the Scoping Notice and the Management Situation Analysis (MSA) on the BLM Rawlins RMP Web site. BLM requested public input in identifying resource issues and concerns, management alternatives, or other ideas in determining future land use decisions for the RMPPA. The scoping period lasted until April 7, 2003. Scoping meetings were held in Rock Springs, Baggs, Rawlins, and Laramie. The scoping period, its results, and additional agency and public participation are described in Chapter 5, Coordination and Consultation.

Draft EIS—This document is the draft EIS. The draft EIS considers public and agency comments received during the scoping process, provides a description of the alternatives, describes the environment that would be affected, and assesses the potential impacts. A Notice of Availability (NOA) for the draft EIS was published in the *Federal Register*.

Comment Period and Public Hearings—The public and federal, state, and local government agencies may review and comment on the draft EIS during a 90-day comment period. BLM will hold a public hearing to receive comments from the public. Opportunities for public involvement are further described in Chapter 5, Coordination and Consultation.

Final EIS—The purpose of the final EIS (EIS) is for BLM to assess, consider, and respond to public and agency comments received on the draft EIS. An NOA will be published in the *Federal Register* when the Proposed RMP final EIS is available. A 30-day protest period will follow the release of the Proposed RMP final EIS.

Record of Decision (ROD)—The ROD is a separate and concise public record that clearly identifies and describes the chosen RMP and links BLM's decision to the analysis presented in the EIS. The ROD addresses how environmental impacts and other factors were considered in the decision-making process.

Table 1-2. The EIS Process

EIS PROCESS
Notice of Intent
▼
Scoping Period
▼
Draft EIS
▼
Comment Period and Public Hearings
▼
Final EIS
▼
Record of Decision

This planning area wide final EIS provides a comprehensive evaluation of BLM's potential management actions for the broad administration of the public land within the Rawlins RMPPA and the natural resources found on those lands. A comprehensive final EIS that includes all of BLM's management programs is needed because management actions share a common timing or geography with other

management actions, thereby creating potential conflict among various resource values and management actions.

This planning area wide final EIS also allows for tiering (see also 40 CFR 1505.28) of subsequent activity or project-specific EISs or Environmental Assessments (EAs) that are conducted within the RMPPA. That is, subsequent lower-level EISs or EAs will reference and adopt the relevant information and goals from this broader planning area-wide EIS as formal NEPA documentation, thereby avoiding duplication of effort and reducing costs associated with completing future NEPA analyses.

1.1.2 Agency Roles and Relationships

This section identifies roles and responsibilities of both lead and cooperating government agencies in the EIS process.

BLM

The BLM is the lead agency for the EIS process. The lead agency takes primary responsibility for preparing the EIS as well as requesting the participation of each cooperating agency. According to federal regulations, the lead agency is to request the participation of each cooperating agency in the EIS process at the earliest possible time. Also, the lead agency must use the environmental analysis and proposals of cooperating agencies with jurisdiction by law or special expertise, to the maximum extent possible consistent with its responsibility as lead agency.

Cooperating Agencies

Upon request of the lead agency, any other federal agency that has jurisdiction by law will be a cooperating agency (also called a cooperator). In addition, any other federal agency that has special expertise with respect to any environmental issue that should be addressed in the EIS may be a cooperating agency upon request of the lead agency. An agency may also request the lead agency to designate it a cooperating agency.

The concept of cooperators has been extended from federal agencies to include state and local government agencies in recent years. This inclusion of state and local government agencies as cooperating agencies is consistent with BLM's planning approach and policies. Any designated federal, state, or local government agency that becomes a cooperator is required to sign a Memorandum of Understanding (MOU) as to its specific roles and responsibilities.

The primary role of the cooperating agencies is to provide input during the EIS process on issues for which they have special expertise or jurisdiction. They also serve as reviewers of draft information and give overall advice on the EIS process. Cooperators meet with the lead agency periodically throughout the EIS process to discuss EIS issues as a group. Cooperating agencies are expected to participate in the EIS process at the earliest possible time, including participation in the scoping process. Staffs from cooperating agencies are available to enhance the interdisciplinary capability of the lead agency by providing needed information throughout the NEPA process.

The following agencies with jurisdiction, special expertise, or interest in the Rawlins RMP development process have agreed to participate in the EIS process as cooperating agencies:

- Saratoga-Encampment-Rawlins Conservation District
- Medicine Bow Conservation District
- Little Snake River Conservation District

- Sweetwater County Conservation District
- U. S. Environmental Protection Agency (EPA)
- State of Wyoming and its agencies
- Carbon County
- Sweetwater County
- Albany County.

1.2 Purpose and Need for a New Rawlins Resource Management Plan/Environmental Impact Statement

1.2.1 Background

An RMP guides management actions on public lands covered by the plan. Land use plan decisions establish goals and objectives for resource management, the measures needed to achieve goals and objectives, and parameters for using BLM lands or resources. They identify lands that are open or available for certain uses, including any applicable restrictions, and lands that are closed to certain uses. Land use plan decisions ordinarily are made on a broad scale and customarily guide subsequent site-specific implementation decisions. When there are competing resource uses and values in the same area, the Federal Land Policy and Management Act (FLPMA) requires that BLM manage the public lands and their various resources so that they are used in the combination that will best meet the present and future needs of the American people. Land use plan decisions are made according to the procedures in BLM's planning regulations in 43 CFR 1600.

An EIS serves as the action-forcing device to ensure that the policies and goals of NEPA are infused into the ongoing programs and actions of the Federal Government. The EIS provides full and fair discussion of significant environmental impacts and informs decision-makers and the public of the reasonable alternatives, which would avoid or minimize adverse impacts or enhance the quality of the human environment. An EIS is prepared according to the regulations for implementing NEPA in 40 CFR 1500–1508.

The BLM prepares an EIS in conjunction with an RMP to plan actions and make decisions affecting public lands in the planning area.

The Great Divide RMP, approved by the Wyoming BLM State Director on November 8, 1990, currently covers the public lands included in the Rawlins RMP. The Great Divide RMP provides guidance and direction for management of BLM-administered public land surface and federal mineral estate.

1.2.2 Purpose

The purpose of the Rawlins RMP Revision and EIS is to replace the existing Great Divide RMP, and to address the deficiencies described in the Great Divide RMP Evaluation (see Section 1.2.3). The Rawlins RMP will provide the overall management direction for the public lands and resources administered by the RFO. Portions of the Great Divide RMP determined to be adequate will likely be unchanged in the plan revision.

The Great Divide RMP includes five Wilderness Study Areas (WSA)—Encampment River Canyon, Prospect Mountain, Bennett Mountains, Adobe Town, and Ferris Mountains; four Areas of Critical Environmental Concern (ACEC)—Jep Canyon, Como Bluff, Shamrock Hills, and Sand Hills; three Wild Horse Herd Management Areas (HMA)—Adobe Town, Stewart Creek, and Lost Creek; and three Special Recreation Management Areas (SRMA)—Continental Divide National Scenic Trail, North Platte River,

and Shirley Mountain Caves. Major land uses include mineral development, wildlife habitat, wild horse use, livestock grazing, and recreation.

1.2.3 Need

BLM completed an evaluation of the Great Divide RMP on July 5, 2001. The BLM determined that the RMP was deficient in the following areas as a result of changing conditions and demands on the area's resources:

- Although air quality decisions are adequate (i.e., comply with state law and standards and guidelines), there is a need for a regionwideregion wide analysis.
- Environmental justice (Executive Order 12898) has not been addressed.
- Old *Classification and Multiple Use Act* classifications and withdrawals are being used to protect various resource values.
- Management direction for utility and transportation systems and communication sites may be inadequate.
- Management direction for land tenure adjustment may be inadequate.
- Standards for Healthy Rangelands (BLM 1997) must be incorporated into all programs.
- The vegetation resource is treated as a subset of livestock grazing.
- Invasive-plant decisions are not included in the RMP.
- Fluid mineral development levels are approaching Reasonable Foreseeable Development (RFD) scenarios established for analysis purposes in the existing RMP.
- Protection standards for paleontological resources are lacking.
- Recreation uses and demands are increasing.
- New ACEC designations may be needed, and existing ones may be outdated.
- Visual Resource Management (VRM) classifications are outdated. There are inconsistencies between the Rock Springs Field Office and the Rawlins Field Office. The designation for Adobe Town WSA is inconsistent between the Rock Springs Field Office and the Rawlins Field Office.
- Federal and state requirements for water quality warrant additional attention as the RMP is implemented and updated.
- Wild and Scenic River evaluations have not been conducted in the RMPPA.
- New information on cultural resources has been prepared.

Based on the plan evaluation findings, along with new information and changed circumstances since adoption of the Great Divide RMP (see Chapter 3, Affected Environment), the Rawlins Field Office will replace the Great Divide RMP/EIS with the new Rawlins RMP/EIS.

The evaluation also noted that many of the decisions of the Great Divide RMP had already been implemented. In some cases, implementation of previous decisions resulted in the establishment of valid existing rights or other obligations that will be an important consideration in the preparation of the

Rawlins RMP. For example, many of the oil and gas resources in the planning area have been leased. The presence of these valid existing rights will affect the management choices available for BLM to consider in developing the Rawlins RMP. Alternatives described in the RMPPA will address potential stipulations attached to new leases, consider the availability of lands for future oil and gas leasing, and describe mitigation measures to be considered in approving Applications for Permits to Drill (APDs).

1.3 Overview of the BLM Planning Process

As provided by the FLPMA of 1976, the BLM has the responsibility to plan for and manage "public lands." As defined by the act, "public lands" are those federally owned lands, and any interest in lands (e.g., federally owned mineral estate), that are administered by the BLM.

The process for the development, approval, maintenance, and amendment or revision of RMPs was initiated under the authority of Section 202(f) of the FLPMA and Section 202(c) of the NEPA of 1969. BLM planning regulations in Title 43 of the CFR, Part 1600 (43 CFR 1600), and the Council on Environmental Quality (CEQ) regulations in 40 CFR 1500 guide the process.

The preplanning phase of the BLM planning process consists of (1) compiling and reviewing the current laws, regulations, policies, Executive Orders, and directives pertaining to the RMPPA; and (2) developing any needed State Director's guidance specific to the planning effort and the RMPPA.

BLM decision-making relevant to land use planning includes the following:

- **Management planning.** The highest level of decision-making specific to land and resource use is in the management plan. The RMP is BLM's management plan. RMPs generally make land use allocations and provide general future management direction for managing specific areas of land and provide the framework for management of all natural resources under BLM authority. Plan decisions are based on a public NEPA disclosure process, usually including the development of an EIS.

- **Activity planning.** For BLM, mid-level decisions are provided in activity or implementation plans. These plans encompass more detailed management decisions than RMPs. Activity planning addresses management of specific programs and usually selects and applies best management practices (BMPs) to meet land use plan objectives. Decisions that cover major (e.g., often geographically widespread) proposals lead to coordinated activity plans that cover all programs in an integrated manner. A program-oriented activity plan such as a "habitat management plan" is another example of an activity plan. Activity plans can be assessed through either an EIS or an EA level of NEPA analysis.

- **Project decisions.** For BLM, individual projects proposed in a specific location are analyzed for localized or site-specific effects. For example, an oil and gas proposal is evaluated based on the Application for Permit to Drill (APD) process, with a NEPA document presenting impact analysis for the proposed well(s). A documented project decision allows the wells to be drilled and completed with site-specific mitigation.

As the highest level in the BLM planning process, the RMP will prescribe the allocation of and general future management direction for the resources and land uses of the BLM-administered public lands in the entire RMPPA. In turn, the RMP also guides lower tiers of the planning process; the activity plans and project- or site-specific plans.

1.3.1 Planning Issues

Planning issues are determined from demands, concerns, conflicts, or problems involving the use or management of public lands and resources. These issues are usually expressed in terms of the effects that some land and resource uses have on other land and resource uses or resource values. The following planning issues have been identified through public scoping and information gathered in analyzing the existing management situation in the RMPPA. These issues are based on the input of BLM personnel, the public, and interagency consultation.

Issue 1: Development of Energy Resources and Minerals-Related Issues

Special attention is needed to address energy resource development (i.e., oil and gas, coal, solar, and wind energy) and related transportation network conflicts with other land and resource uses and values. Principal considerations include disruptive activities and human presence in big game (i.e., elk, deer, antelope, moose, and bighorn sheep) habitat, big game crucial habitat (crucial winter range and birthing areas), and other important wildlife species habitats (i.e., Greater sage-grouse, plovers, raptors, and fish) and the effects of disruptive activities on recreation values, forage uses, air quality, sensitive vegetation types, and sensitive watersheds. Areas need to be identified where surface disturbing and other disruptive activities (e.g., mineral exploration and development activities, rights-of-way construction activities) are suitable or should be restricted or avoided.

Issue 2: Special Management Designations

There are unique areas or sensitive lands and resources in the RMPPA that meet the criteria for protection and management under special management designations. There are five WSAs—Encampment River Canyon, Prospect Mountain, Bennett Mountains, Adobe Town, and Ferris Mountains. Four areas already designated as ACECs (Como Bluff, Sand Hills, Jep Canyon, and Shamrock Hills Raptor Concentration Area) contain unique resources warranting special management attention. Three of these ACECs (Como Bluff, Jep Canyon, and Shamrock Hills) are within the checkerboard land pattern. Effective management of these ACECs will be extremely difficult without full landowner cooperation, which presently does not exist. Three SRMAs (Continental Divide National Scenic Trail, North Platte River, and Shirley Mountain Caves) contain recreation values that require special management attention. Three HMAs (Adobe Town, Stewart Creek, and Lost Creek) are designated for wild horses. Three designated National Natural Landmarks (NNL) (Big Hollow, Sand Creek, and Como Bluff) containing unique landscape values require special management attention. Additional special management areas have been proposed in areas containing sensitive lands and/or resources. There are also concerns that special management area designations may result in too many restrictions on the use of public lands.

Issue 3: Resource Accessibility

Resource accessibility relates to the idea that the value or usability of some resources is enhanced by improved accessibility by the public. To be used, resources must be accessible (legally and physically) and manageable (the ability to apply constraints or requirements). Some areas in the RMPPA are isolated and difficult to access (i.e., legal and physical access) and manage. Land disposals and acquisitions (fee and easements) could provide improved access and manageability of public lands.

Issue 4: Wildland-Urban Interface

New demands are being placed on public lands because of growth in and around some cities, towns, rural developments, and subdivisions in the RMPPA. Growth has changed the way communities relate to surrounding public lands and has changed the communities' expectations. The basic problem is providing

for public land management along with increased demands for public land and resources. Principal considerations include providing for air and water quality, preventing the depletion of water resources, reducing accelerated erosion in critical watersheds, and preventing fragmentation of critical wildlife habitat. Considerations also include providing for development patterns and transportation and utility corridor planning, and demands for open space and recreational uses, land tenure adjustment, and wildland fire and fuels management.

Issue 5: Special Status Species Management

Attention is needed to address management of special status species (threatened and endangered, proposed, candidate, and sensitive plant and animal species) and the interrelationships of these species with other resource uses and activities. Principal considerations include management of species habitat to ensure continued use by these species. Areas where other resource activities may conflict with special status species and their habitat requirements need to be identified.

Issue 6: Water Quality

Federal and state requirements for addressing water quality of waterbodies located within the RMPPA will warrant additional attention as the RMP is implemented and updated. Land management decisions made by the RFO during the planning effort regarding contributing watersheds can impact water bodies listed on the State of Wyoming's list of threatened or impaired water bodies (303d list), watersheds used for municipal water supplies, and watersheds that contribute to sources of water used for agricultural, industrial, and other purposes.

Increased interest in the production of natural gas in the RMPPA, particularly from coal formations, requires BLM to consider methods to dispose of the water produced during oil and gas exploration and development. Legal changes to the status of depletions in the Colorado and Platte Drainages must be addressed in addition to rule changes for salt loading in the Colorado River Basin. In general, surface-disturbing activities from BLM-approved activities are designed to reduce non-point pollution sources throughout the RMPPA and should be addressed in relation to their impact on water quality.

Issue 7: Vegetation Management

There are conflicting demands for consumptive and nonconsumptive uses of the vegetation resources in the RMPPA. The basic problem is maintaining resource values and nonconsumptive uses while allowing for consumptive uses. Resource values include vegetative cover, watershed protection, maintenance and enhancement of riparian areas, soil stabilization, maintenance and enhancement of wildlife habitat (particularly big game crucial winter range and habitat for candidate, sensitive, proposed, or threatened and endangered wildlife and vegetation species). Vegetative consumptive uses include livestock, wildlife, and wild horse grazing; forest management; off-road vehicle use; vegetation removal by mineral development; rights-of-way construction; and surface disturbing and other disruptive activities.

Issue 8: Recreation, Cultural Resources, and Paleontological Resource Management

Certain resources and areas need protection while others need to be considered for more public and recreation uses. Off-highway vehicle use can conflict with other land and resource uses and can cause damage to resources, including wildlife and watershed values and other recreation values. Principal considerations include providing for suitable and sufficient recreation uses and facilities (both dispersed and commercial), visual resource management, off-highway vehicle road and trail designations, management of paleontological resources, and management of cultural and historical resources (of

particular concern is the need for protection of historic transportation resources such as the Overland Trail, the Cherokee Trail, and expansion era roads, and Native American respected places). The viewshed along these trails and Native American respected places are also an issue.

1.3.2 Planning Criteria

General Planning Criteria

Planning criteria are the constraints or guidelines that are developed to direct the planning effort for preparation of the Rawlins RMP draft EIS. The planning criteria serve the following purposes:

- To ensure that the planning effort is focused on the issues, follows and incorporates legal requirements, addresses management of all public land resources and land uses in the RMPPA, and that preparation is accomplished efficiently
- To identify the scope and parameters of the planning effort for the decision-maker, the interdisciplinary planning team, and the public
- To inform the public of what should and should not be expected from the planning effort. This includes identification of any planning issues that are not ready for decision-making and that will be addressed only through subsequent activity or implementation planning efforts or in approving public land and resource use authorizations (e.g., livestock grazing allotment management plans, wildlife habitat management plans, other coordinated activity planning, watershed management plans, processing applications for permits for mineral exploration, rights-of-way).

Planning criteria are based on standards prescribed by laws and regulations; guidance provided by the BLM Wyoming State Director; the results of consultation and coordination with the public and with other agencies, governmental entities, and Native American tribes; analysis of information pertinent to the RMPPA; public input; and professional judgment. The general planning criteria have been developed to help focus the preparation of planning and management alternatives and the analysis of their impacts, and to guide selection of the preferred alternative for the draft EIS. The degree to which each of the planning criterions, identified below, is used in the planning process will depend on the specific resource presence, accessibility, and demand. Additional planning criteria may be identified as the planning process proceeds.

Planning Criteria for Specific Situations

Criteria for Use of Standard Mitigation Guidelines

The Wyoming BLM has developed standard and best management practices for use in determining the types and levels of mitigation needed to protect important resources from actions involving surface-disturbing and other human-presence disturbance or disruptive activities. These practices are used in the planning/NEPA process for (1) developing management options and alternatives and analyzing their impacts; and (2) as part of the planning criteria for developing the options and alternatives for determining mitigation requirements. The *Wyoming BLM Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* are detailed in Appendix 1, which also contains further information on how the practices are used in the planning/NEPA process.

Criteria for the Coal Screening/Planning Process

The previously conducted coal planning/screening process including application of the coal unsuitability criteria (43 CFR 3461) will be reviewed and revised, as needed, for the planning effort. The NOI to

conduct a planning review and modification of the Great Divide RMP included a call for any available coal and other resource information for the RMPPA. The planning review and coal screening process will be consistent with the Federal Coal Management Program, policies, environmental integrity, national energy needs, and related demands. Conducting the environmental analysis and developing the EIS will serve as a mode for public input to the coal screening/planning process. The coal screening process will be conducted for the Rawlins RMP planning area to determine if existing RMP coal planning decisions are still appropriate in light of changes to the federal coal regulations and changes in resource conditions since the Great Divide RMP was approved (BLM 1990a) (see Appendix 2). After identifying areas of coal occurrence and coal with any degree of development potential in the RMPPA, the remainder of the coal screening/planning process will be conducted on those federal coal areas with development potential to determine what federal coal is acceptable for further consideration for leasing.

Note: Upon consideration of the potential for development of coal resources within the RMPPA during the 20-year life of the plan, it was determined that, with the exception of Carbon Basin, leasing of coal resources is unlikely during the 20-year planning period. Therefore, only the first two steps of the coal screening process (identification of areas with coal development potential and the application of coal unsuitability criteria) will be completed during land use planning for the RMPPA. Completion of the coal screening process will occur upon receipt of a lease-by-application.

Criteria for Hydrocarbon Potential

To aid in the planning review, criteria will be developed for leasing and development of hydrocarbon-based minerals (oil and gas). Using available geologic information, reports of past production, and information from the minerals industry, areas of high, moderate, and low potential for the occurrence and development of hydrocarbons in the RMPPA will be identified. Estimates of reasonably foreseeable oil and gas exploration and development activity will be developed from analysis of geology, past activity, and production. These estimates will be used to aid in the analysis of environmental consequences. Because they are general, these occurrence and development potential classifications and production estimates are appropriate for planning purposes, but they are not appropriate for, nor are they intended to predict, future specific activity or the specific locations of new discoveries.

Criteria for Locatable Minerals Potential

Criteria will be developed for location and development of locatable mineral entry to extract minerals such as gold, diamonds, uranium, and bentonite. Areas of high, moderate, and low occurrence and development potential will be determined to facilitate analysis of the effects that the variety of other land and resource uses and management actions would have on locatable minerals development and vice versa. This determination will be based only on a representative analysis by inference and does not imply that there may or may not be undiscovered locatable minerals of economic value in the RMPPA.

Criteria for Withdrawals and Classifications

Under sections 202(d) and 204(1) of FLPMA, any classification or withdrawal on BLM administered public land is subject to periodic review to determine whether it is serving its intended purpose and is still needed. These reviews would be initiated upon signing of the ROD. During the implementation phase the need for new withdrawals may also be identified. Where the need is identified for new withdrawals that overlap existing withdrawals that should be terminated, the new withdrawals would be put in place before terminating the old withdrawal on the same areas. The criteria for conducting these reviews in the course of the implementation phase are presented below.

For purposes of providing an adequate comparison of impacts, for the planning effort, all existing withdrawals and classifications and their segregative effects will be assumed to continue in effect in the description of the continuation of existing management direction.

Withdrawals Under Other Agency Jurisdiction. The withdrawal review requirement of FLPMA has not yet been completed on those federal lands withdrawn for purposes of other federal agencies (i.e., those under the jurisdiction of the Department of Defense or Bureau of Reclamation). For purposes of this planning effort, it must be assumed that these withdrawals will remain in effect, and that the planning and management authorities for these withdrawn lands will remain with those agencies. It is anticipated that the existing withdrawals (approximately 73,000 acres), with the exception of approximately 3,205 acres of USBOR-administered withdrawn lands, would be retained throughout the life of the plan. However, a withdrawal review program would be initiated to determine if those withdrawals would be retained, revoked or modified. Thus, the planning effort will not include consideration of any planning or management decisions for either the federal land surface or federal minerals within these withdrawn areas, except for the 3,205 acres of USBOR- administered lands with withdrawals likely to be revoked during the life of the Rawlins RMP. These lands will be considered in conducting the environmental analysis for the planning effort in terms of cumulative impacts and in terms of how they may be affected by management in the RMPPA or vice versa.

Withdrawals and Classifications Under BLM Jurisdiction. The review of withdrawals and classifications on any lands under BLM jurisdiction may result in a determination that withdrawals or classifications are no longer serving their intended purposes and should be terminated (either all or in part). This review will include consideration of whether new withdrawals or classifications, for other purposes, are needed and should be put into place before terminating old withdrawals on the same areas.

Criteria for Wilderness

There are five WSAs (Adobe Town, Ferris Mountains, Prospect Mountain, Bennett Mountains, and Encampment River Canyon) on BLM-administered public lands in the RMPPA. These WSAs were established in accordance with the requirements of Section 603(c) and 202 of FLPMA. These WSAs will continue to be managed under the Interim Management Policy for Lands Under Wilderness Review (IMP) until Congress either designates all or portions of the WSAs as wilderness or releases the lands from further wilderness consideration.

Criteria for Areas of Critical Environmental Concern

The relevance and importance criteria for ACEC designation, found in BLM Manual 1613, will be applied to BLM-administered public lands in the RMPPA to determine if any areas have the potential for ACEC designation. An ACEC designation alone does not change the allowed uses of public lands involved (FLPMA-Sec.201[a] and 43 CFR 1601.0-5a). Protective measures for ACECs are not applied or required simply because of the designation, rather, the nature of the values, resources, or natural hazards they contain are the basis for determining the appropriate types and levels of management needed. The only automatic requirement for an ACEC designation is that a "plan of operations" must be submitted for any degree of mining claim development in the area (43 CFR 3809.1-4).

Criteria for Wild and Scenic Rivers

In the course of conducting the analysis of the management situation (MSA document) for the planning effort, BLM-administered public land along waterways in the RMPPA has been reviewed, to determine the land's eligibility and suitability to be considered for inclusion in the National Wild and Scenic Rivers System. In preparing and analyzing options and alternatives for the planning effort, interim management

prescriptions have been developed for public land waterway segments determined to be suitable for further consideration. The Encampment River, within the Encampment River WSA, was the only waterway segment determined to be suitable for further consideration (see Appendix 3).

Criteria for Wild Horses

There are three wild horse HMAs (Adobe Town, Lost Creek, and Stewart Creek) on BLM-administered public land within the RMPPA. These HMAs were established in accordance with the requirements of Section 3 of the Wild, Free-Roaming Horse and Burro Act, as amended. These HMAs will continue to be managed under existing policy and guidance that emphasizes multiple-use management.

Three Herd Areas (HA) in the RMPPA were not established as HMAs. Significant amounts of private land and lack of landowner consent to allow wild horses to occupy private property precluded consideration of these HAs as HMAs.

The current appropriate management levels (AML) for wild horses were based on a 1994 evaluation of wild horse HMAs in the RMPPA. The evaluation analyzed and interpreted extensive monitoring data collected over a number of years. It is assumed that any wild horses within the RMPPA that are above the current AMLs are "excess," in the meaning of the Act, and are subject to removal.

Removal methods, transportation of wild horses, handling/preparation, adoption, and long-term care arrangements are beyond the scope of this analysis and will not be addressed in this planning review.

1.4 Relevant Statutes, Limitations, and Guidelines

The following provides a description of the authorities that apply to the selection and implementation of the management actions for the RMP. This is not an inclusive list of statutes, limitations, and guidelines. Additional laws, regulations, and policies are identified in the various appendices for specific resource programs.

1.4.1 Environmental Policy

NEPA (42 USC 4321, et seq.) requires the preparation of EISs for federal projects that may have a significant effect on the environment. It requires systematic, interdisciplinary planning to ensure the integrated use of natural and social sciences and environmental design arts in making decisions about major federal actions that may have a significant effect on the environment. The procedures required under NEPA are implemented through the CEQ regulations at 40 CFR 1500.

Federal Compliance with Pollution Control Standards (Executive Order [EO] 12088) requires that federal agencies comply with applicable pollution control standards.

Protection and Enhancement of Environmental Quality (EO 11514, as amended by EO 11991) establishes the policy for federal agencies to provide leadership in environmental protection and enhancement.

1.4.2 Land Use and Natural Resources Management

FLPMA, as amended (43 USC 1701, et seq.), provides for public lands to be generally retained in federal ownership for periodic and systematic inventory of the public lands and their resources; for a review of existing withdrawals and classifications; for establishing comprehensive rules and regulations for administering public lands statutes; for multiple-use management on a sustained yield basis; for

protection of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; for receiving fair market value for the use of the public lands and their resources; for establishing uniform procedures for any disposal, acquisition, or exchange; for protecting ACEC; for recognizing the nation's need for domestic sources of mineral, food, timber, and fiber from the public lands, including implementation of the Mining and Mineral Policy Act of 1970; and for payments to compensate states and local governments for burdens created as a result of the immunity of federal lands from state and local taxation. The general land management regulations are provided in 43 CFR 2000, Sub-chapter B.

The General Mining Law of 1872, as amended (30 USC 22, et seq.), provides for locating and patenting mining claims where a discovery has been made for locatable minerals on public lands in specified states. Regulations for staking and maintenance of claims on BLM-administered lands are listed in 43 CFR 3800.

The Mineral Leasing Act of 1920, as amended (30 USC 181, et seq.), provides for the leasing of deposits of coal, phosphate, sodium, potassium, oil, oil shale, native asphalt, solid and semisolid bitumen, bituminous rock or gas, and lands containing such deposits owned by the United States, including those in national forests but excluding those acquired under other acts subsequent to February 25, 1920, and those lands within the national petroleum and oil shale reserves. Regulations for onshore oil and gas leasing are provided in 43 CFR 3100.

The Federal Coal Leasing Amendments Act of 1976 (30 USC 201, et seq.) requires competitive leasing of coal on public lands and mandates a broad spectrum of coal operations requirements for lease management. Coal leasing regulations for BLM-administered lands are provided in 43 CFR 3400.

The Materials Act of 1947, as amended (30 USC 601–604, et seq.), provides for the sale of common variety materials for personal, commercial, or industrial uses and for free use for local, state, and federal governmental entities. The sales of mineral materials are controlled by the regulations listed in 43 CFR 3600.

The Taylor Grazing Act of 1934, as amended (43 USC 315), provides authorization to the Secretary of the Interior to establish grazing districts from any part of the public domain of the United States (exclusive of Alaska) which, in the Secretary's opinion, are chiefly valuable for grazing and raising forage crops; to regulate and administer grazing use of all public lands; and to improve the public rangelands. Regulations for grazing permits and leases are provided in 43 CFR 4100.

The Public Rangelands Improvement Act of 1978 (43 USC 1901, et seq.) provides for the improvement of range conditions on public rangelands, research on wild horse and burro population dynamics, and other range management practices.

The Federal Noxious Weed Act of 1974, as amended (7 USC 2814), provides for establishment and funding of an undesirable plant management program, completion and implementation of cooperative agreements with state agencies, and establishment of integrated management systems to control undesirable plant species.

Executive Order (E.O.) 11987 (Exotic Organisms), signed May 24, 1977, requires federal agencies, to the extent permitted by law, to restrict the introduction of exotic species into the natural ecosystems on lands and waters owned or leased by the United States; to encourage states, local governments, and private citizens to prevent the introduction of exotic species into natural ecosystems of the United States; to restrict the importation and introduction of exotic species into any natural U.S. ecosystems as a result of activities they undertake, fund, or authorize; and to restrict the use of federal funds, programs, or

authorities to export native species for introduction into ecosystems outside the United States where they do not occur naturally.

E.O.13112 (Invasive Species), signed on February 3, 1999, prevents the introduction of invasive species and provides for their control, as well as to minimize the economic, ecological, and human health impacts that invasive species cause. Under this Executive Order, federal agencies whose actions may affect the status of invasive species shall (1) identify such actions, (2) use relevant programs and authorities to prevent, control, monitor, and research such species, and (3) not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere.

The Wild, Free-Roaming Horse and Burro Act of 1971 provides for the management, protection, and control of wild horses and burros on public lands and authorizes "adoption" of wild horses and burros by private individuals. Regulations applicable to wild horse and burro management on BLM-administered lands are provided in 43 CFR 4700.

E.O. 12548 provides for establishment of appropriate fees for the grazing of domestic livestock on public rangelands and directs that the fee shall not be less than $1.35 per animal unit month.

The Wilderness Act of 1964 (16 USC 1131, et seq.) provides for the designation and preservation of wilderness areas.

1.4.3 Air Quality

The Clean Air Act of 1990, as amended (42 USC 7401, 7642), requires BLM to protect air quality, maintain federal- and state-designated air quality standards, and abide by the requirements of the state implementation plans.

Wyoming Air Quality Standards and Regulations, Chapters 1 to 11, specify the requirements for air permitting and monitoring to implement Clean Air Act and state ambient air quality standards.

1.4.4 Water Quality

The Clean Water Act of 1987, as amended (33 USC 1251), establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation's water. The act also requires permits for point source discharges to navigable waters of the United States and the protection of wetlands and includes monitoring and research provisions for protection of ambient water quality.

Wyoming Water Quality Regulations implement permitting and monitoring requirements for the National Pollutant Discharge Elimination System, operation of injection wells, groundwater protection requirements, prevention and response requirements for spills, and salinity standards and criteria for the Colorado River Basin.

Protection of Wetlands (E.O. 11990) requires federal agencies to take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

Floodplain Management (E.O. 11988) provides for the restoration and preservation of national and beneficial floodplain values, and enhancement of the natural and beneficial values of wetlands in carrying out programs affecting land use.

1.4.5 Cultural Resources

The Historic Sites Act (16 USC 461) declares national policy to identify and preserve historic sites, buildings, objects, and antiquities of national significance, thereby providing a foundation for the National Register of Historic Places.

The National Historic Preservation Act of 1966, as amended (16 USC 470), expands protection of historic and archaeological properties to include those of national, state, and local significance. It also directs federal agencies to consider the effects of proposed actions on properties eligible for or included in the National Register of Historic Places.

The Archaeological Resources Protection Act of 1979, as amended (16 USC 470a, 470cc, 470ee), requires permits for the excavation or removal of federally administered archaeological resources, encourages increased cooperation among federal agencies and private individuals, provides stringent criminal and civil penalties for violations, and requires federal agencies to identify important resources vulnerable to looting and to develop a tracking system for violations.

The Native American Graves Protection and Repatriation Act of 1990 provides a process for federal agencies to return certain Native American cultural items (e.g., human remains, funerary objects, sacred objects, and objects of cultural patrimony) to lineal descendants and culturally affiliated Native American tribes.

Protection and Enhancement of the Cultural Environment (Executive Order 11593) directs federal agencies to locate, inventory, nominate, and protect federally owned cultural resources eligible for the National Register of Historic Places and to ensure that their plans and programs contribute to preservation and enhancement of nonfederally owned resources.

The National Trails System Act of 1968, as amended (16 USC 1241–1249), establishes a national trails system and requires that federal rights in abandoned railroads be retained for trail or recreation purposes, or sold with the receipts to be deposited in the Land and Water Conservation Fund.

1.4.6 Hazardous Materials

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 USC 9601–9673), provides for liability, risk assessment, compensation, emergency response, and cleanup (including the cleanup of inactive sites) for hazardous substances. The act requires federal agencies to report sites where hazardous wastes are or have been stored, treated, or disposed and requires responsible parties, including federal agencies, to clean up releases of hazardous substances.

The Resource Conservation and Recovery Act (RCRA), as amended by the Federal Facility Compliance Act of 1992 (42 USC 6901–6992), authorizes the Environmental Protection Agency (EPA) to manage, by regulation, hazardous wastes on active disposal operations. The Act waives sovereign immunity for federal agencies with respect to all federal, state, and local solid and hazardous waste laws and regulations. Federal agencies are subject to civil and administrative penalties for violations and to cost assessments for the administration of the enforcement.

The Emergency Planning and Community Right-To-Know Act of 1986 (42 USC 11001–11050) requires the private sector and federal, state, local, and tribal governments to inventory chemicals and chemical products, to report those in excess of threshold planning quantities, to inventory emergency response

equipment, to provide annual reports and support to local and state emergency response organizations, and to maintain a liaison with the local and state emergency response organizations and the public.

1.4.7 Wildlife

The Endangered Species Act of 1973 (ESA), as amended (16 USC 1531, et seq.), directs federal agencies to ensure that their actions do not jeopardize threatened and endangered species, and that through their authority they help bring about the recovery of such species.

The Bald Eagle Protection Act of 1940 (16 USC 668), amended in 1962 to include the golden eagle, prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions.

Fish and Wildlife Coordination Act of 1958 (16 USC 661 et seq.) provides that whenever the waters or channel of a body of water are modified by a department or agency of the United States, the department or agency first will consult with the U.S. Fish and Wildlife Service and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur, with a view to the conservation of wildlife resources.

Fish and Wildlife Improvement Act of 1978 (16 USC 742l) authorizes the Secretary of the Interior and the Secretary of Commerce to assist in training of state fish and wildlife enforcement personnel, to cooperate with other federal or state agencies for enforcement of fish and wildlife laws, and to use appropriations to pay for rewards and undercover operations.

Fish and Wildlife Conservation Act of 1980, as amended, (16 USC 2901-2911, commonly known as the Nongame Act) encourages states to develop conservation plans for nongame fish and wildlife of ecological, educational, aesthetic, cultural, recreational, economic or scientific value. The states may be reimbursed for a percentage of the costs of developing, revising, or implementing conservation plans approved by the Secretary of the Interior. Amendments adopted in 1988 and 1989 also direct the Secretary to undertake certain activities to research and conserve migratory nongame birds.

Migratory Bird Treaty Act of 1918 (16 USC 703-711) manages and protects migratory bird species through consultation with state and local governments and protection of land and water resources necessary for the conservation of migratory birds. Under the Act, taking, killing, or possessing migratory birds is unlawful.

The Sikes Act of 1960 (16 USC 670a-670o), as amended, Public Law 86-797, provides for cooperation by the Departments of the Interior and Defense with state agencies in planning, development, and maintenance of fish and wildlife resources on military reservations throughout the United States. Public Law 93-452, signed in 1974, authorized conservation and rehabilitation programs on BLM lands. Public Law 97-396, approved in 1982, provided for the inclusion of endangered plants in conservation programs developed for BLM lands. It also defined "cooperative agreements" with states and clarified section 209 concerning purchases and contracts for property and services from states.

1.5 Relationship with Other Plans

BLM land use plans and amendments must be consistent with officially approved or adopted resource-related plans of Native American tribes, other federal agencies, and state and local governments to the maximum extent practical, given that BLM land use plans must also be consistent with the purposes, policies, and programs of FLPMA and other federal laws and regulations applicable to public lands (43 CFR 1610.3-2 [a]).

If these other entities do not have officially approved or adopted resource-related plans, BLM land use plans must, to the maximum extent practical, be consistent with their officially approved and adopted resource-related policies and programs. This consistency will be accomplished as long as BLM land use plans are consistent with the policies, programs, and provisions of public land laws and regulations (43 CFR 1610.3-2 [b]).

This draft EIS with its associated descriptions of planning alternatives is being distributed to other federal agencies, state and local governments, and Native American tribes for the opportunity for them to identify where specific inconsistencies may exist, and to suggest ways to resolve them.

CHAPTER 2—DESCRIPTIONS OF THE ALTERNATIVES

2.1 INTRODUCTION

Chapter 2 describes four alternative Resource Management Plans (RMP) for the management of the Resource Management Plan Planning Area (RMPPA). These alternatives are divided into one no action alternative and three action alternatives as follows: Alternative 1 (No Action—Continuation of Existing Management Direction), Alternative 2 (Emphasis on the Development of Resources), Alternative 3 (Emphasis on Protection of Resources), and Alternative 4 (Preferred Alternative). Alternative 1 includes direction provided by the Great Divide RMP (BLM 1990a) and a new direction and policy that have been subsequently developed and resulting amendments to the plan. The three action alternatives were developed to present a range of management options to guide decision-making for managing uses and activities within the RMPPA. Each alternative management plan is intended to minimize adverse impacts on cultural and natural resources while providing for compatible resource use and development opportunities, consistent with current laws, regulations, and policies.

Alternatives were developed to establish a framework for measuring the impacts on the RMPPA that might occur as a result of future management. The alternatives themselves do not constitute management decisions, but instead represent reasonable approaches to managing land and activities consistent with laws, regulations, and policies. The Bureau of Land Management (BLM) has the discretion to select an alternative in its entirety or to combine aspects of the various alternatives presented in this draft to develop the Proposed RMP and Final Environmental Impact Statement (EIS). The National Environmental Policy Act (NEPA) requires the development and analysis of several alternatives, including a No Action Alternative, to measure the impacts that a set of actions could have on the RMPPA. According to NEPA, BLM must consider these impacts in developing the RMP for the RMPPA, as described in Chapter 1.

Section 2.2 presents an overview of the alternatives development process, including alternatives and management options considered but eliminated from detailed analysis. Section 2.3 describes management guidance and actions that are applicable or common to all alternatives, including the Alternative 1. Management alternatives considered in the Draft EIS are described in detail in Sections 2.4 through 2.7. Section 2.8 presents a comparison summary of impacts from management actions proposed for the four management alternatives addressed in Chapter 4 of the Draft EIS. Section 2.9 describes the monitoring strategy to be applied to the management of all land and resource management programs. The formation of Activity Plan Working Groups (APWG) is also described in Section 2.9.

2.2 DEVELOPMENT OF ALTERNATIVES

The following sections describe the alternatives development process, including management goals.

2.2.1 Alternatives Development Process

BLM complied with NEPA requirements in the developing of alternatives for this RMP Draft EIS (DEIS), including seeking public input and analyzing an adequate range of reasonable alternatives, including Alternative 1. Alternative formulation took into consideration existing decisions in the Great Divide RMP, the 2001 Great Divide RMP evaluation (the results of which were presented in Chapter 1), and issues and concerns developed internally and solicited from the public during scoping.

The existing Great Divide RMP (1990 Great Divide Resource Area Record of Decision [ROD] and Approved RMP [BLM 1990a]) served as the point of departure for Alternative 1. Many of the management actions occurring in the 1990 RMP were found to be acceptable and reasonable; thus, there was limited need to develop alternative management prescriptions under the three action alternatives. In many cases, management prescriptions are the same across all alternatives or in some cases reflect only a decision to implement or not implement an action. Actions that are the same across all four alternatives are presented in Section 2.3.

Public input received during the scoping process was considered to ensure that all issues and concerns would be addressed, as appropriate, in developing the alternatives and their management action options. The scoping process and its results, as well as opportunities for future public and agency involvement, are summarized in Section 5.2.

Where necessary to meet the planning criteria for the RMPPA, to address comments from cooperating agencies, and to provide a reasonable range of alternatives, the alternatives include management options for the RMPPA that would modify or amend decisions in the Great Divide RMP. Finally, all alternatives meet the management goals for each BLM resource and land management program.

Development of alternatives began with the identification of management actions and the analysis of the environmental effects of Alternative 1. Other alternatives were then developed to address resource issues and concerns identified through the analysis of Alternative 1.

Review of the alternatives included cooperating agency involvement to ensure consistency with other agency goals and objectives prior to the development of the Preferred Alternative (Alternative 4). In addition, the Preferred Alternative was developed following a review of the management actions and environmental effects of the other three alternatives.

An adequate range of alternatives was developed for a comparative analysis. Management alternatives considered in the DEIS are described in detail in Sections 2.4 through 2.7 and are presented in Table 2-1.

2.2.2 Management Goals

Management goals were defined for each resource management category and land use program that BLM must address in the planning process. The management goals for each resource management category and land use program are presented in Table 2-1.

2.2.3 Alternatives and Management Options Considered But Eliminated From Detailed Analysis

The following alternatives and management options were considered as possible ways of resolving resource management issues and conflicts but were eliminated from detailed analysis because they were unreasonable or not practical as a result of technical, legal, or policy factors.

Wild Horses and Burros

In developing the wild horse management alternatives that were considered in detail, the following two alternatives were considered but eliminated from detailed analysis:

Establish Herd Management Areas in Herd Areas Not Supporting Wild Horses

The three herd areas (HA) within the Rawlins RMPPA (Checkerboard South, Doty Mountain/Cherokee, and Bolton Ranch) that do not contain established herd management areas (HMA) were reviewed to determine if the conditions precluding HMA designation were still valid. Previous planning efforts determined these HAs failed to meet criteria for suitably maintaining a healthy population of wild horses in accordance with the intent of the Act. Those criteria failures included the following:

- The area was composed of more than 50 percent privately controlled land and the private landowners did not express an interest in having their lands included in an HMA.
- The area contained numerous barriers that prevented wild horse access to adequate yearlong habitat.
- Most of the horses in these areas were privately owned and had been removed.

It was determined the conditions within these HAs have not changed significantly from when the HAs were originally evaluated. In addition, establishing HMAs within these HAs would require allocation of sufficient forage to sustain a population of wild horses on public lands, thereby removing some or all of the permitted livestock from the HAs. Therefore, an alternative to establish wild horse HMAs in any of these three HAs will not be considered further.

Elimination of All Wild Horses from the Rawlins RMPPA

This alternative would be viable only if the management of wild horses were not possible in any HAs located in the planning area. As this is not the case, this alternative would contravene the intent and letter of the Wild Horse & Burro Act of 1971, which states "... they (wild horses) are considered in the area where presently found as an integral part of the natural system of the public lands" and should be "protected and managed as components of the public lands." This alternative was not considered further.

Reintroduction of a Wild Bison Population

Public comment received during scoping suggested that a wild, free-roaming population of bison should be returned to the Red Desert Basin within the RMPPA. The alternative was not considered in detail because of the following issues identified during alternative formulation: (1) Wyoming law does not currently provide for the presence of free-ranging bison outside the Yellowstone ecosystem; (2) big game (antelope, deer, and elk) would be adversely affected by the construction and maintenance of fences that would be required to confine a bison population to any area equaling or approximating the Great Divide Basin; and (3) BLM lacks the statutory authority to manage any species of animal on the public lands except wild horses, which already exist in significant numbers in the Great Divide Basin and areas adjacent to it.

Elimination of Livestock Grazing

The elimination of livestock grazing from all public lands in the planning area was considered as one management option to resolving range and watershed management issues in the current Great Divide RMP. However, after reviewing vegetation data, the rangeland health assessment, and public scoping comments, BLM concluded that eliminating livestock grazing from all public lands continues not to be a viable or necessary management option.

Western Heritage Alternative

The Western Heritage Alternative was developed or endorsed by a number of state and national conservation organizations and was provided to BLM during public scoping. The Western Heritage Alternative, as presented, incorporated many timely issues and concerns that would be required of any balanced approach to managing the public lands. Much of the information provided was a description of past and present condition of resources similar to the existing environment discussion provided in Chapter 3. To its credit, the Western Heritage Alternative did provide or develop issues and concerns into management recommendations for many of the resource issues that it presented. However, the Western Heritage Alternative proposed that a "no surface occupancy" (NSO) stipulation be considered for surface-disturbing and disruptive activities on more than 90 percent of the RMPPA (about 3,117,000 acres). This level of NSO was considered not reasonable and, therefore, was not considered in detail in the Rawlins RMP/DEIS. Many of the resource issues and concerns addressed in the Western Heritage Alternative were considered during development of alternatives considered in detail in the RMP.

Oil and Gas Development Allowable to Limits of Existing RMP Only

An alternative was considered that would have limited oil and gas exploration and development activity to levels analyzed in the existing Great Divide RMP. However, following further analysis and discussion, this alternative was considered to be unrealistic and unreasonable because reasonably foreseeable exploration levels established in 1986 in the Great Divide RMP have almost been achieved. The Rawlins Field Office (RFO) evaluation of the Great Divide RMP in 2001 identified the fluid mineral reasonable foreseeable development (RFD) at an analysis level that would be exceeded in the near future. This alternative would have effectively limited oil and gas exploration and development to that which has already been approved. In addition, public comments received during scoping and issue identification indicated a general acceptance of continued mineral development, provided it is properly managed.

Expanded Wilderness Study Area Alternative

Several citizens' proposals for wilderness study areas (WSA) were received and reviewed by the RFO. These included proposals in the Adobe Town, Kinney Rim, Wild Cow, and Ferris Mountains areas, including approximately 316,000 acres of public land. In response to these proposals, the RFO reviewed the current policy and guidance on wilderness inventory, identification, management, and protection of lands with wilderness characteristics. A WSA expansion alternative will not be analyzed in detail for the following reasons.

- The authority set forth in Section 603(a) of the Federal Land Policy Management Act (FLPMA) to complete the three-part wilderness review process (inventory, study, and report to Congress) expired on October 21, 1993; Section 202 of FLPMA does not apply to new WSA proposals; and consideration of new WSA proposals on BLM-administered public lands is no longer valid.

- In April 2003 settlement of a lawsuit over the designation of new WSAs on BLM-administered public lands in Utah (State of Utah vs. Department of Interior 2003) resulted in a change of direction on wilderness designation. The settlement resulted in the issuance of BLM Washington Office Instruction Memorandum No. 2003-195 (Rescission of National Level Policy Guidance on Wilderness Review and Land Use Planning) which rescinded the *BLM Wilderness Inventory and Study Procedure Handbook (H-6310-1).*

- FLPMA land use plan decisions may accord special management protection for special values through the land use planning process. It should be noted that in response to public requests that BLM grant WSA status to various public lands, BLM completed an evaluation of the various

proposals to establish the presence or absence of wilderness characteristics (i.e., naturalness, solitude, primitive recreation). Two areas, the Adobe Town fringe and West Ferris Mountain, were determined to support wilderness characteristics. Alternatives discussed in Chapter 2 were developed to consider protection and management for the special values.

- BLM may continue to inventory public lands for resources or other values, including wilderness characteristics, as a part of managing the public lands and land use planning. Information provided by the public has been considered along with all other resource information in the Rawlins land use planning process.

Consideration of Additional Areas as Areas of Critical Environmental Concern

Public comment received during scoping suggested that a number of areas be considered for designation as Areas of Critical Environmental Concern (ACEC). Designation of Shirley Mountains, Chain Lakes, Ferris Dunes, and white-tailed prairie dog complexes as ACECs has been considered in the alternatives analyzed. However, the designations of plover concentration areas, the Bates Hole/Chalk Mountain cushion plant community, and Powder Rim juniper woodland have not been considered in any of the alternatives analyzed. BLM is required to determine if areas proposed for ACEC designation meet the relevance and importance criteria (as defined in BLM Manual Section 1613) prior to inclusion in the RMP process. Areas that did not meet the relevance and importance criteria were dropped from further consideration for ACEC designation (BLM 2004). Areas that met the relevance and importance criteria are discussed in Chapter 3 and management of these areas is presented in Section 2.3.11 and Table 2-1 below.

2.3 Management Actions Common to All Alternatives

This section describes management actions that are applicable or common to all alternatives. Alternative-specific management actions follow in Table 2-1.

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

In other cases, management actions are consistent across all alternatives because actions have been carried forward from the existing Great Divide RMP. Where management actions from the existing Great Divide RMP were found to be meeting BLM's current goals, alternatives to acceptable management actions or direction were found to be unnecessary. In many cases, the decisions from the existing RMP are still appropriate to meet the goals and objectives for management of the public lands.

2.3.1 Air Quality

Air quality standards are maintained by the State of Wyoming, which determines whether it is necessary to regulate emissions. When necessary, the state would regulate emissions through its State Implementation Plan (SIP) for air quality by promulgating the appropriate rule. Objectives of the State of Wyoming SIP would include the protection of public health and safety and the well-being of sensitive natural resources. Thus, BLM would minimize, within the scope of its authority, any emissions that may add to atmospheric deposition, cause violations of air quality standards, or degrade visibility. The

Environmental Protection Agency (EPA) would provide oversight responsibility during this process and would approve the State of Wyoming SIP.

State standards enforced in the RMPPA would be as strict or stricter than federal standards. Special requirements to alleviate air quality impacts would be considered on a case-by-case basis in processing land use authorizations.

BLM would cooperate with the operation of the National Atmospheric Deposition Program (NADP)/National Trends Network atmospheric deposition monitoring site, as well as in the collection of basic climate and meteorological data from remote automatic weather stations. The NADP sites included in this analysis are Snowy Range, Brooklyn Lake, and South Pass City.

BLM would follow the specific guidance for the application of air quality protection measures (presented in Appendix 4) within the RMPPA.

2.3.2 Cultural Resources

Cultural resources would be identified and protected on a case-by-case basis, according to site-specific needs.

Cultural properties eligible for National Register of Historic Places (NRHP) listing would be managed for preservation of cultural and historic values (Appendix 5).

Where the setting contributes to NRHP eligibility, management actions resulting in visual elements that diminish the integrity of the property's significant historic features would be intensively managed. Unevaluated portions of the setting would be managed as contributing until a cultural inventory and evaluation is completed and the setting is determined to be contributing or non-contributing (Appendix 5).

2.3.3 Wildland Fire and Fuels Management

BLM would manage wildland fire mitigation and fuels activities to first provide for firefighter and public safety. Public lands within the checkerboard or other intermixed landownership areas would be managed in association with the private and state lands therein. Appropriate management response (AMR) would most often result in suppression activities (Map 2-1).

AMRs for special management areas (SMA) would protect or enhance the relevant and important values of the ACEC or other SMAs requiring special management attention. A high priority for fire management activities would be given to areas identified as communities at risk (as identified in Federal Register, Volume 66, Number 3, 2001), industrial interface areas, and areas containing resource values considered high priority within the RMPPA (Map 2-1).

Fuel treatments, including prescribed fire and mechanical, chemical, and biological treatments, would be used for fuels reduction and to meet other multiple-use resource objectives, including returning fire to its natural role in the ecosystem (also see the vegetation section of Table 2-1). Identified wildland-urban interfaces (WUI) and communities at risk would receive priority for fuels reduction.

Rehabilitation and restoration efforts would be undertaken to protect and sustain ecosystems, public health, and safety, and to help communities protect infrastructure.

2.3.4 Forestry

All forest and woodlands in the planning area would be open to noncommercial harvest of minor wood products, such as fuelwood, posts and poles, Christmas trees, and wildings. Forest and woodlands management would also include manipulation of aspen, juniper, and other noncommercial tree species to meet forest health and/or other multiple-use objectives.

2.3.5 Lands and Realty

The RMPPA would be open to operation of the public land laws, the Mining Law of 1872, and to locatable mineral entry except for 1,582,260 acres of existing withdrawals (see Section 3.6).

In compliance with Section 204(1) of FLPMA, reviews of withdrawn lands in the planning area would be completed to determine whether existing withdrawals are serving or needed for their intended purposes. The existing withdrawals in the planning area would remain in place unless or until it is determined they should be terminated and, if necessary, a plan amendment to the Rawlins RMP is made. Such determination or amendment would be based on full examination of the issues associated with withdrawal terminations, including the land use, environmental, and other factors associated with opening public lands now closed to entry under the public land laws or to mineral location under the mining laws. Where appropriate and necessary to protect other resource values, new withdrawals would be pursued and implemented prior to terminating any existing withdrawals. Existing and new withdrawals are listed in Table 2-2 at the end of this chapter.

Coal classifications are no longer necessary on 671,768 acres in the RMPPA. Existing withdrawals would be reviewed and could be terminated, when appropriate.

Nonfederal lands would be considered for acquisition to meet the objectives of the various resource management programs. Examples of lands that would be acquired include inholdings within WSAs, some SMAs, and HMAs (Appendix 6).

Proposals for alternative energy development would be considered on a case-by-case basis. No proposals for alternative energy development, other than wind power, are anticipated to occur in the foreseeable future; therefore, only wind energy potential is considered. Proposals for location of wind energy development would be considered on a case-by-case basis and subject to a site-specific NEPA analysis. Areas with important or sensitive resource values would be avoided. Avoidance areas would vary by alternative.

All BLM-administered public lands, except WSAs and some SMAs (including ACECs), would be open to consideration for placement of transportation and utility rights-of-way (ROW) systems. Each transportation system and utility ROW would be located adjacent to existing facilities, when possible. Areas with important or sensitive resource values would be avoided. Existing major transportation and utility ROW routes, identified in Chapter 3, and presented in Map 2-2, would be designated corridors. However, major transportation routes within the RMPPA that are located east of the Carbon County-Albany County line would not be considered for ROW corridor designation because of the scattered public land ownership pattern in the area. All corridors would be designated for power lines (above ground and buried), telephone lines, fiber optic lines, pipelines, access roads and other linear type ROWs. Specific proposals would require site-specific environmental analysis and compliance with established permitting processes. Activities generally excluded from ROW corridors include mineral materials disposal, range and wildlife habitat improvements involving surface disturbance and facility construction, campgrounds, and public recreation facilities and other facilities that would attract public use. ROW facilities would not be placed adjacent to each other if issues with safety or incompatibility or resource

conflicts were identified. The designated width, allowable uses, and excluded uses for each corridor may be modified during implementation of the approved RMP. All designated ROW corridors would avoid to the extent possible those areas identified on Map 17 and Table 2-3 (presented at the end of this chapter). The number, type, extent, and proximity of new ROWs within designated corridors would be determined when the criteria (Appendix 6) for each corridor are identified.

Mitigation requirements for surface-disturbing and disruptive activities would be applied to activities related to utility/transportation systems to protect important resource values (Appendix 1).

Certain lands withdrawn for Seminoe Reservoir (2,000 acres) and the Savery-Pothook area (1,205 acres), currently managed by the Bureau of Reclamation (BOR), are being considered for revocation (Appendix 7). The revocation was reviewed by BLM and a determination made that the lands are suitable for return to public domain status because they are no longer needed for the purpose for which they were withdrawn. Lands considered for revocation have been reviewed for management options and a determination made that these lands would be managed the same as adjacent public lands.

2.3.6 Livestock Grazing

Livestock grazing would be managed to provide for protection or enhancement of all resource values. The Wyoming Standards for Healthy Rangelands (S&Gs) (BLM 1997) would be implemented when authorizing livestock grazing use and related activities in the planning area (Appendix 8).

The current amounts, kinds, and seasons of livestock grazing use would be authorized until monitoring indicates a grazing use adjustment is necessary, or that a class of livestock or season of use modification can be accommodated. Monitoring would include coordination, consultation, and negotiation with grazing permittees.

Requests for changes in season-of-use or kind-of-livestock would be considered on a case-by-case basis and reviewed to determine range suitability and to evaluate potential impacts to both riparian and upland vegetation and other land resource uses.

Designated camping areas, wetland/riparian spring exclosures, sensitive plant species exclosures, some wildlife management areas, coal mines, and some oil and gas production facilities are closed to grazing.

Domestic sheep and goats would not be authorized within 9 miles of identified wild bighorn sheep habitat unless a natural or topographic feature provides an effective barrier (Map 2-3).

2.3.7 Minerals

The Energy Policy and Conservation Act Amendments (EPCA) of 2000, Public Law (PL) 106-469, directed the Secretary of the Interior to conduct an inventory of oil and natural gas resources beneath federal lands. The act also directed the Department of Interior to identify the extent and nature of any restrictions to resource development. As a result, the Departments of the Interior, Agriculture, and Energy released a report, *Scientific Inventory of Onshore Federal Lands' Oil and Gas Resources and Reserves and the Extent and Nature of Restrictions or Impediments to their Development* (referred to as the "EPCA Inventory"), in January 2003.

BLM is integrating the results of the EPCA Inventory into its RMPs. The oil and gas resource inventory data is integrated into the RFD scenario that predicts future mineral development within the RMPPA. The restrictions and impediments to mineral resource development would be considered throughout the RMP with the intent to—

- Clearly present mitigation requirements necessary to reduce impacts of oil and gas operations on other resources.
- Ensure that such mitigation is either statutorily required or scientifically justifiable and is the least restrictive measure necessary to accomplish the desired level of resource protection. The mitigation requirements would be monitored to determine if more or less restrictive measures might accomplish the same goal.

Oil and gas lease stipulations may be modified or eliminated using the exception, modification, or waiver criteria outlined in this RMP (Appendix 9) or through more site-specific environmental analysis. Those stipulations that are either too restrictive or too lenient to accomplish the desired resource protection would be changed if monitoring or new scientific data justify the change. Clarifying changes may be made to the wording of oil and gas lease stipulations as long as there is no substantial change to the mitigated protection, as justified by new scientific data or monitoring.

There is no reasonably foreseeable coal development in the Rawlins RMPPA for the 20-year analysis period for this EIS. Only the first two steps of the coal screening process (Appendix 2) have been conducted on the federal coal lands that have federal coal occurrence, which resulted in a determination that approximately 5,029 acres (containing an estimated 70.1 million tons of surface mineable federal coal) were unsuitable for surface coal mining. Approximately 56,240 acres (containing an estimated 2,388.8 million tons of surface mineable federal coal) were identified as acceptable for further leasing consideration. The unsuitable coal areas are depicted on Appendix Maps A2-2, A2-3, and A2-4. The remaining steps of the coal leasing process would be completed upon receipt of a lease-by-application. Per regulations found at 43 CFR 3461, the coal screening process cannot be applied to lands currently leased for coal. Within the RMPPA, seven existing coal leases are exempt from the coal screening process: Hanna Basin (six leases; 19,016 acres of federal coal land) and Carbon Basin (one lease; 5,235 acres of federal coal land).

The only coal activity analyzed in the EIS is reclamation activity in the Hanna Basin. Future economic conditions may change and make the existing Hanna Basin coal leases more likely to be developed. In Carbon Basin, in addition to the existing lease acreage, an additional 6,693 acres and 163,300,000 tons of federal coal are acceptable for further consideration for leasing as a result of the 1998 Carbon Basin RMP Amendment. The existing coal lease for Carbon Basin is addressed in the cumulative impact section.

No decisions on lands acceptable for further consideration for leasing would be made until after a lease application is received.

Leases would be considered on a case-by-case basis only, as lease applications are received. The first two steps of the coal screening process would be revisited, and coal screening would be completed [including the multiple-use screen and the surface-owner consultation screen].

Federal coal lease applications would be accepted only on those federal coal lands with development potential identified as acceptable for further leasing consideration after application of the coal unsuitability criteria (the above-mentioned approximately 56,240 acres and 2,388.8 million tons of surface mineable federal coal) (Maps A2-2, A2-3, and A2-4 and Appendix 2).

About 6,693 acres of federal coal lands containing 163 million tons of federal coal in the Carbon Basin are acceptable for further leasing consideration. Of the 6,693 acres of federal coal lands, 120 acres are acceptable for leasing consideration by subsurface mining methods only. This decision has been carried forward from the 1998 Carbon Basin RMP Amendment (1998 Carbon Basin RMP Amendment for acreages, tonnages, and locations of areas within the Carbon Basin acceptable for leasing consideration).

All lands open to oil and gas leasing consideration also would be open to geophysical exploration, subject to appropriate resource surveys, surface protection measures, adequate bonding, and adherence to State of Wyoming standards for geophysical operations.

Vehicular use for necessary tasks (as defined in the Glossary), such as geophysical exploration including project survey and layout, is subject to off-highway vehicle (OHV) designations. Exceptions may be necessary to protect other resources on a case-by-case basis following environmental analysis.

With the exception of WSAs and some other SMAs, the remainder of the planning area would be open to consideration for leasing of oil shale, geothermal resources, and nonenergy leasable minerals.

Approximately 1,582,260 acres would be closed to locatable mineral entry under existing mineral location withdrawals (Map 2-4). The remainder of the planning area would be open to mineral location. Stipulations to protect sensitive resource values would be based on interdisciplinary review of individual proposals and environmental analysis.

Mineral material disposals are discretionary actions. Disposal would be considered on a case-by-case basis. Stipulations to protect important surface values would be based on interdisciplinary review of individual proposals.

2.3.8 Off-Highway Vehicle Management

With some exceptions, the planning area would be open to use of motorized over-the-snow vehicles, provided that they do not adversely affect wildlife or vegetation (see the SMA section and the wildlife and fisheries section of Table 2-1 for specific OHV exceptions).

In conformance with BLM Washington Office IM No. 2004-005 (October 1, 2003), the RMPPA will be divided into areas that are open, limited, or closed to OHV travel (Map 2-5). Those areas that are designated limited may have seasonal restrictions or travel limitations to either existing or designated roads and vehicle routes, or any combination of these. Until the designation process is completed, travel in Limited to Designated Areas (LDA) would remain limited to existing roads and vehicle routes. Travel on parcels of public land not having legal public access would remain limited to existing roads and vehicle routes.

Off-road OHV use would be allowed for necessary tasks except in WSAs and specific SMAs (see SMAs portion of Table 2-1).

The Encampment River Canyon Area (about 6,700 acres) would be closed to motorized vehicle use, including over-the-snow vehicles, December 1 to April 30, to reduce stress on wildlife that may winter in the canyon area. The Encampment River Trail would be closed to all types of motorized vehicle use year-round.

2.3.9 Paleontology

Paleontological resources would be managed to protect their important scientific values. Area closures, restrictions, or other mitigation requirements for the protection of paleontological values would be determined on a case-by-case basis. Collecting of scientifically significant vertebrate fossils by qualified paleontologists would be allowed by permit only.

2.3.10 Recreation Resources

Existing recreation sites would be maintained or improved to assure continued availability to the recreating public. Additional recreation sites would be considered for development based on need or demand, site suitability, and legal public access.

The entire RMPPA would be open to dispersed recreation with the exception of specific areas that must be excluded to protect public health and safety or special resource values.

2.3.11 Special Management Areas

Wilderness Study Areas

WSAs (Map 2-6) would be managed according to the Interim Management Policy for Lands Under Wilderness Review, until Congress either designates each WSA as "wilderness" or releases it from consideration and it reverts to multiple-use land.

The Ferris Mountains WSA (21,880 acres) would be closed to all types of motorized vehicle use.

Areas of Critical Environmental Concern

Under different alternatives, designations of the following areas vary from ACEC to areas with other special management prescriptions. For the designation of these areas as ACECs or other special management areas, refer to Table 2-1 (Maps 2-7 through 2-13). Occurrence and acreages vary per alternative for each of these areas.

Como Bluff Area

Case-by-case examination of any proposed surface-disturbing and disruptive activities would be made to determine potential adverse effects and appropriate mitigation would be applied to minimize those effects.

Sand Hills Area and Potential JO Ranch Expansion

No surface occupancy would be allowed on the 18 acres around the JO Ranch buildings. Developments, uses, and facilities would be managed spatially to avoid damage to vegetation.

Jep Canyon Area

Surface-disturbing activities would be intensively managed to prevent loss of significant habitat. Management would be applied on a case-by-case basis to determine potential adverse effects and appropriate mitigation to minimize those effects. Developments, uses, and facilities would be managed to avoid damage to vegetation and wildlife habitat.

Shamrock Hills Area

Surface-disturbing activities would be intensively managed to maintain raptor-nesting habitat. Management would be applied on a case-by-case basis. Developments, uses, and facilities would be managed to avoid damage to vegetation and wildlife habitat.

The area would be open to oil and gas leasing with intensive management of surface-disturbing and disruptive activities.

Stratton Sagebrush Steppe Research Area

The entire area (5,530 acres) would be closed to locatable mineral entry, mineral material disposal, and land tenure adjustments, including sales. Withdrawals would be pursued.

Motorized vehicle use would be limited to designated roads and vehicle routes.

Laramie Peak Area

The area would be open to oil and gas leasing with intensive management of surface-disturbing and disruptive activities. Plans of operations would be required for locatable mineral exploration and development (except casual use), for disturbance of five acres or more.

Red Rim-Daley Area

The area would be open to oil and gas leasing with intensive management of surface-disturbing and disruptive activities.

Pennock Mountain Area

The Pennock Mountain crucial elk winter range (9,806 acres) would be closed to human presence from November 15 to April 30.

Wick-Beumee Area

The public land within the Wick-Beumee wildlife habitat management area (280 acres) (Map 2-10) would be managed as a wildlife habitat management area. The Wick-Beumee crucial elk winter range (280 acres) would be closed to motorized vehicle use, including over-the-snow vehicles, from November 15 to April 30.

Historic Trails (Cherokee, Overland, Rawlins to Baggs, and Rawlins to Fort Washakie)

Sections of the historic trails with intact trail traces (two-tracks, etc.) would be preserved in their present condition. Historic trail use that would result in adverse effects to the trail trace (Appendix 5) would be evaluated on a case-by-case basis.

Actions resulting in linear crossings of the trails would be evaluated on a case-by-case basis, and surface-disturbing and disruptive activities would be intensively managed.

Where the setting of the trails contributes to NRHP eligibility, actions resulting in visual elements that diminish the integrity of the property's significant historic features would be intensively managed. Unevaluated portions of the trail setting would be managed as contributing until a cultural inventory is completed and the setting is determined to be contributing or noncontributing (Appendix 5).

Upper Muddy Creek Watershed/Grizzly Area

To protect the Colorado River cutthroat trout reintroduction area, 4,520 acres of public lands and 69,770,000 tons of federal coal would be unsuitable for further leasing consideration (Map A2-4 in Appendix 2). For additional coal management discussion, see Section 2.3.7 and the minerals section of Table 2-1.

Rehabilitation of degraded stream reaches would be carried out in specific problem areas. Livestock grazing use would be managed to provide for protection or enhancement of other resource values.

High Savery Dam Area

The area would be cooperatively managed for recreational and multiple-use objectives and irrigation water, consistent wit the June 2003 MOU between Wyoming Water Development Commission (WWDC) and BLM (Appendix 23). The area would be open to mineral leasing with a NSO stipulation.

For public safety and protection of structures and facilities, public access would be closed to vehicular travel. Public access would be restricted to foot travel only.

The WWDC would be responsible for water, wetland, and riparian management on the subject public lands, as required by the U.S. Army Corps of Engineers (COE) Section 404 permit for the High Savery Dam and Reservoir Project. Management of these resources would be coordinated with the BLM.

The High Savery allotment would be open to livestock grazing to meet vegetative management goals and the objectives for the High Savery Dam and Reservoir Project area. Grazing use would be authorized on a temporary, nonrenewable basis.

Special Recreation Management Areas

Continental Divide National Scenic Trail SRMA

The Continental Divide National Scenic Trail (600 acres; the federal portion of the trail consists of about 82 miles by 60 feet) would be managed to provide opportunities for trail users to view the diverse topographic, geographic, vegetative, wildlife, and scenic phenomena that characterize the Continental Divide and to observe examples of human use of the natural resources.

The special resource management area (SRMA) would be managed to protect the corridor. Land exchanges and easement acquisitions would be pursued to improve the continuity of the trail where opportunities arise. Kiosks would be erected at each end of the RMPPA portion of the trail to provide information on access to the trail.

The area would be open to oil and gas leasing with intensive management of surface-disturbing and disruptive activities.

North Platte River Area

Access opportunities to the North Platte River would be identified and pursued.

Rawlins OHV Area

The area would be closed to livestock grazing.

National Natural Landmarks

Lands totaling 800 acres in the Big Hollow National Natural Landmark (NNL) and 160 acres in the Sand Creek NNL would be considered for disposal to individuals, organizations, agencies, or institutions that would manage these areas in accordance with their NNL status (Map 2-18).

Encampment River Potential Wild and Scenic River

The Encampment River Potential Wild and Scenic River (WSR) (Map 2-19) would be managed to maintain or enhance the outstanding remarkable values and classification (Wild) (Appendix 3). This WSR falls entirely within the Encampment River WSA, which constrains the development of alternative interim management prescriptions. Interim management actions for the Encampment River that are common to all alternatives include—

- Temporary cultural and paleontological activities would be allowed on the public lands.
- Public lands would be closed to oil and gas leasing, and closed to locatable mineral entry and operation of the public land laws including sale. Withdrawals would be pursued.
- Public lands would be closed to recreational dredging, and to surface-disturbing and disruptive activities such as major recreational developments, ROWs. Some minor recreational developments such as hiking trails and signs would be allowed.
- Public lands would be closed to development of water impoundments, diversions, or hydroelectric power facilities.
- Public lands would be closed to motorized vehicles. Nonmotorized vehicles, e.g., bicycles, wheelchairs, game carts, would be restricted to existing trails.
- Public lands would be closed to commercial timber harvest.
- Range improvements and increases in grazing preference would not be allowed.
- Public lands would be managed as Visual Resource Management (VRM) Class I. The area would be designated an AMR fire suppression area.

2.3.12 Transportation and Access

The public land transportation system would be maintained or modified to provide for public health and safety and adequate access to public lands.

2.3.13 Vegetation

Under all alternatives, forage allocation on acquired lands would be consistent with the purpose of the acquisition and multiple-use objectives for the area.

Aspen stands would be managed to increase distribution and improve seral structure.

All forms of control for noxious and invasive weeds and pests would be allowed in the RMPPA on a case-by-case basis.

Special Status Plant Species and Habitat

Populations of special status species would be fenced to protect them from grazing, trailing, or other disturbance where needed. Known populations of special status plant species would be closed to locatable mineral entry and operation of the public land laws, including sale. Withdrawal would be pursued.

Known habitat for BLM Wyoming State sensitive plant species would be open to oil and gas leasing with intensive management of surface-disturbing and disruptive activities.

The fenced Gibben's beardtongue (*Penstemon gibbensii*) site (approximately 15 acres) would be maintained to protect the population from disturbance.

In unique plant communities, such as the Muddy Gap Cushion Plant Community area, notices would be required for locatable mineral exploration and development (except casual use) consistent with regulations. Intensive management actions would be taken to protect the unique plant communities where necessary. Unique plant communities would be closed to mineral material disposals.

Informal conferencing and consultation with the U.S. Fish and Wildlife Service (FWS) would occur for authorized activities that would potentially affect the habitat for endangered, threatened, proposed, and candidate plant species within the RMPPA (Appendix 10). The Statewide Programmatic Biological Assessments and Biological Opinions authorized for each plant species, including all the reasonable and prudent measures and terms and conditions would be implemented within the RMPPA.

2.3.14 Water Quality, Watershed, and Soils Management

Activities that would cause new water depletion within the Colorado River system would comply with the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin (Appendix 11). Activities that would cause existing or new water depletion within the North Platte River system would comply with Intra-Service Consultations covering the recovery of endangered species in the Platte River (Appendix 11).

Intensive management of surface-disturbing and disruptive activities would be implemented in watersheds contributing to water bodies listed on the state's 303d list of water bodies with water quality impairments or threats.

Surface Disturbance and Permanent Structures in Waterways

Linear crossings, such as pipelines, utilities, or roads across waterbodies, wetlands, and/or ephemeral channels, would be considered on a case-by-case basis with intensive management to protect the above areas. Surface-disturbing activities would be avoided on unstable areas, such as landslides, slumps, and areas exhibiting soil creep.

Muddy Creek Watershed (USGS HUC 14050004)

Surface-disturbing activities would be intensively managed within those portions of the Muddy Creek drainage that contribute to degradation of reaches previously or currently listed on the 303d list (Map 2-20).

Sage Creek Watershed (USGS HUC 101800209)

Sage Creek Watershed, USGS HUC 101800209, is listed on the state 303d list for sediment contribution to the North Platte River. Surface-disturbing activities, vegetation treatments, and grazing management actions would be intensively managed to reduce sediment loading to the North Platte River (Map 2-20).

2.3.15 Wild Horses

Periodic (rather than annual) gathers will be the primary tools for population management in the Lost Creek, Adobe Town, and Stewart Creek HMAs.

Appendix 12 contains a detailed description of the development, application, and interpretation of appropriate management levels (AML) for the Rawlins HMAs. The AML for the Adobe Town HMA would remain at 700 adults; the AML for the Stewart Creek HMA would remain at 150 adults. These AMLs could change based on future monitoring.

2.3.16 Wildlife and Fisheries

BLM would cooperate with the Wyoming Game and Fish Department (WGFD) in considering and planning for the introduction, transplant, reestablishment, augmentation, and/or stocking of wildlife and fish species for nonthreatened and nonendangered species. BLM would also cooperate with the FWS and WGFD in considering and planning for the introduction, transplant, reestablishment, augmentation, and/or stocking of wildlife and fish species for threatened and endangered species.

Surface-disturbing and other activities would be intensively managed in all raptor concentration areas (RCA) to reduce physical disturbance of raptor habitat and disturbance to the birds. This would entail a case-by-case examination of proposals to determine potential effects and appropriate mitigation to minimize those effects.

Best management practices (BMP) (Appendix 13) would be applied to surface-disturbing and disruptive activities to maintain or enhance wildlife species and their habitats.

Endangered (E), Threatened (T), Proposed (P), and Candidate (C) Species

Informal conferencing and consultation with the U.S. FWS would occur for authorized activities that would potentially affect the habitat for endangered, threatened, proposed, and candidate species within the RMPPA (Appendix 10). The Statewide Programmatic Biological Assessments and Biological Opinions authorized for each species, including all the reasonable and prudent measures and terms and conditions would be implemented for the RMPPA.

Threatened and endangered, candidate, and proposed species and habitat conservation measures identified in the biological assessment (BLM 2004b) will be adhered to for compliance with the Endangered Species Act (Appendix 14). These measures would be applied to all surface-disturbing and disruptive activities, as appropriate, to ensure compliance with Section 9 of the Endangered Species Act. The biological assessment for the RMP contains additional supporting information and rationale for the conservation measures. Some of these conservation measures are described in Appendix 14.

Other Special Status Species

Surface-disturbing and disruptive activities that would potentially affect the habitat of other special status species would be considered on a case-by-case basis (Appendices 1 and 15).

Surface-disturbing and disruptive activities located in potential mountain plover habitat are prohibited during the reproductive period of April 10 to July 10 for the protection of breeding and nesting mountain plover. Additional protection measures would be applied if this area were later determined to be within occupied habitat (Appendix 16). Occupied habitat is defined as areas where broods and adults have been found in the current year or documented in at least 2 of the past 5 years.

2.4 Alternative 1: No Action—Continuation of Existing Management

Alternative 1 is defined as a continuation of the current management direction. Ongoing programs initiated under existing legislation and regulations in the Great Divide RMP would continue. Thus, Alternative 1 describes the current resource and land use management direction in the RMPPA. Alternative 1 and its impact analysis represent the baseline to which the other management alternatives and their associated analyses are compared. Management actions proposed under Alternative 1 are presented in Table 2-1.

2.5 Alternative 2: Emphasis on Development of Resources

Alternative 2 provides expanded opportunities to use and develop resources found within the RMPPA. This alternative emphasizes development and intensive management, while placing less emphasis on environmental protection. Resources would be protected to the extent required by applicable laws and regulations. Development and activities would occur throughout the RMPPA as proposed through management actions consistent with existing BLM guidelines. Management actions proposed under Alternative 2 are presented in Table 2-1.

2.6 Alternative 3: Emphasis on Protection of Resources

Alternative 3 changes the mix of opportunities to use, develop, and manage resources. The alternative emphasizes the improvement and protection of habitat for wildlife and sensitive plant and animal species; improvement of riparian areas and water quality; preservation of the unique genetic phenotypes in the Lost Creek HMA; and protection of historic and cultural sites. Development of resources within the RMPPA would occur with intensive management of surface-disturbing and disruptive activities. Management actions proposed under Alternative 3 are presented in Table 2-1.

2.7 Alternative 4: Preferred Alternative

The Preferred Alternative provides a balance of providing opportunities to use and develop resources within the RMPPA while ensuring environmental conservation. The preferred alternative provides the guidance that emphasizes both resource use and resource protection. This balanced alternative best meets the issues and concerns raised during scoping. The preferred alternative represents the management actions recommended by the Field Manager to the State Director as the actions that best resolve planning issues within the RMPPA and that best promote balanced multiple-use objectives. Management actions proposed under the Preferred Alternative are presented in Table 2-1.

2.8 Comparative Summary of Impacts

Table 2-4 at the end of this chapter, provides a summary of the impacts of management actions proposed under each alternative, organized by resource or resource management program. The environmental consequences of the management actions proposed under each alternative are analyzed in Chapter 4.

2.9 MONITORING AND EVALUATION PLAN AND ACTIVITY PLAN WORKING GROUPS

2.9.1 Monitoring and Evaluation Plan

Management actions identified for the Rawlins RMPPA are based on studies and the best scientific and commercial information available. However, conditions may change during the term (20 years) of the land use plan. Experience has shown that implemented management actions can be improved, as new technology and new information become available. It is also possible that changes in land use will require a different management action to protect the resources. To address the changing conditions and provide management flexibility using BMP, the RFO will monitor and evaluate the approved plan using a process that provides the optimum means of checking the effectiveness of management actions. This process will measure the effectiveness of existing actions by monitoring these actions and applying the results of new scientific research. To do this, the process will analyze the current resource conditions resulting from implemented actions and identify and recommend alternatives or modified actions, as necessary, to reach established objectives and goals. Because capability to conduct the process at the optimum level can vary from year to year, the actions to be monitored will be prioritized.

Appendix 17 presents a description of the monitoring and evaluation plan to be implemented.

2.9.2 Activity Plan Working Groups

RMP decisions establish goals, objectives, and management actions for activities on public lands. Standard or BMP are identified in land use plans. Activity-level actions include implementation plans and analyses such as Allotment or Habitat Management Plans, Oil and Gas Field Development Plans, Recreation Management Plans, and Coordinated Activity Plans. These activity-level plans evaluate the sufficiency of RMP decisions and standard practices. They analyze the need to modify existing decisions and practices in light of proposed or projected resource use or activity.

BLM supports the formation of APWGs when circumstances dictate. Potential cooperating agencies in these working groups could assist BLM in the preparation of environmental analyses for activity-level actions or modifications to current plans. BLM or potential cooperating agencies may identify the need for activity planning and the associated APWG formation. This approach is similar to the process used by BLM and its cooperating agencies to develop this RMP.

The objectives of APWGs are to—

- Minimize controversy by being proactive rather than reactive to public land use and resource conflicts
- Provide effective and cost-efficient, consensus-based mitigation of resource conflicts
- Improve resource conditions by recommending practices and mitigation measures appropriate to special situations
- Streamline public land authorizations, increase implementation flexibility, and notify public land users of required practices.

The recommendation to establish an APGW commits BLM to meet with potential cooperating agencies prior to scoping for major activity plans or RMP amendments to establish the level and extent of the involvement of APGWs. Examples of issues potentially requiring formation of an APGW include—

- OHV use escalating to a significant issue
- Activity level approaching that contained in the impact analyses made from reasonable foreseeable actions in an RMP or previous activity plan analysis
- Proposals for oil and gas surface location densities or acres disturbed above a certain amount per unit area
- Identification of the need to prepare a Recreation Management Activity Plan
- Significant change to assumptions used for impact analysis in an RMP.

Examples of resource locations or management situations in which activity or use may trigger working group formation include:

- Where crucial or important wildlife habitats overlap with areas of high potential for surface disturbance (e.g., where WGFD has identified crucial deer winter range or other important habitats and high intensity oil and gas development areas overlap)
- Wildland urban interfaces
- Where two or more resources of interest to cooperating agencies are in conflict (e.g., significant surface disturbance in identified habitat for threatened and endangered or state sensitive species).

When an APWG is convened, objectives include—

- Establishing working group membership and organization. Examples of existing working groups are found in the Continental Divide/Wamsutter II Wildlife Protection Plan (ROD, page 15 and App. D, May 2000) or the Powder River Basin Interagency Work Groups (ROD, page 11, April 2003).
- Identifying issues, practices, and management actions the working group should address.
- Establishing mechanisms and processes for communicating recommendations to BLM.
- Identifying public involvement and notification needs associated with working group activities.

Other attributes and functions of APWGs are—

- APWGs will be specific to the activity plan.
- APWGs will provide suggestions and recommendations to BLM for evaluating mitigation, reclamation, and habitat management practices (e.g., off-site mitigation, compensation mitigation, and a mitigation account, in addition to specific practices [Appendix 18]).

Table 2-1. Summary Comparison of Alternatives

AIR QUALITY			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals			
To maintain or enhance air quality levels and, within the scope of BLM's authority, minimize emissions that may add to acid rain, cause violations of air quality standards, or degraded visibility.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To protect public health and safety and the well being of sensitive natural resources.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions			
Management actions for air quality management are common to all alternatives because of specific limitations on management of resources (e.g., various laws and regulations) that guided the development of the management alternatives. Management actions common to all alternatives are presented in Section 2.3.			

CULTURAL RESOURCES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals			
To ensure opportunities for scientific, educational, recreational, and traditional uses of cultural resources by present and future generations.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To resolve conflicts between cultural resources and other resource values and land use activities.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To design cultural resource management actions to maintain the value appropriate to each cultural resource.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

CULTURAL RESOURCES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Actions by Alternative			
Land acquisitions would be pursued to preserve cultural resources, as appropriate.	Land acquisitions would be considered to preserve cultural resources, on a case-by-case basis as opportunities arise.	Same as Alternative 1.	Same as Alternative 1.
An area within ¼ mile of a cultural property or the visual horizon, whichever is closer, would be an avoidance area for surface disturbing and disruptive activities, if the setting contributes to NRHP eligibility (Appendix 5).	Same as Alternative 1.	Surface disturbing activities would not be allowed within ¼ mile of a cultural property or the visual horizon, whichever is closer, if the setting contributes to NRHP eligibility (Appendix 5).	Same as Alternative 3.

FIRE AND FUELS MANAGEMENT			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals			
To protect human life, property, communities at risk, and other communities and enhance and protect the public land resources through fuels management, AMR, and use of wildland fire for resource benefit.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To complement and support state and local wildland fire actions through AMR and use of wildland fire for resource benefit.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To manage fire to restore natural ecosystem functions, reduce losses from catastrophic wildland fire, and protect multiple-use values.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

FIRE AND FUELS MANAGEMENT			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Actions by Alternative			
Note: This section of the table presents actions for the management of wildland fire. Vegetation treatment actions are located in the Vegetation section of this table.			
Wildland fire suppression activities in the entire RMPPA would be managed for AMR. Wildland fire for resource benefit would be used to protect, maintain, and enhance resources and, as nearly as possible, allow fire to function in its natural ecological role. Use of wildland fire would be based on the current Federal Wildland Fire Management Policy and the Southern Wyoming Zone Fire Management Plan.	With the exception of some SMAs (see Map 2-1 and SMA section of this table), emphasis would be placed on the suppression of all wildfires, regardless of ignition source.	With the exception of WUIs, some ACECs, and other SMAs, the use of wildland fire for resource benefit would be emphasized for all natural ignitions.	Same as Alternative 1.

FORESTRY			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals			
To enhance ecological health and productivity and the species diversity of the forestlands through forest management practices.	To enhance health and productivity of the commercial forestlands through forest management practices.	To allow forest succession to occur with minimal human intervention that would comply with the Healthy Forest Initiative.	Same as Alternative 1.
Management Actions by Alternative			
All forests and woodlands in the Resource Management Plan Planning Area (RMPPA) (111,400 acres) would be managed to meet forest health objectives.	Same as Alternative 1.	Forest health goals would be met only through management actions designed to promote forest health.	Same as Alternative 1.
Forests and woodlands would be managed using natural processes; prescribed fire; and chemical, mechanical, and biological treatments (Appendix 19).	Forests and woodlands would be managed using prescribed fire, and chemical, mechanical, and biological treatments (Appendix 19).	Forests and woodlands would be managed with emphasis on natural processes (Appendix 19).	Same as Alternative 1.

FORESTRY			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
About 25,900 acres of commercial forest in the RMPPA would be available for commercial timber harvest.	Same as Alternative 1.	No forestlands would be available for commercial timber harvests; management actions on 25,900 acres of commercial forestlands would be allowed to enhance forest health and meet public demand for minor wood products.	About 19,200 acres of commercial forest in the RMPPA would be available for commercial timber harvest.
Of the 25,900 acres, about 6,700 acres have steep slopes and riparian areas and associated buffer zones, which would require that additional restrictions and/or mitigation measures be applied to timber harvest actions in these areas.	Same as Alternative 1.	Forestlands would be available for management actions designed to promote forest health.	About 6,700 acres of steep slopes and riparian areas and their associated buffer zones would not be available for commercial timber harvest.

LANDS AND REALTY			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals			
To support the goals and objectives of other resource programs for managing BLM-administered public lands and to respond to public demand for land use authorizations.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To improve management efficiency in areas of scattered or intermingled land ownership patterns and to respond to community needs for expansion and economic development.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

LANDS AND REALTY			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Actions by Alternative			
Withdrawals			
Proposed withdrawals of about 7,660 acres would be pursued. These areas would be closed to operation of the public land laws, including disposal, and to mineral location under the mining laws (Table 2-2).	Proposed withdrawals of about 8,390 acres would be pursued. These areas would be closed to operation of the public land laws, including disposal, and to mineral location under the mining laws (Table 2-2).	Proposed withdrawals of about 272,350 acres would be pursued. These areas would be closed to operation of the public land laws, including disposal, and to mineral location under the mining laws (Table 2-2).	Proposed withdrawals of about 14,450 acres would be pursued. These areas would be closed to operation of the public land laws, including disposal, and to mineral location under the mining laws (Table 2-2).
Land Tenure Adjustment			
About 61,010 acres of BLM-administered public lands would meet the FLPMA disposal criteria and would be available for consideration for disposal (Maps 2-22 through 2-25 and Appendix 6).	About 46,230 acres of BLM-administered public lands meet the FLPMA disposal criteria and would be available for consideration for disposal (Maps 2-26 through 2-29 and Appendix 6).	No specific tracts would be considered for disposal.	Same as Alternative 2.
Before taking any disposal action, consideration would be given to each individual tract and would include public involvement (Appendix 6).	Same as Alternative 1.	No specific tracts would be considered for disposal.	Same as Alternative 1.
The preferred method of disposal, consolidation, or acquisition of lands by BLM would be through exchange.	There would be no preferred method of disposal.	No specific tracts would be considered for disposal.	Same as Alternative 1.
Energy Development and Exploration Management Actions			
The area within ¼ mile of the incorporated boundaries of all cities/towns (1,500 total acres) would be open to oil and gas leasing with intensive management.	Same as Alternative 1.	The area within ½ mile of the incorporated boundaries of all cities/towns (4,500 total acres) would be open to oil and gas leasing with an NSO stipulation.	The area within ¼ mile of the incorporated boundaries of all cities/towns (1,500 acres) would be open to oil and gas leasing with an NSO stipulation. Existing oil and gas leases would be intensively managed.

LANDS AND REALTY			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
The area within ¼ mile of the incorporated boundaries of all cities/towns (1,500 total acres) would be open to locatable mineral entry, mineral material disposals, and operation of the applicable public land laws, including sale, with intensive surface management.	Same as Alternative 1.	The area within ½ mile of the incorporated boundaries of all cities/towns (4,500 total acres) would be closed to locatable mineral entry and mineral material disposals. Withdrawals would be pursued.	The area within ¼ mile of the incorporated boundaries of all cities/towns (1,500 acres) would be closed to locatable mineral entry and mineral material disposals. Withdrawals would be pursued.
Alternative Energy Development–Wind Energy Resources Management Actions			
Wind energy development would not be allowed in avoidance areas identified on Map 2-30.	Wind energy development would not be allowed in avoidance areas identified on Map 2-31.	Wind energy development would not be allowed in avoidance areas identified on Map 2-32.	Wind energy development would not be allowed in avoidance areas identified on Map 2-33.
Utility/Transportation Systems Management Actions			
Areas with important resource values would be avoided where possible in planning for new facility placement. If it becomes necessary for facilities (i.e., linear ROWs) to be placed within avoidance areas, effects would be intensively managed (Table 2-5 at the end of this chapter). Avoidance areas are identified on Map 2-30.	Same as Alternative 1, except as indicated by avoidance and exclusion areas (Table 2-5 at the end of this chapter). Avoidance areas are identified on Map 2-31.	Areas with important resource values would be closed to new facility placement and routes (Table 2-5 at the end of this chapter). Avoidance areas are identified on Map 2-32.	Same as Alternative 1.
Communication Sites Management Actions			
Location of new communication sites would be evaluated on a case-by-case basis.	Same as Alternative 1.	BLM would require co-location of communication sites and would restrict new cell towers or communication sites to existing, designated communication sites.	Same as Alternative 1.
Areas with important resource values would be avoided where possible in planning for new facility placement and routes. If it becomes necessary for facilities to be placed within avoidance areas, effects would be intensively managed.	Same as Alternative 1.	Avoidance and exclusion areas identified in Table 2-5 would be closed to new facility placement and routes.	Same as Alternative 1.

LIVESTOCK GRAZING			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goal by Alternative			
To enhance livestock grazing while maintaining a balance between other economic uses and wildlife habitat and watershed and riparian areas while maintaining or improving range condition.	Same as Alternative 1.	To maintain livestock grazing and a balance between other economic uses and wildlife habitat and watershed and riparian areas while maintaining or improving range condition.	Livestock grazing will be managed in a compatible balance with other economic uses, wildlife habitat, and watershed and riparian areas while maintaining or improving range condition and achieving rangeland standards.
Management Actions by Alternative			
General			
BLM would work closely with operators to determine the most appropriate methods for achieving the Standards.	Same as Alternative 1.	BLM would work closely with operators to determine the most appropriate methods for achieving the Standards and desired plant community (DPC).	Same as Alternative 3.
Grazing systems and range improvements would be designed to achieve the management goals for livestock grazing, and would serve as the primary means of improving or maintaining desired range conditions.	Grazing systems and range improvements would be implemented to maximize livestock production while maintaining other resource values.	Grazing systems and range improvements would be implemented to enhance wildlife, watershed, and riparian values while reducing livestock conflicts with other resources.	Grazing systems and range improvements would be designed to achieve and maintain healthy rangelands.
Changes in class of livestock within HMAs would be considered.	Same as Alternative 1.	Changes in class of livestock within HMAs that would benefit the primary purpose for the management of wild horses would be considered.	Changes in class of livestock within HMAs that would not impair management of wild horses would be considered.
Conversions from cattle or sheep to domestic bison would be considered in all areas.	Same as Alternative 1.	Conversions from cattle or sheep to domestic bison would not be allowed in areas of blocked federal surface land ownership (Map 2-34).	Same as Alternative 3.
Vacant Grazing Allotments			
Livestock grazing use on public lands in vacant grazing allotments is a discretionary action. The following area, as identified in the SMA section, would be recognized as a vacant allotment and would be grazed only on a temporary, non-renewable basis:	Same as Alternative 1.	Livestock grazing use on public lands in vacant grazing allotments is a discretionary action. The following areas, as identified in the SMA section, would be recognized as vacant allotments and would be grazed only on a temporary, non-renewable basis:	Same as Alternative 3.

LIVESTOCK GRAZING			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
• High Savery		• Chain Lakes • Pennock • High Savery Allotments may be added or removed from this list as the situation warrants.	
Fences			
New fence construction would be authorized according to BLM standards. Existing fences would be modified according to current BLM standards where needed or as older fences are reconstructed (Appendix 19).	Same as Alternative 1.	New fence construction would be authorized according to BLM standards. Existing fences would be modified according to current BLM standards (Appendix 19).	Same as Alternative 1.
No similar action.	No similar action.	In those areas where BLM standard fence is not adequate to control domestic sheep use, herding would be required.	Same as Alternative 3.

MINERALS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To provide opportunities for leasing, exploration, and development of minerals and oil and gas while protecting other resource values.	Emphasize leasing, exploration, and development of minerals and oil and gas while maintaining other resource values to the extent possible.	Provide opportunities for leasing, exploration, and development of minerals and oil and gas while providing enhanced protection for other resource values.	Same as Alternative 1.
Management Actions by Alternative			
Oil and Gas			
Oil and Gas Classification A. Areas open to leasing, subject to the terms and conditions of the standard lease form.			
857,040 acres of federal oil and gas leasable lands, presented on Map 2-35, would be open to leasing consideration and subject to standard lease stipulations (Appendix 20).	1,382,470 acres of federal oil and gas leasable lands, presented in Map 2-36, would be open to leasing consideration and subject to standard lease stipulations (Appendix 20).	642,100 acres of federal oil and gas leasable lands, presented in Map 2-37, would be open to leasing consideration and subject to standard lease stipulations (Appendix 20).	853,690 acres of federal oil and gas leasable lands, presented on Map 2-38, would be open to leasing consideration and subject to standard lease stipulations (Appendix 20).

MINERALS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Oil and Gas Classification B. Areas open to leasing, subject to minor constraints such as seasonal restrictions. These are areas where it has been determined that moderately restrictive lease stipulations may be required to mitigate impacts on other land uses or resource values.			
3,321,600 acres of federal oil and gas leasable lands, presented in Map 2-35, would be open to leasing consideration and subject to lease stipulations, such as seasonal restrictions.	2,880,710 acres of federal oil and gas leasable lands, presented in Map 2-36, would be open to leasing consideration and subject to lease stipulations, such as seasonal restrictions (i.e., Endangered Species Act [ESA] and Migratory Bird Treaty Act [MBTA] species).	2,407,810 acres of federal oil and gas leasable lands, presented in Map 2-37, would be open to leasing consideration and subject to lease stipulations, such as seasonal restrictions.	3,279,670 acres of federal oil and gas leasable lands, presented in Map 2-38, would be open to leasing consideration and subject to lease stipulations, such as seasonal restrictions.
Oil and Gas Classification C. Areas open to leasing, subject to major constraints such as NSO stipulations on an area more than 40 acres or more than 1/4 mile wide. In these areas, it has been determined that highly restrictive lease stipulations are required to mitigate impacts on other lands or resource values. This category also includes areas where overlapping minor constraints would severely limit development of fluid mineral resources.			
343,140 acres of federal oil and gas leasable lands, presented in Map 2-35, would be open to leasing consideration and subject to lease stipulations such as NSO.	258,110 acres of federal oil and gas leasable lands, presented in Map 2-36, would be open to leasing consideration and subject to lease stipulations such as NSO.	1,417,630 acres of federal oil and gas leasable lands, presented in Map 2-37, would be open to leasing consideration and subject to lease stipulations such as NSO.	377,590 acres of federal oil and gas leasable lands, presented in Map 2-38, would be open to leasing consideration and subject to lease stipulations such as NSO.
Oil and Gas Classification D. Areas closed to leasing. These are areas where it has been determined that other land uses or resource values cannot be adequately protected with even the most restrictive lease stipulations; appropriate protection can be ensured only by closing the lands to leasing.			
66,120 acres of federal oil and gas leasable lands, presented in Map 2-35, would be closed to leasing.	66,610 acres of federal oil and gas leasable lands, presented in Map 2-36, would be closed to leasing.	120,360 acres of federal oil and gas leasable lands, presented in Map 2-37, would be closed to leasing.	76,950 acres of federal oil and gas leasable lands, presented in Map 2-38, would be closed to leasing.
General Protection Requirements			
Surface disturbing activities would be intensively managed. Leases would be issued with stipulations to protect resource values. Oil and gas stipulations for each oil and gas classification are presented in Table 2-6 at the end of this chapter (Map 2-35).	Surface disturbing activities would be intensively managed. Leases would be issued with stipulations to protect resource values. Oil and gas stipulations for each oil and gas classification are presented in Table 2-6 at the end of this chapter (Map 2-36).	Surface disturbing activities would be intensively managed. Leases would be issued with stipulations to protect resource values. Oil and gas stipulations for each oil and gas classification are presented in Table 2-6 at the end of this chapter (Map 2-37).	Surface disturbing activities would be intensively managed. Leases would be issued with stipulations to protect resource values. Oil and gas stipulations for each oil and gas classification are presented in Table 2-6 at the end of this chapter (Map 2-38).
Locatable Minerals			
About 7,660 acres would be withdrawn from locatable mineral entry under proposed withdrawals (Table 2-2 and Map 2-4).	About 8,390 acres would be withdrawn from locatable mineral entry under proposed withdrawals (Table 2-2 and Map 2-39).	About 272,350 acres would be withdrawn from locatable mineral entry under proposed withdrawals (Table 2-2 and Map 2-40).	About 14,450 acres would be withdrawn from locatable mineral entry under proposed withdrawals (Table 2-2 and Map 2-41).

MINERALS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Plans of operation would be required for locatable minerals activities that would cause surface disturbance (except casual use) regardless of the size of the disturbance for the following ACECs (Map 2-7): Como Bluff ACEC 1,690 ac Sand Hills ACEC 7,960 ac Jep Canyon ACEC 13,810 ac Shamrock Hills ACEC 18,400 ac	No similar action.	Plans of operation would be required for locatable minerals activities that would cause surface disturbance (except casual use) regardless of the size of the disturbance for the following ACECs (Map 2-8): Historic Trails 66,260 ac	Plans of operation would be required for locatable minerals activities that would cause surface disturbance (except casual use) regardless of the size of the disturbance for the following ACECs (Map 2-9): Sand Hills ACEC 12,700 ac

OFF-HIGHWAY VEHICLE USE			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To ensure the continued availability of OHV opportunities, to meet legal requirements for the health and safety of visitors, and to mitigate conflicts with other resource uses.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To provide opportunities for motorized recreation experiences while protecting other resources from excessive disturbance, road/route/trail proliferation, and human encroachment.	Same as Alternative 1.	To provide more regulated opportunities for motorized recreation experiences while enhancing protection of other resources from excessive disturbance, road/route/trail proliferation, and human encroachment.	Same as Alternative 3.
To allow OHV use where possible and provide adequate protection to identified sensitive resources.	Same as Alternative 1.	To allow legitimate OHV use where possible and provide additional protection to identified sensitive resources.	Same as Alternative 3.

OFF-HIGHWAY VEHICLE USE			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Actions by Alternative			
Motorized Vehicle Use			
Motorized vehicle use in the Dune Ponds Cooperative Management Area (3,730 acres) would be limited to existing roads and vehicle routes on vegetated portions of the area. The nonvegetated sand areas of the active dunes would be open to OHV use.	Same as Alternative 1.	The entire Dune Ponds Cooperative Management Area (3,730 acres) would be closed to OHV use.	Same as Alternative 1.
OHV use to retrieve big game kills would be allowed off existing roads and vehicle routes.	Same as Alternative 1.	OHV use to retrieve big game kills would be limited to roads and vehicle routes, except where roads and vehicle routes are closed.	OHV use to retrieve big game kills would be allowed within 300 feet of existing roads and vehicle routes, except where roads and vehicle routes are closed.
OHV use to access camping sites would be allowed off existing roads and vehicle routes.	Same as Alternative 1.	OHV use to access camping sites would be limited to roads and vehicle routes, except where roads and vehicle routes are closed.	OHV use to access camping sites would be limited to within 300 feet of existing roads and vehicle routes, except where roads and vehicle routes are closed.
3,730 acres would be open to OHV use (Map 2-5 and Appendix 21). 2,222,330 acres would be limited to either designated or existing roads and vehicle routes. 1,284,490 acres would be limited to existing roads and vehicle routes (within the checkerboard or other intermixed landownership areas). 23,020 acres would be closed to OHV use.	4,210 acres would be open to OHV use (Map 2-42 and Appendix 21). 2,221,981 acres would be limited to either designated or existing roads and vehicle routes. 1,284,970 acres would be limited to existing roads and vehicle routes (within the checkerboard or other intermixed landownership areas). 23,020 acres would be closed to OHV use.	No areas would be designated as open to OHV use (Map 2-43 and Appendix 21). 2,167,290 acres would be limited to either designated or existing roads and vehicle routes. 1,284,970 acres would be limited to existing roads and vehicle routes (within the checkerboard or other intermixed landownership areas). 71,980 acres would be closed to OHV use.	3,730 acres would be open to OHV use (Map 2-44 and Appendix 21). 2,201,510 acres would be limited to either designated or existing roads and vehicle routes. 1,284,970 acres would be limited to existing roads and vehicle routes (within the checkerboard or other intermixed landownership areas). 34,030 acres would be closed to OHV use.
No similar action.	No similar action.	13,180 acres would be limited to designated roads and vehicle routes and closed to over-the-snow vehicles (Map 2-43 and Appendix 21).	13,180 acres would be limited to designated roads and vehicle routes and closed to over-the-snow vehicles (Map 2-44 and Appendix 21).

OFF-HIGHWAY VEHICLE USE			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
17,910 acres would be seasonally closed to OHV use (Map 2-5 and Appendix 21).	Same as Alternative 1 (Map 2-42 and Appendix 21).	14,060 acres would be seasonally closed to OHV use (Map 2-43 and Appendix 21).	Same as Alternative 3 (Map 2-44 and Appendix 21).
Road densities would not be restricted.	Same as Alternative 1.	Road densities would not be allowed to exceed levels that diminish or adversely affect other resources or resource values.	Road density would be considered during the analysis process and authorization of surface disturbing and disruptive activities.

PALEONTOLOGY			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To maintain the integrity of the scientific value of paleontological resources.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions Note: This section of the table presents actions for the management of paleontological resources. Management actions for the Como Bluff ACEC are located in the SMA section of this table.			
Management actions for paleontology are common to all alternatives because of specific limitations on management of resources (e.g., various laws and regulations) that guided the development of the management alternatives. Management actions common to all alternatives are presented in Section 2.3.			

RECREATION RESOURCES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To ensure the continued availability and accessibility of outdoor recreational opportunities, to meet legal requirements for the health and safety of visitors, and to mitigate conflicts with other resource uses.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

RECREATION RESOURCES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
To manage recreation values to accommodate existing uses, prevent or mitigate environmental degradation resulting from recreation and other uses, and provide for the anticipated recreation uses and use levels in the RMPPA.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
Developed and undeveloped recreation sites (9,660 acres) would be open to oil and gas leasing with an NSO stipulation. Surface disturbance would be intensively managed in the ¼-mile area surrounding these sites (an additional 7,930 acres).	Same as Alternative 1.	Developed and undeveloped recreation sites (9,660 acres) and the surrounding ½-mile area (an additional 15,800 acres) would be open to oil and gas leasing with an NSO stipulation.	Developed and undeveloped recreation sites (9,660 acres) and the surrounding ¼-mile area (an additional 7,930 acres) would be open to oil and gas leasing with an NSO stipulation.
Developed recreation sites (3,480 acres) would be closed to locatable mineral entry, mineral material disposals, and operation of the public land laws, including sale. Withdrawals would be pursued.	Same as Alternative 1.	Developed and undeveloped recreation sites (9,660 acres) would be closed to locatable mineral entry, mineral material disposals, and operation of the public land laws, including sale. Withdrawals would be pursued. Within the ½-mile area surrounding these sites (18,540 additional acres), surface disturbing and disruptive activities would be intensively managed. Buried utilities would be allowed with adequate reclamation of the surface. Above ground facilities would be avoided unless adequately mitigated to protect the recreation site viewshed.	Developed and undeveloped recreation sites (9,660 acres) would be closed to locatable mineral entry, mineral material disposals, and operation of the public land laws, including sale. Withdrawals would be pursued. Within the ¼-mile area surrounding these sites (7,930 additional acres), surface disturbing and disruptive activities would be intensively managed. Buried utilities would be allowed with adequate reclamation of the surface. Above ground facilities would be avoided unless adequately mitigated to protect the recreation site viewshed.
The west end of the Ferris Mountains (5,270 acres) (Map 2-45) would be managed for multiple use.	Same as Alternative 1.	The west end of the Ferris Mountains (5,270 acres) (Map 2-45) would be managed to preserve naturalness and opportunities for primitive and unconfined recreation.	Same as Alternative 3.

RECREATION RESOURCES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
The west end of the Ferris Mountains would be open to operation of public land laws, including sale.	Same as Alternative 1.	The west end of the Ferris Mountains would be closed to operation of the public land laws, including sale. Withdrawals would be pursued.	Same as Alternative 3.
The west end of the Ferris Mountains would be open to locatable mineral entry.	Same as Alternative 1.	The west end of the Ferris Mountains would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 3.
The west end of the Ferris Mountains would be open to mineral material disposals.	Same as Alternative 1.	The west end of the Ferris Mountains would be closed to mineral material disposals.	Same as Alternative 3.
The west end of the Ferris Mountains would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	The west end of the Ferris Mountains would be closed to oil and gas leasing. Surface disturbing activities on existing leases would be intensively managed to preserve naturalness in the area.	Same as Alternative 3.
The west end of the Ferris Mountains would be designated as an AMR fire suppression area.	Same as Alternative 1.	The west end of the Ferris Mountains would be designated as an AMR fire suppression area. Use of heavy equipment in this area would be limited.	Same as Alternative 3.
Off-road vehicular travel for "necessary tasks" would be allowed in the west end of the Ferris Mountains.	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed in the west end of the Ferris Mountains.	Same as Alternative 3.
The Adobe Town fringe areas (31,510) (Map 2-45) would be managed for multiple use.	Same as Alternative 1.	The Adobe Town fringe areas (31,510 acres) (Map 2-45) would be managed to preserve naturalness and opportunities for primitive and unconfined recreation.	Same as Alternative 1.
The Adobe Town fringe areas would be open to operation of public land laws, including sale.	Same as Alternative 1.	The Adobe Town fringe areas would be closed to operation of public land laws, including sale. Withdrawals would be pursued.	Same as Alternative 1.

RECREATION RESOURCES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
The Adobe Town fringe areas would be open to locatable mineral entry.	Same as Alternative 1.	The Adobe Town fringe areas would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 1.
The Adobe Town fringe areas would be open to mineral material disposals.	Same as Alternative 1.	The Adobe Town fringe areas would be closed to mineral material disposals.	Same as Alternative 1.
The Adobe Town fringe areas would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	The Adobe Town fringe areas would be closed to oil and gas leasing. Surface disturbing and disruptive activities on existing leases would be intensively managed to preserve the naturalness of the area.	Same as Alternative 1.
The Adobe Town fringe areas would be designated as an AMR fire suppression area.	Same as Alternative 1.	The Adobe Town fringe areas would be designated as an AMR fire suppression area. Use of heavy equipment in this area would be limited.	Same as Alternative 1.
Off-road vehicular travel for "necessary tasks" would be allowed in the Adobe Town fringe areas.	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed in the Adobe Town fringe areas.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To maintain and protect the integrity of unique resource values, preserve historic significance, and provide opportunity for other uses where appropriate.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Manage WSAs according to the Interim Management Policy for Lands Under Wilderness Review to retain their suitability for designation as wilderness.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
To maintain or enhance the outstandingly remarkable values of waterway segments in the RMPPA that meet the WSR suitability factors until Congress decides whether to include the suitable waterway in the National Wild and Scenic Rivers System (NWSRS).	No similar action.	Same as Alternative 1.	Same as Alternative 1.
Note: A summary of special management designations and the associated acreages by alternative are presented in Table 2-7. Appendix 22 presents an overview of BLM's ACEC designation process.			
Wilderness Study Areas			
Management Actions by Alternative			
Motorized vehicle use in the Adobe Town WSA (34,220 acres) would be limited to designated roads and vehicle routes (Map 2-6).	Same as Alternative 1.	The Adobe Town WSA would be closed to OHV use (34,220 acres) (Map 2-6).	Same as Alternative 1.
The Prospect Mountain (1,150 acres) and Bennett Mountains (5,960 acres) WSAs would be open to all types of motorized use on existing roads and vehicle routes that were present before 1980, when WSAs were established. The Encampment River Canyon WSA (4,510 acres) would be open to all types of motorized use on existing roads and vehicle routes that were present before the establishment of the WSA, from May 1 to November 30, and closed to all motorized vehicles from December 1 to April 30 (Map 2-6).	Same as Alternative 1.	The Prospect Mountain (about 1,150 acres), Encampment River Canyon (about 4,510 acres), and Bennett Mountains (about 5,960 acres) WSAs would be closed to all types of motorized vehicle use (Map 2-6).	Same as Alternative 3.
Management of Areas of Critical Environmental Concern (ACEC)			
Como Bluff ACEC/NNL			
Management Goals by Alternative			
To protect the integrity of the paleontological values and the historical context of the area.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Actions by Alternative			
The Como Bluff NNL/ACEC designation (1,690 acres) (Map 2-7) would be retained.	The Como Bluff ACEC designation would be terminated, and would be managed as a NNL.	Same as Alternative 1.	Same as Alternative 2.
The Como Bluff NNL would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities within ¼ mile of exposures of the Morrison Formation.	The Como Bluff NNL would be open to oil and gas leasing.	The Como Bluff ACEC would be open to oil and gas leasing with an NSO stipulation on new leases. Surface disturbing activities on existing leases would be intensively management.	Same as Alternative 1.
Plans of operations would be required for locatable mineral exploration and development (except casual use), regardless of the number of acres that may be disturbed.	Plans of operations would be required for locatable mineral exploration and development (except casual use) for surface disturbances of five acres or more.	Public lands would be closed to locatable mineral entry and operation of the public land laws, including sale. Withdrawals would be pursued.	Same as Alternative 2.
Those areas open to locatable mineral entry would also be open to mineral material disposals.	Same as Alternative 1.	Those areas closed to locatable mineral entry would also be closed to mineral material disposals.	The area would be open to mineral material disposals.
No similar action.	No similar action.	As opportunities arise, acquisition of adjacent lands or easements to improve public access would be considered and evaluated.	Same as Alternative 3.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed (OHV definition in the Glossary). Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
Sand Hills ACEC and Potential JO Ranch Expansion			
Management Goals by Alternative			
To manage the resources in the Sand Hills ACEC to protect the unique vegetation community complex, to maintain wildlife habitat values, to minimize soil erosion, and to promote recreational opportunities.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
No similar action.	No similar action.	To manage and protect the JO Ranch for historical and cultural values that meets the needs of preserving a cultural way of life in the region from early ranching to the present.	Same as Alternative 3.
Management Actions by Alternative[1]			
The Sand Hills ACEC (Map 2-7, 7,960 acres) designation would be retained.	The Sand Hills ACEC designation would be terminated, and would be managed as a wildlife habitat management area.	Same as Alternative 1.	Same as Alternative 1.
No similar action.	No similar action.	The existing ACEC boundaries would be expanded to include the JO Ranch acquisition (4,740 acres in expansion, for 12,700 total acres) (Map 2-8).	Same as Alternative 3 (Map 2-9).
No similar action.	The JO Ranch buildings and related facilities would not be stabilized. Signs would be placed to allow for the protection of public health and safety.	The JO Ranch buildings and related facilities would be stabilized to protect the integrity of the site and provide for public health and safety.	Same as Alternative 3.
The area would be open to federal oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	The area would be closed to new federal oil and gas leasing. Surface disturbing activities on existing leases would be intensively managed to meet the objectives of the ACEC.	The area would be open to federal oil and gas leasing. Surface disturbing activities on oil and gas leases would be intensively managed to meet the objectives of the ACEC.
Plans of operations would be required for locatable federal mineral exploration and development (except casual use), regardless of the number of acres that may be disturbed.	Plans of operations would be required for locatable federal mineral exploration and development (except casual use), for surface disturbances of five acres or more.	Public lands would be closed to locatable mineral entry and operation of the public land laws, including sale. Withdrawals would be pursued.	Same as Alternative 1.
Those areas open to locatable mineral entry would also be open to mineral material disposals.	Same as Alternative 1.	Those areas closed to locatable mineral entry would also be closed to mineral material disposals.	Same as Alternative 1.

1 The JO Ranch exchange is pending; however, management actions are provided in this plan with the understanding that the exchange will be completed before issuance of the ROD for the Rawlins RMP. If the exchange is not completed by the time the ROD is issued, the ROD would be drafted such that any decisions for the JO Ranch would not take effect until the Pittsburg and Midway Coal Mining Company (P&M) exchange is completed.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
No similar action.	No similar action.	Big game seasonal closures to motor vehicle use would be implemented as needed.	Same as Alternative 3.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed (OHV definition in the Glossary). Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
OHV use in the Sand Hills ACEC would be limited to designated roads and vehicle routes and open to over-the-snow vehicles.	Same as Alternative 1.	OHV use in the Sand Hills/JO Ranch ACEC (12,700 acres) would be limited to designated roads and vehicle routes and closed to over-the-snow vehicles.	Same as Alternative 3.
The unique vegetation complex of the Sand Hills ACEC would be protected from sources of disturbance through intensive management of surface disturbing and disruptive activities. Case-by-case examination of any proposed surface disturbing and disruptive activity would be made to determine potential adverse effects and appropriate mitigation to minimize those effects.	Same as Alternative 1.	Surface disturbing and disruptive activities would be prohibited to protect the vegetation complex of the Sand Hills ACEC, subject to valid existing rights.	Same as Alternative 1.
New fence construction would be authorized to BLM standards. Existing fences would be modified to current BLM standards as needed.	Same as Alternative 1.	To protect big game seasonal migration, no new fences would be authorized. Existing fences would be modified to current BLM standards.	Same as Alternative 1.
No similar action.	No similar action.	The 18 acres that include the JO Ranch buildings and a 2-mile transition zone or the visual horizon, whichever is closer, would be designated as VRM Class II.	Same as Alternative 3.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
The ACEC is designated an AMR area with emphasis on fire suppression.	The Sand Hills area is designated an AMR area with emphasis on fire suppression.	The AMR for fire in the Sand Hills ACEC is to limit the growth potential of wildfires to the smallest possible size. Fuel reduction activities would reduce fire spread through the use of firebreaks along existing roads and vehicle routes.	Same as Alternative 3.
No similar action	No similar action	Turn the historic ranch into an interpretive site exhibiting late 19th century ranching in the area, and the roles of historic roads and vehicle routes throughout the area.	Develop an interpretive program for the JO Ranch.
Jep Canyon ACEC/Jep Canyon Wildlife Habitat Management Area			
Management Goals by Alternative			
To maintain the integrity of crucial winter habitat for elk.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To maintain the productivity of nesting raptor pairs.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To seek the cooperation of owners of adjacent property in management of the habitat.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Jep Canyon ACEC (Map 2-7, 13,810 acres) would be maintained.	The ACEC designation would not be maintained, and would be managed as a wildlife habitat management area.	Same as Alternative 2.	Same as Alternative 2.
The area would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	The area would be closed to new federal oil and gas leasing. Surface disturbing and disruptive activities on existing leases would be intensively managed to meet the objectives of the wildlife habitat management area.	The area would be open to oil and gas leasing. Surface disturbing activities on oil and gas leases would be intensively managed to meet the objectives of the wildlife habitat management area.
Plans of operations would be required for locatable mineral exploration and development (except casual use), regardless of the number of acres that would be disturbed.	Plans of operations would be required for locatable mineral exploration and development (except casual use), for surface disturbance of 5 acres or more.	Public lands would be closed to locatable mineral entry and operation of the public land laws, including sale. Withdrawals would be pursued.	Same as Alternative 2.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Those areas open to locatable mineral entry would also be open to mineral material disposals	Same as Alternative 1.	Those areas closed to locatable mineral entry would also be closed to mineral material disposals.	Same as Alternative 1.
No similar action.	No similar action.	As opportunities arise, acquisition of adjacent lands or easements to improve public access would be considered and evaluated.	Same as Alternative 3.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
In the Jep Canyon ACEC, OHV use would be limited to designated roads and vehicle routes and open to over-the-snow vehicles.	No similar action.	OHV use would be limited to designated roads and vehicle routes and closed to over-the-snow vehicles.	Same as Alternative 3.
Surface disturbance in the aspen communities would be intensively managed. Case-by-case examination of any proposed surface disturbing and disruptive activities would be made to determine potential adverse affects and appropriate mitigation to minimize and or reduce these effects.	No similar action.	Surface disturbance in the aspen communities would be restricted or prohibited through intensive management. Case-by-case examination of any proposed surface disturbing and disruptive activities would be made to determine potential adverse affects and appropriate mitigation to minimize and or reduce these effects.	Surface disturbance in the aspen communities would be intensively managed. Case-by-case examination of any proposed surface disturbing and disruptive activities would be made to determine potential adverse affects and appropriate mitigation to minimize and or reduce these effects. Aspen stands would be managed to increase distribution and improve seral structure.
The ACEC is designated an AMR fire suppression area.	The area is designated an AMR fire suppression area.	Same as Alternative 2.	Public lands within the checkerboard or other intermixed landownership areas would be managed in association with the private and state lands therein. AMR would most often result in suppression activities (Map 2-9).

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Shamrock Hills ACEC			
Management Goals by Alternative			
To protect the concentration of breeding and nesting ferruginous hawk species, as well as other bird species, including the mountain plover, sage sparrow, and Greater sage-grouse.	Same as Alternative 1.	To maintain or improve habitat and protect the concentration of breeding and nesting ferruginous hawk species, as well as other bird species, including the mountain plover, sage sparrow, and Greater sage-grouse.	Same as Alternative 1.
To seek the cooperation of owners of adjacent property in management of the habitat.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Shamrock Hills ACEC (Map 2-7, 18,400 acres) would be maintained.	The ACEC designation would not be maintained, and would be managed as a wildlife habitat management area.	The ACEC designation would not be maintained, and the area would be managed as a raptor concentration area.	Same as Alternative 3.
Plans of operations would be required for locatable mineral exploration and development (except casual use), regardless of the number of acres that may be disturbed.	Plans of operations would be required for locatable mineral exploration and development (except casual use), for surface disturbance of five acres or more.	Public lands would be closed to locatable mineral entry and operation of the public land laws, including sale. Withdrawals would be pursued.	Same as Alternative 2.
Those areas open to locatable mineral entry would also be open to mineral material disposals.	Same as Alternative 1.	Those areas closed to locatable mineral entry would also be closed to mineral material disposals.	The area would be open to mineral material disposals.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
The area is designated an AMR fire suppression area.	Same as Alternative 1.	Same as Alternative 1.	Public lands within the checkerboard or other intermixed landownership areas would be managed in association with the private and state lands therein. AMR would most often result in suppression activities (Map 2-9).

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Stratton Sagebrush Steppe Research Area Potential ACEC			
Management Goals by Alternative			
To protect the integrity of the historic and scientific values in the study area.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Stratton Sagebrush Steppe Research Area Potential ACEC (Map 2-7, 5,530 acres) would continue to be managed to meet demands for research.	The proposed area would be managed as a research area and would not be designated as an ACEC.	The proposed area would be designated an ACEC.	Same as Alternative 2.
The area would be open to oil and gas leasing with a NSO stipulation. Surface disturbing activities on existing leases would be intensively managed.	The area would be open to oil and gas leasing. Operators would be required to submit a management plan to describe how activities would affect research objectives. Mitigation would be required, where necessary, to protect the research area.	The area would be closed to oil and gas leasing. Surface disturbing activities on existing leases would be intensively managed to meet the objectives of the ACEC.	The area would be closed to oil and gas leasing. Surface disturbing activities on existing leases would be intensively managed to meet the objectives of the research area.
Livestock grazing would be managed to meet multiple-use objectives.	Same as Alternative 1.	Livestock grazing would be managed to meet research objectives of the ACEC.	Livestock grazing would be managed to meet objectives of the research area.
The area is designated an AMR fire suppression area.	Same as Alternative 1.	The area is designated an AMR fire suppression area to meet the research objectives of the ACEC.	The area is designated an AMR fire suppression area to meet the research objectives of the research area.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 3.
Chain Lakes Potential ACEC			
Management Goals by Alternative			
To protect the unique, fragile, and rare alkaline desert lake system, which requires additional protection through more intensive management and to maintain wildlife habitat values.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Actions by Alternative			
The Chain Lakes area (Map 2-7, 30,470 acres) would be managed as a wildlife habitat management area.	The Chain Lakes area would not be designated as an ACEC, and would be managed as a wildlife habitat management area.	The Chain Lakes area (Map 2-8, 30,470 acres) would be managed as an ACEC.	Same as Alternative 1.
Public lands would be open to locatable mineral entry and open to operation of public land laws, including sale.	Same Alternative as 1.	Public lands would be closed to locatable mineral entry and operation of the public land laws, including sale. Withdrawals would be pursued.	Same as Alternative 1.
Public lands would be open to mineral materials disposals.	Same as Alternative 1.	Public lands within the ACEC would be closed to mineral material disposals.	Same as Alternative 1.
The area would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	The area would be closed to oil and gas leasing. Surface disturbing activities on existing leases would be intensively managed to meet the objectives of the ACEC.	Same as Alternative 1.
The area is designated an AMR fire suppression area.	Same as Alternative 1.	Same as Alternative 1.	AMR for wildland fire on public lands within the checkerboard or other intermixed landownership areas would be managed in association with the private and state lands therein.
Off-road vehicular travel for "necessary tasks" would be allowed.	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
Livestock would be managed to meet multiple-use objectives.	Same as Alternative 1.	This area would be managed as a vacant allotment (livestock grazing section).	Same as Alternative 3.
No similar action.	No similar action.	Surface disturbing activities within the unique alkaline desert wetland communities would be intensively managed.	Same as Alternative 3.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Laramie Peak Potential ACEC			
Management Goals by Alternative			
To restore, improve and enhance habitat conditions for bighorn sheep and other wildlife species, including crucial winter range habitats for bighorn sheep, elk, and mule deer.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Laramie Peak area (Map 2-7) (18,940 acres) would be managed as a wildlife habitat management area.	The area would not be designated as an ACEC, and would be managed as a wildlife habitat management area.	The Laramie Peak area (Map 2-8)(18,940 acres) would be managed as an ACEC.	Same as Alternative 1.
Public lands would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 1.
Public lands within the area would be open to mineral material disposals.	Same as Alternative 1.	Public lands within the ACEC would be closed to mineral material disposals.	Same as Alternative 1.
Where opportunities arise, land tenure adjustments, including acquisition of lands, easements, or exchange, would be considered to meet the multiple-use objectives.	No similar action.	As opportunities arise, acquisition of adjacent lands or easements to improve public access would be considered and evaluated to meet the objective of the ACEC.	Actively pursue land tenure adjustments, including acquisition of lands, easements, or exchange, to meet the management objective of the wildlife habitat management area.
The area is designated an AMR fire suppression area.	Same as Alternative 1.	Same as Alternative 1.	AMR on the public lands within the intermixed landownership areas would be managed in association with the private and state lands therein.
Off-road vehicular travel for “necessary tasks” would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for “necessary tasks” would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 3.
OHV use would be limited to designated roads and vehicle routes.	OHV use would be limited to existing roads and vehicle routes.	Same as Alternative 1.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Red Rim-Daley Potential ACEC			
Management Goals by Alternative			
To protect crucial winter habitat for pronghorn.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions for the Red Rim-Daley Potential ACEC by Alternative			
The Red Rim-Daley area (Map 2-7, 15,980 acres) would be managed as a wildlife habitat management area.	Same as Alternative 1.	The Red Rim-Daley area (Map 2-8, 15,980 acres) would be managed as an ACEC.	Same as Alternative 1.
Public lands would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 1.
Plans of operations would be required for locatable mineral exploration and development (except casual use), for disturbance of five acres or more.	Same as Alternative 1.	No similar action.	Same as Alternative 1.
Public lands would be open to the operation of public land laws.	Same as Alternative 1.	Public lands would be closed to land tenure adjustments, including sale. Withdrawals would be pursued.	Same as Alternative 1.
No similar action.	No similar action.	Those areas closed to locatable mineral entry would also be closed to mineral material disposals.	No similar action.
No similar action.	No similar action.	As opportunities arise, acquisition of adjacent lands or easements to improve public access would be considered and evaluated.	No similar action.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
The area is designated an AMR fire suppression area.	Same as Alternative 1.	The ACEC is designated an AMR fire suppression area.	AMR for fire on public lands within the checkerboard or other intermixed landownership areas would be managed in association with the private and state lands therein.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Pennock Mountain Wildlife Habitat Management Area			
Management Goals by Alternative			
To protect the crucial winter habitat for elk and mule deer.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Pennock Mountain wildlife habitat management area (7,770 acres) (Map 2-10) would be managed as a wildlife habitat management area and for all other compatible use.	The area would not be designated as an ACEC or a wildlife habitat management area.	Same as Alternative 1.	Same as Alternative 1.
Actively pursue land tenure adjustments including acquisition of lands, easements, or exchange, to meet multiple-use management objectives.	No similar action.	Same as Alternative 1.	Same as Alternative 1.
Public lands would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 1.
Public lands would be open to mineral material disposals.	Same as Alternative 1.	Those areas closed to locatable mineral entry would also be closed to mineral material disposals.	Same as Alternative 1.
Off-road vehicular travel for "necessary tasks" would be allowed.	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
The Pennock Mountain Wildlife Habitat Management Area would be closed to livestock grazing.	The area would be closed to grazing.	This area would be managed as a vacant allotment (livestock grazing section). Livestock grazing would be used as a management tool for the Pennock Mountain cooperative management unit.	Same as Alternative 3.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Wick-Beumee Wildlife Habitat Management Area			
Management Goals by Alternative			
To protect the winter range for elk, quality year-round habitat for wildlife, and public access for quality wildlife experiences.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
Public lands would be open to operation of the public land laws, including sale.	Same as Alternative 1.	Public lands would be closed to operation of the public land laws, including sale. Withdrawals would be pursued.	Public lands would be closed to land tenure adjustments, including sale. Withdrawals would be pursued.
Public lands would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 1.
Public lands would be open to mineral material disposals.	Same as Alternative 1.	Those areas closed to operation of the public land laws would also be closed to mineral material disposals.	Same as Alternative 1.
The area would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	The area would be closed to oil and gas leasing. Surface disturbing and disruptive activities on existing leases would be intensively managed to meet the objectives of the wildlife habitat area.	Same as Alternative 1.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
Surface disturbing activities in aspen communities would be intensively managed.	Same as Alternative 1.	Surface disturbing and disruptive activities in aspen communities would be avoided or prohibited.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Shirley Mountain Caves SRMA/Shirley Mountain Bat Cave Potential ACEC			
Management Goals by Alternative			
To protect the hibernaculum for several bat species located within Cave Creek Cave as well as recreational caving opportunities.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Shirley Mountain Caves SRMA (24,440 acres) (Map 2-14) would be managed to provide for protection and enjoyment of the cave system while other resource uses would be allowed aboveground.	The Shirley Mountain Caves SRMA would not be maintained.	The Shirley Mountain Caves SRMA would not be maintained. The Shirley Mountain Bat Cave area (520 acres) (Map 2-8) would be managed as an ACEC.	The Shirley Mountain Caves SRMA would not be maintained. The Shirley Mountain Bat Cave area (240 acres) (Map 2-9) would be managed as an ACEC.
Timber harvesting would be allowed to meet Healthy Forest Initiative objectives (see the Forest Management section of this table).	Timber harvesting would be intensively managed within ¼ mile of the cave complex to meet bat cave management and Healthy Forest Initiative objectives.	Timber harvesting would not be allowed within ½ mile of the bat cave complex (Cave Creek).	Timber harvesting would not be allowed within ¼ mile of the bat cave complex (Cave Creek).
Public lands would be open to operation of the public land laws, including sale.	Same as Alternative 1.	Public lands would be closed to operation of the public land laws, including sale. Withdrawals would be pursued.	Public lands would be closed to land tenure adjustments, including sale. Withdrawals would be pursued.
Public lands would be open to locatable mineral entry.	Public lands would be closed to locatable mineral entry (240 acres). Withdrawals from locatable mineral entry would be pursued.	Public lands would be closed to locatable mineral entry (520 acres). Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 2.
Public lands would be open to mineral material disposals.	Those areas closed to locatable mineral entry (240 acres) would also be closed to mineral material disposals.	Those areas closed to locatable mineral entry (520 acres) would also be closed to mineral material disposals.	Same as Alternative 2.
The area would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	The area would be closed to oil and gas leasing. Surface disturbing activities on existing leases would be intensively managed to meet the objectives of the ACEC.	The area would be open to oil and gas leasing. Surface disturbing activities would be intensively managed to meet the objectives of the ACEC.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Seasonal closure of the Cave Creek cave gate to human occupancy from November 1 through March 31 for the protection of the bat hibernaculum.	Same as Alternative 1.	Same as Alternative 1.	Seasonal closure of the Cave Creek cave gate to human occupancy from October 15 through April 30 for the protection of the bat hibernaculum.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
The area is designated an AMR fire suppression area.	The area is designated an AMR fire suppression area. Heavy equipment use would be limited in this area.	Same as Alternative 2.	The ACEC is designated an AMR fire suppression area. Heavy equipment use would be limited in this area.
Laramie Plains Lakes Potential ACEC			
Management Goals by Alternative			
To protect potential habitat for the endangered Wyoming toad.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Laramie Plains Lakes area (1,600 acres) would not be designated as an ACEC, and would be managed as wildlife habitat management area.	Same as Alternative 1.	The Laramie Plains Lakes (Map 2-8, 1,600 acres) would be managed as an ACEC.	The Laramie Plains Lakes area (Map 2-13, 1,600 acres) would be managed as a wildlife habitat management area.
Public lands would be open to operation of the public land laws, including sale.	Same as Alternative 1.	Public lands would be closed to operation of the public land laws, including sale. Withdrawals would be pursued.	Public lands would be closed to land tenure adjustments, including sale. Withdrawals would be pursued.
Actively pursue acquisition of lands or easements to enhance access to public lands and/or expand habitat to meet the objectives of the management area.	Acquisition of lands or easements to enhance access to public lands and/or expand habitat would not be pursued.	Actively pursue acquisition of lands or easements to enhance access to public lands and/or expand habitat to meet the objectives of the ACEC.	Same as Alternative 1.
Public lands would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Public lands would be open to mineral material disposals.	Same as Alternative 1.	Public lands would be closed to mineral material disposals.	Public lands would be open to mineral material disposals with avoidance of potential habitat for the endangered Wyoming toad.
The area would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	The area would be closed to oil and gas leasing. Surface disturbing activities on existing leases would be intensively managed to meet the objectives of the wildlife habitat area.	Same as Alternative 1.
The area is designated an AMR fire suppression area.	Same as Alternative 1.	The ACEC is designated an AMR fire suppression area.	Same as Alternative 1.
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 3.
Livestock grazing use would be managed to meet multiple-use objectives.	Same as Alternative 1.	Livestock grazing use would be managed to meet the objectives of the ACEC.	Same as Alternative 1.
Historic Trails (Cherokee, Overland, Rawlins to Baggs, and Rawlins to Fort Washakie) Potential ACEC			
Management Goals by Alternative			
To stabilize and protect significant sites and segments along the trails.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Cherokee and Overland trails area (contributing segments within 41,000 acres of federal land) would be managed for the preservation of historic values.	Same as Alternative 1.	The area within ¼ mile from the edge of the Overland Trail, Cherokee Trail, Rawlins to Baggs Road, and Rawlins to Fort Washakie Road would be designated an ACEC (Map 2-8).	Same as Alternative 1.
An area within ¼ mile or the visual horizon of the trail, whichever is closer, would be an avoidance area for surface disturbing and disruptive activities (Map 2-46).	Same as Alternative 1.	Surface disturbing activities would not be allowed within the ACEC (Map 2-47).	Surface disturbing and disruptive activities would not be allowed within ¼ mile or the visual horizon, whichever is closer, of the historic trails (Map 2-48).

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
An area within ¼ mile or the visual horizon of the trails, whichever is closer, would be open to oil and gas leasing and would be an avoidance area for surface disturbing and disruptive activities.	Same as Alternative 1.	The ACEC would be open to oil and gas leasing with an NSO stipulation. Surface disturbing activities on existing leases would be intensively managed.	An area within ¼ mile or the visual horizon of the trails, whichever is closer, would be open to oil and gas leasing with an NSO stipulation. Surface disturbing and disruptive activities on existing leases would be intensively managed.
Public lands within the historic trails area would be open to locatable mineral entry.	Same as Alternative 1.	Public lands within the ACEC would be closed to locatable mineral entry and operation of the public land laws, including sale. Withdrawals would be pursued.	Public lands within ¼ mile or the visual horizon of the trails, whichever is closer, would be closed to locatable mineral entry and operation of the public land laws (only) within contributing portions of the trails. Public lands within ¼ mile or the visual horizon of the trails, whichever is closer, would be open to locatable mineral entry and operation of the public land laws within noncontributing portions of the trails. Unevaluated portions of the trails would be managed as contributing until cultural resource inventories are conducted and an evaluation is made as to their contributing/non-contributing status (Appendix 5).

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Public lands within the historic trails area would be open to mineral material disposals.	Same as Alternative 1.	Public lands within the ACEC would be closed to mineral material disposals.	Public lands within ¼ mile or the visual horizon, whichever is closer, would be closed to mineral material disposals within contributing portions of the trails. Public lands within ¼ mile of the visual horizon of the trails, whichever is closer, would be open to mineral material disposals within the noncontributing portions of the trails. Unevaluated portions of the trails would be managed as contributing until cultural resource inventories are conducted and an evaluation is made as to their contributing/non-contributing status (Appendix 5)."
No similar action.	No similar action.	The setting that contributes to NRHP eligibility within 5 miles of historic trails would be designated as VRM Class II (Map 2-49). Those areas where the setting does not contribute to NRHP eligibility would be designated the same as the surrounding VRM class.	The setting that contributes to NRHP eligibility within 2 miles of historic trails would be designated as VRM Class II (Map 2-50). Those areas where the setting does not contribute to NRHP eligibility would be designated the same as the surrounding VRM class.
Blowout Penstemon ACEC			
Management Goals by Alternative			
To protect the unique parabolic dune complex of steep sandy slopes deposited at the base of granite or sedimentary mountains or ridges that contains the only known population of the endangered blowout penstemon plant in Wyoming, and protect the area to assure the continued existence of the plant and to allow for the continued research of this unique plant.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Actions for the Blowout Penstemon ACEC by Alternative			
The Blowout Penstemon area (4,020 acres) would not be designated as an ACEC.	Same as Alternative 1.	The proposed area would be designated as an ACEC and managed as an endangered plant habitat area (Map 2-8).	Same as Alternative 3.
The area would be open to locatable mineral entry and mineral material disposals.	Same as Alternative 1.	The ACEC would be closed to locatable mineral entry and mineral material disposals. Withdrawal would be pursued.	Same as Alternative 3.
The area is designated an AMR fire suppression area.	Same as Alternative 1.	Fire suppression activities would be utilized to maintain early succession plant communities.	Same as Alternative 3.
Actively pursue land tenure adjustments, including acquisition of lands, easements, or exchange, to meet the resource management objectives.	No similar action.	Actively pursue land tenure adjustments, including acquisition of lands, easements, or exchange, to meet the ACEC management goals.	Same as Alternative 3.
Off-road vehicular travel for "necessary tasks" would be allowed (see definitions of OHV and necessary tasks in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed (see definition of necessary tasks in the Glossary). Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 3.
Upper Muddy Creek Watershed/Grizzly Potential ACEC			
Management Goals by Alternative			
To protect the Colorado River fish fauna that is unique to the Muddy Creek watershed and to protect general riparian function.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To protect the crucial winter habitat for elk.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The Grizzly Allotment portion of the Upper Muddy Creek Watershed/Grizzly area (26,850 acres) would be managed as WHMA (Map 2-10).	The Upper Muddy Creek Watershed/Grizzly area (70,780 acres) would be managed as a wildlife habitat management area (Map 2-11).	The proposed area (70,780 acres) would be designated as an ACEC (Map 2-8).	The area would not be designated as an ACEC and would be managed as a fish habitat management area (70,780 acres)(Map 2-13).

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
The area would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	NSO stipulations would be applied on existing leases within ¼ mile of all ephemeral or perennial stream channels. Surface disturbing activities on existing leases with ¼ mile of all ephemeral and perennial stream channels would be intensively managed. Surface disturbing activities on existing leases in the remainder of the proposed area would be intensively managed.	Same as Alternative 1.
Public lands would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 1.
Plans of operation would be required for locatable mineral exploration and development (except casual use), for disturbances of five acres or more.	Same as Alternative 1.	No similar action.	Same as Alternative 1.
Those areas open to locatable mineral entry would also be open to mineral material disposals.	Same as Alternative 1.	Those areas closed to locatable mineral entry would also be closed to mineral material disposals.	Those areas open to locatable mineral entry would also be open to mineral material disposals with consideration given to fish habitat.
Public lands would be open to the operation of the public land laws.	Same as Alternative 1.	Public lands would be closed to land tenure adjustments, including sale. Withdrawals would be pursued.	Same as Alternative 1.
Motorized vehicle use would be limited to designated roads and vehicle routes.	Same as Alternative 1.	Motorized vehicle use would be limited to designated roads and vehicle routes. Closures of specific roads and vehicle routes, including seasonal closures, would be considered on a case-by-case basis to meet the objectives of the ACEC.	Motorized vehicle use would be limited to designated roads and vehicle routes. Closures of specific roads and vehicle routes, including seasonal closures, would be considered on a case-by-case basis to meet the objectives of the fish habitat management area.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Off-road vehicular travel for "necessary tasks" would be allowed (OHV definition in the Glossary).	Same as Alternative 1.	Off-road vehicular travel for "necessary tasks" would not be allowed. Exceptions may be authorized on a case-by-case basis following environmental analysis.	Same as Alternative 1.
Surface-disturbance activities would be prohibited within 500 feet of Muddy and Littlefield Creek riparian systems. Where surface disturbance cannot be avoided intensive management would be applied to any surface disturbing activity.	Same as Alternative 1.	No surface disturbing or disruptive activities would be allowed within 500 feet of Muddy and Littlefield Creek riparian systems.	Same as Alternative 1.
Areas within 500 feet of ephemeral and perennial streams would be avoidance areas for developments, uses, and facilities. Where disturbance from linear features could not be avoided, intensive management would be applied.	Same as Alternative 1.	Areas within ¼ mile of ephemeral and perennial streams would be avoidance areas for developments, uses, and facilities. Where disturbance from linear features could not be avoided, intensive management would be applied.	Avoidance areas for surface disturbing and disruptive activities and linear crossings would include (1) identified 100-year flood plains, (2) areas within 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and (3) areas 100 feet from the inner gorge of ephemeral channels.
In-stream structures that interfere with the movement of native fishes among habitats would be removed, reconstructed, or retrofitted to allow fish passage. Barriers built to facilitate reintroduction efforts would be maintained until they have completed their purpose.	No similar action.	Same as Alternative 1.	Same as Alternative 1.
Implement management actions to reintroduce the Colorado River cutthroat trout (CRCT) and other native fishes within those portions of the Muddy Creek watershed above the confluence with McKinney Creek.	Same as Alternative 1.	Actively pursue, in cooperation with WGFD, USFS, and private landowners, opportunities to expand reintroduction efforts for CRCT and other native cold and warm water fishes into adjacent habitats within the upper Muddy Creek watershed.	Same as Alternative 3.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Surface disturbing activities in aspen communities would be intensively managed.	No similar action.	Surface disturbing activities in aspen communities would be restricted or prohibited through intensive management of surface disturbing and disruptive activities.	Surface disturbing activities in aspen communities would be intensively managed. Aspen stands would be managed to increase distribution and improve seral structure.
The area is designated an AMR fire suppression area.	Same as Alternative 1.	The ACEC is designated an AMR fire suppression area.	Same as Alternative 1.
White-Tailed Prairie Dog Potential ACEC			
Management Goals by Alternative			
The areas would be managed for the protection of prairie dog habitat, a keystone species.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The white-tailed prairie dog areas would not be designated as an ACEC.	Same as Alternative 1.	The white-tailed prairie dog areas (Map 2-8) would be managed as an ACEC for protection of prairie dog habitat. (Note: eight identified complexes have not been mapped and the acreage has not been determined.)	Same as Alternative 1.
Surface disturbing or disruptive activities within white-tailed prairie dog towns would be avoided.	No similar action.	Surface disturbing or disruptive activities within White-tailed Prairie Dog ACEC would be prohibited within 164 feet (50 meters).	Same as Alternative 1.
Public lands would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawal from locatable mineral entry would be pursued.	Same as Alternative 1.
Public lands would be open to mineral material disposals.	Same as Alternative 1.	Those areas closed to locatable mineral entry would be closed to mineral material disposals.	Same as Alternative 1.
Above ground facilities (with the exception of power lines) within ¼ mile of white-tailed prairie dog towns would not be equipped with anti-raptor perching devices.	Same as Alternative 1.	No above ground facilities would be allowed within ¼ mile of white-tailed prairie dog towns, unless the facilities are equipped with anti-raptor perching devices.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Land tenure adjustments to benefit white-tailed prairie dogs would not be pursued.	Same as Alternative 1.	As opportunity arises, land tenure adjustments, including acquisition of lands, easements, or exchange, would be pursued to meet the ACEC objectives.	Same as Alternative 1.
Motorized vehicle use would be limited to designated roads and vehicle routes.	Same as Alternative 1.	Motorized vehicle use would be limited to designated roads and vehicle routes. Closures of specific roads and vehicle routes would be considered on a case-by-case basis to meet the objectives of the ACEC. New road construction would be assessed on a case-by-case basis.	Motorized vehicle use would be limited to either designated roads and vehicle routes or existing roads and vehicle routes depending on the land ownership pattern in the area of specific white-tailed prairie dog complexes.
Prairie dog poisoning would be allowed in white-tailed prairie dog towns/complexes in accordance to existing, local Annual Predator Damage Management Plans.	Same as Alternative 1.	Prairie dog poisoning by Animal and Plant Health Inspection Service (APHIS) would not be allowed in white-tailed prairie dog towns and complexes, except for demonstrated reasons of human health and safety.	Same as Alternative 3.
High Savery Dam Potential ACEC			
Management Goals by Alternative			
To protect the High Savery Dam and Reservoir Site.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To develop part of the site as a fishery for CRCT.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To manage the area for recreation purposes.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The High Savery Dam and Reservoir area (530 acres) would be managed jointly with WWDC according to the memorandum of understanding (MOU) dated June 2, 2003, as presented in Appendix 23.	Same as Alternative 1.	The High Savery Dam would be managed as an ACEC (Map 2-8).	Same as Alternative 1.
Public lands would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawals would be pursued.	Same as Alternative 3.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Public lands would be open to mineral material disposals.	Same as Alternative 1.	Those areas closed to locatable mineral entry would also be closed to mineral material disposals.	Same as Alternative 3.
Public lands would be open to operation of public land laws, including sale, where consistent with the intent and purpose of the MOU.	Same as Alternative 1.	Public lands would be closed to land tenure adjustment, including sale. Withdrawals from lands disposal would be pursued.	Same as Alternative 1.
Special Recreation Management Areas			
Continental Divide National Scenic Trail SRMA			
Management Goals by Alternative			
To promote the recreational use and scenic values of the Continental Divide National Scenic Trail.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To emphasize interpretive and educational opportunities.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
Public lands (600 acres) would be open to locatable mineral entry.	Same as Alternative 1.	Public lands would be closed to locatable mineral entry. Withdrawals from locatable mineral entry would be pursued.	Same as Alternative 3.
Public lands (600 acres) would be open to the operation of the public land laws.	Same as Alternative 1.	Public lands would be closed to land tenure adjustments, including sales. Withdrawals would be pursued.	Same as Alternative 3.
North Platte River Area			
Management Goals by Alternative			
To enhance opportunities for public use and access for recreational activities and maintain the quality of the river experience.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
The SRMA would be managed to provide high-quality recreational opportunities, especially for floating, fishing, camping, and sightseeing. Current public facilities and access would be maintained to support the values of the SRMA.	This area would not be managed as a SRMA.	Same as Alternative 1.	Same as Alternative 1.

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
The SRMA (5,060 acres, including the ¼-mile area on either side of the river) would be open to oil and gas leasing with intensive management of surface disturbance (Map 2-14).	Same as Alternative 1.	The SRMA (12,740 acres, including the ½-mile area on either side of the river) would be closed to oil and gas leasing (Map 2-16).	The SRMA (5,060 acres, including the ¼-mile area on either side of the river) would be open to oil and gas leasing with intensive management of surface disturbance (Map 2-17).
The SRMA (5,060 acres, including the ¼-mile area on either side of the river) would be open to locatable mineral entry and mineral material disposals, with surface disturbing and disruptive activities restricted to maintain the quality of the visual resource.	The area would be open to locatable mineral entry and mineral material disposals, with surface disturbing and disruptive activities restricted to maintain the quality of the visual resource.	The SRMA (12,740 acres, including the ½-mile area on either side of the river) would be closed to locatable mineral entry, mineral material disposals, and operation of the public land laws, including sale. Withdrawals would be pursued.	The SRMA (5,060 acres, including the ¼-mile area on either side of the river) would be closed to locatable mineral entry and mineral material disposals, with surface disturbing and disruptive activities restricted to maintain the quality of the visual resource.
Surface disturbing activities on public lands within ¼ mile on either side of the river would be intensively managed to maintain the quality of the visual resource.	Surface disturbing activities on public lands within ¼ mile on either side of the river would be managed using standard mitigation measures (Appendix 1).	Surface disturbing activities on public lands within ½ mile on either side of the river would be intensively managed to maintain the quality of the visual resource.	Same as Alternative 1.
Rawlins OHV Area			
Management Goals by Alternative			
To provide BLM with a forum for educating the OHV community on riding ethics and regulations, and to provide a safe riding opportunity for skill development and recreation.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
This area would not be managed as a SRMA.	This area would be managed as a SRMA.	Same as Alternative 2.	Same as Alternative 1.
A 480-acre OHV area would be constructed at Hogback Lake. This area would provide for an OHV play area near the town of Rawlins.	A 480-acre OHV area would be constructed at Hogback Lake. This SRMA would provide for an OHV play area near the town of Rawlins (Map 2-15).	A 480-acre OHV area would be constructed at Hogback Lake. This SRMA would provide for competitive events, recreational OHV riding, and an instructional practice area for youth (Map 2-16).	Construct a 480-acre OHV area at Hogback Lake. This area would provide for competitive events, recreational OHV riding, and an instructional practice area.
OHV use in this area would be limited to designated roads and vehicle routes (Map 2-5).	OHV use in this SRMA would be open to OHV travel (Map 2-42).	OHV use in this SRMA would be limited to designated roads and vehicle routes (Map 2-43).	OHV use in this area would be limited to designated roads and vehicle routes (Map 2-44).

SPECIAL MANAGEMENT AREAS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
The area would be open to locatable mineral entry and operation of the public land laws, including sale.	The area would be closed to locatable mineral entry and operation of the public land laws, including sale.	Same as Alternative 2.	Same as Alternative 2.
Areas open to locatable mineral entry would also be open to mineral material disposals.	Areas closed to locatable mineral entry would also be closed to mineral material disposals.	Same as Alternative 2.	Same as Alternative 2.
The area would be open to oil and gas leasing.	The area would be closed to oil and gas leasing. Existing leases would be intensively managed.	Same as Alternative 2.	Same as Alternative 2.
National Natural Landmarks Management			
Management Goals by Alternative			
To maintain the integrity of existing and proposed NNLs.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions			
Management actions for management of national natural landmarks are common to all alternatives and are presented in Section 2.3.			
Wild and Scenic Rivers (Encampment River Potential Wild and Scenic River)			
Management Goals by Alternative			
To maintain or enhance the outstandingly remarkable values for waterways in the RMPPA that meets the WSR suitability factors until Congress decides whether to include the suitable waterway in the NWSRS.	No similar action.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
Surface disturbing activities would not be allowed within ¼ mile of the Encampment River (Map 2-19).	No similar action.	Surface disturbing activities would not be allowed within the viewshed of the Encampment River.	Same as Alternative 3.
Geophysical exploration would be limited to foot access and the use of surface cables on the public lands. Surface charges may be allowed following site-specific analysis.	No similar action.	Geophysical exploration would be not be allowed.	Same as Alternative 1.
Vegetation treatments would be restricted to hand or aerial application.	No similar action.	Vegetation treatments would be restricted to hand application.	Same as Alternative 1.

TRANSPORTATION AND ACCESS MANAGEMENT			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To accommodate access needs for approved public land uses and to manage access where appropriate to protect resource values.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
Consistent with Wyoming BLM access policy, opportunities to acquire or maintain legal access to the following areas (in order of priority) would be pursued (see Areas of Priority Access for Easement Acquisition in Table 2-8 at the end of this chapter).	Consistent with Wyoming BLM access policy, opportunities to acquire or maintain legal access to public lands would be pursued as opportunities arise.	Consistent with Wyoming BLM access policy, opportunities to acquire or maintain legal access to the following areas (in order of priority) would be pursued (see Areas of Priority Access for Easement Acquisition in Table 2-8 at the end of this chapter).	Same as Alternative 3.
To respond to public demand for land use authorizations or other multiple uses, new access would be pursued. Existing access would be maintained or expanded, and excess existing access facilities would be abandoned or closed on a case-by-case basis.	Same as Alternative 1.	Same as Alternative 1.	To respond to public demand for land use authorizations or other multiple uses, new access would be pursued. Existing access would be maintained or expanded, and excess existing access facilities would be abandoned or closed after consultation with local government and interested parties.
Consolidation of public lands would be pursued to increase recreational opportunities for the public land pursued (Table 2-8 at the end of this chapter).	Consolidation of public lands would be pursued, when opportunities arise, to meet recreational demand (Table 2-8 at the end of this chapter). The criteria for which lands would be acquired include in holdings within WSAs, some SMAs, and HMAs (Appendix 6).	Same as Alternative 1.	Same as Alternative 2.

VEGETATION			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To restore, protect, or enhance the diversity and distribution of healthy, functioning ecosystems consisting of native vegetation communities.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.

VEGETATION			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
To restore healthy, functioning native plant communities through reclamation of surface disturbing and disruptive activities.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To enhance the health and diversity of plant communities through use of natural fire and management prescriptions, such as burning, plantings, seedings, and chemical, mechanical, biological, and grazing treatments.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To manage public lands to protect, preserve or enhance T&E and plant species and unique plant communities on the BLM Wyoming State Director's Sensitive Species List.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To control the introduction and proliferation of noxious weeds and invasive species and reduce established populations to acceptable levels. Priority would be to reduce and eliminate, where possible, small new infestations and to control large infestations.	To control the introduction and proliferation of noxious weeds, invasive species and poisonous plants, and reduce established populations to acceptable levels. Priority would be placed on areas where commodity benefits would be enhanced.	To control the introduction and proliferation of noxious weeds and invasive species and reduce established populations to acceptable levels. Priority would be maintenance and attainment of native, weed-free communities.	Same as Alternative 1.
Management Actions by Alternative			
Rangeland Desired Plant Community (DPC)			
Vegetation treatments (mechanical, biological, chemical, and prescribed fire) would be applied to meet standards for rangeland health and watershed function.	Vegetation treatments would be applied to increase forage for livestock and to meet standards for rangeland health and watershed function.	Vegetation treatments (biological and prescribed fire) would be applied to meet standards for rangeland health and watershed function, and to achieve DPC with an emphasis on habitat improvement for wildlife including special status species.	Vegetation treatments (mechanical, biological, chemical, and prescribed fire) would be applied to meet standards for rangeland health and watershed function, and to achieve DPC while considering habitat for wildlife including special status species.
Rangeland areas would be managed to meet rangeland standards (Appendix 8).	Same as Alternative 1.	Rangeland areas would be managed to achieve DPC (Appendix 8).	Same as Alternative 3.

VEGETATION			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Special Status Plant Species and Habitat			
Management practices identified on a case-by-case basis would be applied to surface disturbing and disruptive activities to maintain or enhance special status plant species and their habitat (Appendix 24).	Management practices identified on a case-by-case basis would not be applied to surface disturbing and disruptive activities to maintain or enhance special status plant species and their habitat.	Same as Alternative 1	Same as Alternative 1.
Known habitat for threatened and endangered and proposed and candidate species would be open to oil and gas leasing with intensive management of surface disturbing and disruptive activities.	Same as Alternative 1.	Known habitat for threatened and endangered and proposed and candidate species would be open to oil and gas leasing with a NSO stipulation.	Same as Alternative 3.
Surface disturbing activities would be intensively managed (see definition of Intensive Management in the Glossary), in areas that contain habitat for the blowout penstemon, to maintain or enhance habitat for the plant.	Same as Alternative 1	Surface disturbing activities would not be allowed in areas that contain habitat for the blowout penstemon.	Same as Alternative 1.
Identified habitat for the blowout penstemon plant would be open to locatable mineral entry and mineral material disposals.	Same as Alternative 1	Identified habitat for the blowout penstemon plant would be closed to locatable mineral entry and mineral material disposals. Withdraws would be pursued.	Same as Alternative 3.
BLM-administered public lands that contain identified habitat for the blowout penstemon plant would not be exchanged or sold, when possible.	Same as Alternative 1	BLM-administered public lands that contain identified habitat for the blowout penstemon plant would not be exchanged or sold.	Same as Alternative 3.
Off-road vehicle travel for "necessary tasks" in identified habitat for the blowout penstemon plant would be allowed.	Same as Alternative 1	Off-road vehicle travel for "necessary tasks" in identified habitat for the blowout penstemon plant would not be allowed in order to protect the plant. Exceptions may be authorized on a case-by-case basis following environmental assessment.	Same as Alternative 3.

VEGETATION			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
BLM-administered public lands that contain identified habitat for the Colorado butterfly plant would not be exchanged or sold, when possible.	Same as Alternative 1	BLM-administered public lands that contain identified habitat for the Colorado butterfly plant would not be exchanged or sold.	Same as Alternative 3.
Recreational site development would not be authorized in known Colorado butterfly plant habitat, when possible.	Same as Alternative 1	Recreational site development would not be authorized in known Colorado butterfly plant habitat.	Same as Alternative 3.
BLM-administered public lands that contain identified habitat for the Ute ladies'-tresses plant would not be exchanged or sold, when possible.	Same as Alternative 1	BLM-administered public lands that contain identified habitat for the Ute ladies'-tresses plant would not be exchanged or sold.	Same as Alternative 3.
Recreational site development would not be authorized in known Ute ladies'-tresses plant habitat, when possible.	Same as Alternative 1	Recreational site development would not be authorized in known Ute ladies'- tresses plant habitat.	Same as Alternative 3.

VISUAL RESOURCES MANAGEMENT			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To minimize adverse effects on visual resources while maintaining the effectiveness of land use allocations.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
VRM classes would be designated as shown in Map 2-51 (Table 2-9 at the end of this chapter and Appendix 25).	VRM classes would be designated as shown in Map 2-52 (Table 2-9 at the end of this chapter and Appendix 25).	VRM classes would be designated as shown in Map 2-49 (Table 2-9 at the end of this chapter and Appendix 25).	VRM classes would be designated as shown in Map 2-50(Table 2-9 at the end of this chapter and Appendix 25).

WATER QUALITY, WATERSHED AND SOILS MANAGEMENT			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To manage surface land use and groundwater resources to maintain or improve water quality according to the classes, uses, and standards as enumerated in the State of Wyoming's Water Quality Rules and Regulations.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To maintain the hydrologic condition needed to support riparian/wetland areas, minimize flood and sediment damage to water resources from human and natural causes, maintain and reduce current levels of salt loading in watersheds that lie within the Colorado River Basin, and to protect water resources used by the public and by federal, state, and local agencies for fisheries, wildlife, livestock, agricultural, recreational, municipal, and industrial uses.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
To maintain or enhance soil stability, productivity, and infiltration to prevent accelerated erosion and to provide for optimal plant growth.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
Management Actions by Alternative			
Produced Water from Oil and Gas Activities			
Surface discharge of produced water that meets State standards for water quality would be allowed in the Colorado River Basin. Individual projects would be considered on a site-specific basis.	Same as Alternative 1.	Surface discharge of produced water would not be allowed in the Colorado River Basin. Injection of produced water from Federal oil and gas leases would be required in the Colorado River Basin.	Surface discharge of produced water would not be approved for new projects in the Colorado River Basin. Existing surface discharges in the Colorado River Basin, approved under previous land use plans or authorizations, would be allowed to continue as long as they do not change or exceed water volumes or water quality specified during approval.

WATER QUALITY, WATERSHED AND SOILS MANAGEMENT			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Surface discharge of produced water that meets State standards and beneficial use for water quality would be allowed in the North Platte River Basin and Great Divide Basin.	Same as Alternative 1.	Only State of Wyoming-authorized water discharges of produced water that meets specific BLM land use objectives (e.g., providing water sources to meet livestock and wildlife management goals and/or water use for the protection or enhancement of wetland and riparian areas) would be allowed in the North Platte River Basin and Great Divide Basin.	Same as Alternative 1.
Surface Disturbance and Permanent Structures in Waterways			
Surface disturbing activities would be avoided in the following areas: (1) identified 100-year flood plains, (2) areas within 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and (3) areas 100 feet from the inner gorge of ephemeral channels.	Same as Alternative 1.	Surface disturbing activities would not be allowed in the following areas: (1) identified 100-year flood plains, (2) areas within 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and (3) areas 100 feet from the inner gorge of ephemeral channels.	Same as Alternative 1.
Muddy Creek Watershed (USGS HUC 14050004)			
Activities in the Muddy Creek Watershed that result in water depletion would be allowed provided that depletions are mitigated. (Map 2-20)	Same as Alternative 1.	Water impoundments in the Muddy Creek Watershed that result in a water depletion greater than one acre foot per individual project to the Colorado River system would not be allowed. (Map 2-20)	Same as Alternative 1.
Encampment River Watershed (USGS HUC 1018000205)			
Portions of the Encampment River Watershed would be protected by interim management prescriptions for the Encampment WSR and the Interim Management Policy for WSAs. (Map 2-20)	Same as Alternative 1.	Encampment River Watershed (USGS HUC 1018000205) would be protected for municipal drinking water sources, wild and scenic values, and recreation. New permanent roads or structures would not be allowed. Grazing management and forestry actions and other surface disturbing activities would be intensively managed to meet watershed objectives. (Map 2-20)	Same as Alternative 3.

WILD HORSES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred Alternative)**
Management Goals by Alternative			
To protect, maintain, and control a viable, healthy herd of wild horses while retaining their free-roaming nature and to provide adequate habitat for free-roaming wild horses through management consistent with environmental protection and enhancement policies.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.
No similar action.	Same as Alternative 1.	To preserve and maintain the New World Iberian (Spanish Colonial) genotype and associated phenotype if these genetic characteristics are found to be significant through recognized means of genetic evaluation.	Same as Alternative 3.
Management Actions by Alternative			
The AML for the Lost Creek HMA would remain at 70 adults. The AML was established in 1994 by extensive monitoring and evaluation (Map 2-21 and Appendix 12), and could change based on future monitoring.	Same as Alternative 1.	An interim population objective of 165 would be established for Lost Creek in order to preserve and enhance the New World Iberian genotype and associated phenotype. This interim population objective would be evaluated through genetic testing and habitat monitoring within five years to determine its effectiveness in achieving the objective.	Utilizing accepted means of genetic testing and analysis, in cooperation with the Lander and Rock Springs Field Offices, the total extent of the New World Iberian genotype within the metapopulation that includes the Lost creek HMA (current AML of 70 adults) would be documented. Management practices would be implemented to accomplish the goal of preserving the New World Iberian genotype.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Management Goals by Alternative			
To maintain or improve vegetation condition and/or avoid long-term disturbance in habitat sites for wildlife and fish species. Provide habitat quality and quantity adequate to support a natural diversity of wildlife and fish species. Maintain and enhance habitats sufficient to fulfill the life history requirements of a diversity of wildlife and fish species on public lands.	Same as Alternative 1.	Same as Alternative 1.	To maintain or improve vegetation condition and/or reduce long-term disturbance in habitat sites for wildlife and fish species. Provide habitat quality and quantity adequate to support a natural diversity of wildlife and fish species. Maintain and enhance habitats sufficient to fulfill the life history requirements of a diversity of wildlife and fish species on public lands.
To maintain and enhance aquatic and wildlife resources and provide for biological diversity of plants and wildlife resources while ensuring healthy ecosystems.	To maintain and enhance aquatic and wildlife resources and provide for biological diversity of plants and wildlife resources while ensuring healthy ecosystems to the extent possible while maximizing commodity production.	To enhance aquatic and wildlife resources and provide for biological diversity of plants and wildlife resources while ensuring healthy ecosystems.	Same as Alternative 1.
Management Actions by Alternative			
Note: See Table 2-10 for seasonal restrictions for wildlife on surface disturbing and disruptive and disruptive activities.			
Wildlife habitat objectives would be considered in all reclamation activity. Priority would be given to meeting Standards for Healthy Rangelands (BLM 1997) (Appendix 8 and Appendix 26).	Same as Alternative 1.	Wildlife habitat objectives would be considered for all surface disturbing and disruptive activities. Priority would be given to meeting DPC for wildlife habitat (Appendix 8 and Appendix 26).	Same as Alternative 3.
As proposals are submitted, animal damage control activities in the RMPPA, including the use of lethal poisons, would be considered. These activities are subject to established policies, including NEPA requirements. These activities are also subject to the RFO Annual Predator Damage Management Plan, which is maintained current and consistent with those procedures and policies.	Same as Alternative 1.	Animal damage control activities would not be allowed.	Same as Alternative 1.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Surface disturbing and disruptive activities potentially disruptive to nesting raptors are prohibited within the following distances during the following time periods: 1-mile buffer: golden eagle, ferruginous hawk ¾-mile buffer: barn owl, red-tailed hawk, great-horned owl, osprey, merlin, sharp-shinned hawk, kestrel, prairie falcon, northern harrier, Swainson's hawk, Cooper's hawk, short-eared owl, long-eared owl, peregrine falcon, screech owl, burrowing owl, northern goshawk, and other raptors	Surface disturbing and disruptive activities potentially disruptive to nesting raptors are prohibited within ½ mile of a raptor nest during the following time periods for the protection of raptor nesting areas:	Surface disturbing and disruptive activities potentially disruptive to nesting raptors are prohibited within 1½ miles of a raptor nest during the following time periods for the protection of raptor nesting areas:	Surface disturbing and disruptive activities potentially disruptive to nesting raptors are prohibited within the following distances during the following time periods: 1-mile buffer: golden eagle and ferruginous hawk. ¾-mile buffer: barn owl, red-tailed hawk, great-horned owl, osprey, merlin, sharp-shinned hawk, kestrel, prairie falcon, northern harrier All others ¾ mile;
Feb 1–July 31: all raptor species	Feb 1–July 15: golden eagle, barn owl, red-tailed hawk, great-horned owl, other raptors April 1–July 31: osprey, merlin, sharp-shinned hawk, kestrel, prairie falcon, northern harrier, Swainson's hawk, Cooper's hawk March 1–July 31: short-eared owl, long-eared owl, ferruginous hawk, peregrine falcon, screech owl April 15–Sept. 15: burrowing owl April 1–Aug. 31: goshawk	Feb 1–July 15: golden eagle, barn owl, red-tailed hawk, great-horned owl, other raptors April 1–July 31: osprey, merlin, sharp-shinned hawk, kestrel, prairie falcon, northern harrier, Swainson's hawk, Cooper's hawk March 1–July 31: short-eared owl, long-eared owl, ferruginous hawk, peregrine falcon, screech owl April 15–Sept. 15: burrowing owl April 1–Aug. 31: goshawk	Feb 1–July 15: golden eagle, barn owl, red-tailed hawk, great-horned owl, other raptors April 1–July 31: osprey, merlin, sharp-shinned hawk, kestrel, prairie falcon, northern harrier, Swainson's hawk, Cooper's hawk March 1–July 31: short-eared owl, long-eared owl, ferruginous hawk, peregrine falcon, screech owl April 15–Sept. 15: burrowing owl April 1–Aug. 31: goshawk
Well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence would not be allowed within 825 feet of active raptor nests (ferruginous hawks, 1,200 feet). Distance may vary depending on factors such as nest activity, species, natural topographic barriers, and line-of-sight distances.	Well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence would be allowed.	Well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence would not be allowed within ¼ mile (1,320 feet) of active raptor nests.	Same as Alternative 1.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
RCAs would be open to oil and gas leasing. Surface disturbing and disruptive activities would be intensively managed.	Same as Alternative 1.	RCAs would be closed to oil and gas leasing. Surface disturbing and disruptive activities in existing leases would be intensively managed.	Same as Alternative 1.
Important waterfowl production areas, as they are identified, would be managed for proper functioning condition (PFC) of aquatic habitat and associated wetlands.	Same as Alternative 1.	Important waterfowl production areas, as they are identified, would be managed for DPC of aquatic habitat and associated wetlands	Same as Alternative 3.
Best Management Practices (BMP) (Appendix 13) would be applied to surface disturbing and disruptive activities to maintain or enhance neotropical and other migratory bird species and their habitats.	No similar action.	Same as Alternative 1.	Same as Alternative 1.
Surface disturbing activities and disruptive activities would be intensively managed to maintain or enhance upland game bird species and their habitats.	Surface disturbing and disruptive activities would be managed to maintain upland game bird species and their habitats.	Same as Alternative 1.	Same as Alternative 1.
No similar action.	No similar action.	No similar action.	Proposals for conducting year-long surface disturbing activities, including oil and gas drilling in big game winter ranges, sage-grouse seasonal use areas, and other seasonally sensitive habitats and areas, would be considered if cumulative (environmental) impact analysis of proposed activities indicates a net environmental benefit within the RMPPA. Approval of such activities in all seasonally sensitive areas would be considered a modification of lease seasonal stipulations or APD conditions of approval (Appendix 27).

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
No similar action.	No similar action.	Surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15).	Same as Alternative 3.
Surface disturbing and disruptive activities within big game crucial winter range would not be allowed during the period of November 15 to April 30. (Maps 2-53, 2-54 and 2-55)	Surface disturbing and disruptive activities within big game crucial winter range would be allowed during the period of November 15 to April 30.	Same as Alternative 1.	Same as Alternative 1.
Surface disturbing and disruptive activities within identified big game parturition areas would not be allowed during the period of May 1 to June 30 (Maps 2-55, 2-56).	Surface disturbing and disruptive activities within identified big game parturition areas would be allowed during the period of May 1 to June 30 (Maps 2-55, 2-56).	Surface disturbing and disruptive activities would be prohibited within identified big game parturition areas (Maps 2-55, 2-56).	Same as Alternative 1.
No similar action.	Surface disturbing and disruptive activities would be allowed in big game migration and transitional ranges.	Surface disturbing and disruptive activities would be managed, on a case-by-case basis, in identified big game migration and transitional ranges to maintain their integrity and function for big game species in these areas.	Same as Alternative 3.
Fences identified to be a problem to big game migration would be modified to meet BLM fence standards. New fences would be allowed in big game migration corridors and would meet BLM fence standards.	Fences would not be modified in big game migration areas. New fences would be allowed in big game migration corridors and would meet current BLM fence standards.	All existing fences would be modified to meet BLM fence standards. New fences would not be allowed in big game migration corridors.	Same as Alternative 1.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Water developments for livestock and wild horse use would be allowed in crucial winter range when they are consistent with wildlife habitat needs.	Water developments for livestock and wild horse use would be allowed in crucial winter range.	Water developments for livestock and wild horse use would not be allowed in crucial winter range.	Same as Alternative 1.
Surface disturbing and disruptive activities would be intensively managed to maintain or enhance amphibian species and their habitats.	No similar action.	Same as Alternative 1.	Same as Alternative 1.
For the protection of amphibian species and their habitats, surface disturbing and disruptive activities would be avoided in the following areas: (1) identified 100-year flood plains, (2) areas within 500 feet from perennial waters, springs, wells, and wetlands, and (3) areas 100 feet from the inner gorge of ephemeral channels.	Same as Alternative 1.	For the protection of amphibian species and their habitats, surface disturbing and disruptive activities would not be allowed in the following areas: (1) identified 100-year flood plains, (2) areas within 500 feet from perennial waters, springs, wells, and wetlands, and wetlands, and (3) areas 100 feet from the inner gorge of ephemeral channels.	Same as Alternative 1.
Surface disturbing and disruptive activities would be managed to maintain or enhance reptile species and their habitats.	No similar action.	Same as Alternative 1.	Same as Alternative 1.
Fish Habitat			
Fish habitats would be managed to achieve PFC.	Same as Alternative 1.	All priority fish habitats would be managed to achieve their potential natural condition (Appendix 13).	Fish habitats would be managed to achieve DFC.
Where possible, impoundments and instream structures would be designed to reduce impacts on special status fish species and their habitats.	Same as Alternative 1.	Impoundments and instream structures would not be allowed where negative effects on habitat quality, habitat quantity, or the life cycle requirements of populations of special status fish species would occur.	Impoundments and instream structures would be designed to minimize impacts on special status fish species and their habitats.
Road crossings of water bodies that potentially support fish would be designed to allow fish passage.	Same as Alternative 1.	Road crossings of water bodies that potentially support fish for a portion of the year would be designed to simulate natural stream processes.	Same as Alternative 3.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Endangered (E), Threatened (T), Proposed (P), and Candidate (C) Species			
If prairie dog towns/complexes suitable as black-footed ferret habitat are present at the proposed project level, attempts would be made to locate all project components outside of these towns/complexes to avoid direct impacts on the towns, or a black-footed ferret survey would be required.	Same as Alternative 1	If prairie dog towns/complexes suitable as black-footed ferret habitat were present at the proposed project level, surface disturbing or disruptive activities would be avoided within 164 feet (50 meters).	Same as Alternative 3.
Surface disturbing and disruptive activities potentially disruptive to nesting bald eagles are prohibited within 1 mile of a bald eagle nest from February 1 to July 31.	Surface disturbing and disruptive activities potentially disruptive to nesting bald eagles are prohibited within ½ mile of a bald eagle nest from February 1 to July 15.	Surface disturbing and disruptive activities potentially disruptive to nesting bald eagles are prohibited within 1½ miles of a bald eagle nest from February 1 to July 15.	Surface disturbing and disruptive activities potentially disruptive to nesting bald eagles are prohibited within 1 mile of a bald eagle nest from February 1 to July 15.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
No similar action.	Same as Alternative 1.	Activities and habitat alterations that may disturb bald eagles will be restricted within suitable habitats that occur within bald eagle buffer zones: Zone 1: (within ½ mile 1 February to 15 August) is intended to protect active and alternative nests. For active nests, minimal human activity levels are allowed during the period of first occupancy to 2 weeks after fledging. Zone 2: (within ½ to 1 mile from the nest) is intended to protect bald eagle primary use areas and permits light human activity levels. Zone 3: is designated to protect foraging/concentration areas year-round. This zone would include one of two larger areas, depending on habitat types: (1) 2.5 miles extending in all directions from the nest; and (2) ½ mile from the streambank of all streams within 2.5 miles of the nest. Site-specific habitat types and foraging areas will be evaluated to determine which Zone 3 buffer applies. Zone delineation depends on habitat types. Exceptions may be made after consultation with the USFWS.	Same as Alternative 3.
Boat and raft landing areas would not be developed and outfitting camps would be avoided in Western yellow-billed cuckoo habitat, when possible.	Same as Alternative 1	Boat and raft landing areas would not be developed and outfitting camps would be prohibited in Western yellow-billed cuckoo habitat.	Same as Alternative 3.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Surface disturbing and disruptive activities potentially disruptive to Western yellow-billed cuckoos would not be prohibited within ½ mile of identified habitat from April 15 to August 15 for the protection of nesting Western yellow-billed cuckoos.	Same as Alternative 1	Surface disturbing and disruptive activities potentially disruptive to Western yellow-billed cuckoos would be prohibited within ½ mile of identified habitat from April 15 to August 15 for the protection of nesting Western yellow-billed cuckoos.	Same as Alternative 3.
The use of malathion, or other pesticides, would be authorized near Wyoming toad occupied habitats, on a case-by-case basis.	Same as Alternative 1	The use of malathion, or other pesticides, would not be authorized near Wyoming toad occupied habitats.	Same as Alternative 1.
Disposal of BLM-administered public lands that contain habitat necessary to accomplish the recovery of the Wyoming toad would be avoided.	Same as Alternative 1	BLM-administered public lands that contain habitat necessary to accomplish recovery of the Wyoming toad would not be exchanged or sold.	Same as Alternative 3.
Any action that would result in stream channel instability, erosion, and sedimentation within known Western boreal toad habitat would be avoided.	Same as Alternative 1	Any action that could result in stream channel instability, erosion, and sedimentation within known Western boreal toad habitat would not be authorized, unless there is a benefit to the species.	Same as Alternative 1.
Species Listed on the BLM Wyoming State Director's Sensitive Species List			
Surface disturbing and disruptive activities would be intensively managed to minimize impacts on identified crucial habitat for sensitive species for the purpose of protecting these species and their associated habitats (Appendix 15).	Surface disturbing and disruptive activities would be allowed in identified crucial habitat for sensitive species for the purpose of protecting these species and their associated habitats (Appendix 15).	Surface disturbing and disruptive activities would be prohibited in identified crucial habitat for sensitive species for the purpose of protecting these species and their associated habitats (Appendix 15).	Same as Alternative 1.
Surface disturbing and disruptive activities in white-tailed and black-tailed prairie dog towns would be avoided.	Surface disturbing and disruptive activities would be allowed to occur in white-tailed and black-tailed prairie dog towns.	Surface disturbing and disruptive activities would be prohibited within 50 meters (164 feet) of identified white-tailed and black-tailed prairie dog towns.	Same as Alternative 1.
Prairie dog poisoning would be allowed in white-tailed and black-tailed prairie dog towns and complexes in accordance to existing, RFO APDMP.	Same as Alternative 1.	Prairie dog poisoning would be prohibited in white-tailed and black-tailed prairie dog towns/complexes, except for demonstrated reasons of human health and safety.	Same as Alternative 3.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Above ground facilities within ¼ mile of prairie dog towns would not be equipped with anti-raptor perching devices.	Same as Alternative 1.	No above ground facilities would be allowed within ¼ mile of prairie dog towns, unless the facilities are equipped with anti-raptor perching devices.	Same as Alternative 1.
Surface disturbing and disruptive activities would avoid black-tailed prairie dog towns.	Same as Alternative 1.	Surface disturbing and disruptive activities would be prohibited within 50 meters (164 feet) of black-tailed prairie dog towns.	Same as Alternative 1.
Power poles within prairie dog towns would be equipped with raptor anti-perch devices.	Same as Alternative 1	Power poles would not be allowed within prairie dog towns.	Placement of power poles within prairie dog towns would be avoided; however, in the event that power poles are required to be placed within these towns, raptor anti-perch devices would be required.
No similar action.	No similar action.	Surface disturbing or disruptive activities within Greater sage-grouse breeding or nesting habitat would require the use of best management practices designed to reduce both the direct loss of habitat and disturbance to the birds during the critical breeding and nesting seasons (Appendix 15).	Same as Alternative 3.
High profile structures (e.g. buildings, storage tanks, overhead power lines, wind turbines, towers, and windmills) would be authorized within 1 mile of an active Greater sage-grouse and sharp-tailed grouse lek.	Same as Alternative 1.	High profile structures (e.g. buildings, storage tanks, overhead power lines, wind turbines, towers, and windmills) would be prohibited within 1 mile of an active Greater sage-grouse and sharp-tailed grouse lek.	Location of high profile structures (e.g. buildings, storage tanks, overhead power lines, wind turbines, towers, and windmills) would be authorized on a case-by-case basis from ¼ mile to 1 mile of an active Greater sage-grouse and sharp-tailed grouse lek.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Surface disturbing and disruptive activities located within a ¼ mile of a known Greater sage-grouse and sharp-tailed grouse lek would be allowed; however, the project would be located in the least disruptive location from the lek, on a case-by-case basis. Surface disturbing and disruptive activities potentially disruptive to breeding and nesting Greater sage-grouse and sharp-tailed grouse are prohibited within a 2-mile radius of the center of a Greater sage-grouse lek, and 1-mile radius of the center of a sharp-tailed grouse lek from March 1 to June 30.	Surface disturbing and disruptive activities located within a ¼ mile of a known Greater sage-grouse and sharp-tailed grouse lek would be allowed; however, the project would be located in the least disruptive location from the lek, on a case-by-case basis. Surface disturbing and disruptive activities potentially disruptive to breeding and nesting Greater sage-grouse and sharp-tailed grouse are not prohibited within a 2-mile radius of the center of a Greater sage-grouse lek, and 1-mile radius of the center of a sharp-tailed grouse lek from March 1 to June 30.	The following would occur in Greater sage-grouse and sharp-tailed grouse leks: (1) prohibit surface-disturbance or occupancy within ¼ mile of the perimeter of occupied Greater sage-grouse and sharp-tailed grouse leks; and (2) avoid human activity between 6:00 p.m. and 9:00 a.m. from March 1 –May 20 within ¼ mile of the perimeter of occupied Greater sage-grouse and sharp-tailed grouse leks. The following would occur in Greater sage-grouse and sharp-tailed grouse nesting/early brood-rearing habitat: avoid surface disturbing and disruptive activities, geophysical surveys, and organized recreational activities (events) which require a special use permit in suitable Greater sage-grouse and sharp-tailed grouse nesting and early brood-rearing habitat within 2 miles of an occupied Greater sage-grouse lek, and 1 mile of a sharp-tailed grouse lek, or in identified Greater sage-grouse and sharp-tailed grouse nesting and early brood-rearing habitat outside the 2 miles, or 1 mile, buffer from March 15 –July 15.	Same as Alternative 3.

WILDLIFE AND FISHERIES			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
In the area east of State Highway 789, south of Interstate 80, west of State Highway 71 and Carbon County Road 401, and north of State Highway 70, surface disturbing and disruptive activities potentially disruptive to breeding and nesting Greater sage-grouse and sharp-tailed grouse are prohibited within a 2-mile radius of the center of a Greater sage-grouse lek, and within a 1-mile radius of the center of a sharp-tailed grouse lek from March 1 to June 30.	In the area east of State Highway 789, south of Interstate 80, west of State Highway 71 and Carbon County Road 401, and north of State Highway 70, surface disturbing and disruptive activities potentially disruptive to breeding and nesting Greater sage-grouse and sharp-tailed grouse are not prohibited within a 2-mile radius of the center of a Greater sage-grouse lek, and within a 1-mile radius of the center of a sharp-tailed grouse lek from March 1 to June 30.	In the area east of State Highway 789, south of Interstate 80, west of State Highway 71 and Carbon County Road 401, and north of State Highway 70, the following would occur: Greater sage-grouse and sharp-tailed grouse leks: (1) prohibit surface-disturbance or occupancy within ¼ mile of the perimeter of occupied Greater sage-grouse and sharp-tailed grouse leks; and (2) avoid human activity between 6:00 p.m. and 9:00 a.m. from March 1–May 20 within ¼ mile of the perimeter of occupied Greater sage-grouse and sharp-tailed grouse leks. Greater sage-grouse and sharp-tailed grouse nesting/early brood-rearing habitat: avoid surface disturbing and disruptive activities, geophysical surveys, and organized recreational activities (events) which require a special use permit in suitable Greater sage-grouse and sharp-tailed grouse nesting and early brood-rearing habitat within 4 miles of an occupied Greater sage-grouse lek or within 2 miles of an occupied sharp-tailed grouse lek or in identified Greater sage-grouse and sharp-tailed grouse nesting and early brood-rearing habitat from March 15–July 15.	In the area east of State Highway 789, south of Interstate 80, west of State Highway 71 and Carbon County Road 401, and north of State Highway 70, the following would occur: Greater sage-grouse and sharp-tailed grouse leks: (1) prohibit surface-disturbance or occupancy within ¼ mile of the perimeter of occupied Greater sage-grouse and sharp-tailed grouse leks; and (2) avoid human activity between 6:00 p.m. and 9:00 a.m. from March 1 to May 20 within ¼ mile of the perimeter of occupied Greater sage-grouse and sharp-tailed grouse leks. Greater sage-grouse and sharp-tailed grouse nesting/early brood-rearing habitat: avoid surface disturbing and disruptive activities, geophysical surveys, and organized recreational activities (events) which require a special use permit in suitable Greater sage-grouse and sharp-tailed grouse nesting and early brood-rearing habitat within 2 miles of an occupied Greater sage-grouse lek, or within 1 mile of an occupied sharp-tailed grouse lek, or in identified Greater sage-grouse, and sharp-tailed grouse nesting and early brood-rearing habitat from March 15–July 15.
Surface disturbing and disruptive activities potentially disruptive to delineated Greater sage-grouse and sharp-tailed grouse winter concentration areas are prohibited during the period of November 15 to April 30 for the protection of Greater sage-grouse and sharp-tailed grouse winter concentration areas.	No similar action.	Surface disturbing and disruptive activities potentially disruptive to delineated Greater sage-grouse and sharp-tailed grouse winter concentration areas are prohibited during the period of November 15 to March 14 for the protection of Greater sage-grouse and sharp-tailed grouse winter concentration areas.	Same as Alternative 3.

Table 2-2. Proposed Withdrawals

Proposed Withdrawal	Acres[2]			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Encampment River Campground	10	10	10	10
Corral Creek Recreation Site	10	10	10	10
Bennett Peak Recreation Site	20	20	20	20
Teton Reservoir Recreation Site	350	350	350	350
Prior Flat Campground	90	90	90	90
Dugway Recreation Site	40	40	40	40
Nine Mile Hill Recreation Site	130	130	130	130
Fort Washakie Stage Station	130	130	130	130
Sage Creek Stage Station	N/A	N/A	120	120
Midway Stage Station	N/A	N/A	110	110
All Historic Trails	N/A	N/A	66,260	N/A
Overland Trail	680	680	N/A	N/A
Big Creek Proposed Recreation Site	30	30	30	30
Prospect Creek Proposed Recreation Site	20	20	20	20
Gibben's Beardtongue Site	15	15	15	15
Como Bluff ACEC	N/A	N/A	1690	N/A
Sand Hills ACEC	N/A	N/A	12,700	N/A
Stratton Hydrology Research Area	5,530	5,530	5,530	5,530
Chain Lakes Habitat Management Area	N/A	N/A	30,560	N/A
Red Rim - Daley Habitat Management Area	N/A	N/A	15,980	N/A
Wick-Beumee Wildlife Habitat Management Area	N/A	N/A	280	280
Shirley Mountain Bat Cave Habitat Management Area	N/A	240	520	240
Laramie Plains Lakes Area ACEC	N/A	N/A	1,600	1,600
Blowout Penstemon Site	N/A	N/A	4,040	4,040
Upper Muddy Creek Watershed/Grizzly ACEC	N/A	N/A	70,780	N/A
High Savery Dam Reservoir Habitat Management Area	N/A	N/A	530	N/A
Continental Divide National Scenic Trail-CDNST	N/A	N/A	600	600
North Platte River SRMA	N/A	N/A	12,740	N/A
Encampment River WSR	620	620	620	620
Rim Lake Recreation Site	N/A	N/A	70	N/A
Shirley Basin Reservoir	N/A	N/A	90	N/A
Jep Canyon Wildlife Habitat Management Area	N/A	N/A	13,810	N/A
Shamrock Hills ACEC	N/A	N/A	18,400	N/A
Total Withdrawals	7,675	7,915	257,875	13,985

[2] Acres may not add due to overlaps

Table 2-3. Current ROW Corridors

Current ROW Corridors[1]	Total Nominal Width
Exxon/Frontier Natural Gas Pipelines (multiple)	600 feet
Spence-Bairoil-Jim Bridger 230 kV Transmission Line	600 feet
CIG Natural Gas Pipeline	2 miles
Lost Creek Natural Gas Pipeline	600 feet
Sinclair Natural Gas Pipelines (multiple)	600 feet
WAPA Power Line	600 feet
1-80 Corridor (pipelines, public utilities, roads)	4 miles

Table 2-4. Summary Comparison of Impacts

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Air Quality			
There would be an increase in emissions of carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), PM_{10}, and $PM_{2.5}$, volatile organic compounds (VOC) and hazardous air pollutants (HAP), but none of these increases would cause any exceedance of state or federal ambient air quality standards. Qualitative emissions projections show that the total emissions would increase over time from 12,912 tons per year of pollutants in the base year to 37,924 tons per year by 2023.	Impacts under this alternative would be the same as under Alternative 1. Qualitative emissions projections show that the total emissions would increase over time from 12,912 tons per year of pollutants in the base year to 39,974 tons per year by 2023; the highest of any alternative.	Impacts under this alternative would be similar to those under Alternative 1. Qualitative emissions projections show that the total emissions would increase over time from 12,912 tons per year of pollutants in the base year to 31,875 tons per year by 2023; the lowest of any alternative.	Impacts under this alternative would be similar to those under Alternative 1. Qualitative emissions projections show that the total emissions would increase over time from 12,912 tons per year of pollutants in the base year to 36,982 tons per year by 2023.
Impacts on Cultural Resources			
Disturbance of approximately 98,339 acres (from forest, lands and realty livestock and minerals management actions) would potentially impact an estimated 891 cultural sites eligible for the NRHP. VRM Class I areas, SMAs, and NSO stipulations would protect 79,560 acres from surface disturbing activities, providing indirect protection to cultural resource sites. VRM Class II designation of 359,610 acres would provide indirect protection to the setting of Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility.	Disturbance of approximately 98,793 acres (from forest, lands and realty, livestock, and minerals management actions) would potentially impact an estimated 895 cultural sites eligible for the NRHP. VRM Class I areas, SMAs, and NSO stipulations would protect 75,920 acres from surface disturbing activities, providing indirect protection to cultural resource sites. VRM Class II designation of 233,950 acres would provide indirect protection to the setting of Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility.	Disturbance of approximately 92,719 acres (from forest, lands and realty, livestock, and minerals management actions) would potentially impact an estimated 840 cultural sites eligible for the NRHP. VRM Class I areas, SMAs, and NSO stipulations would protect 222,070 acres from surface disturbing activities, providing indirect protection to cultural resource sites. VRM Class II designation of 941,810 acres would provide indirect protection to the setting of Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility.	Disturbance of approximately 87,583 acres (from forest, lands and realty, livestock, and minerals management actions) would potentially impact an estimated 794 cultural sites eligible for the NRHP. VRM Class I areas, SMAs, and NSO stipulations would protect 116,000 acres from surface disturbing activities, providing indirect protection to cultural resource sites. VRM Class II designation of 589,530 acres would provide indirect protection to the setting of Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Fire and Fuels			
Vegetation treatments (2,500 acres/year) would not be adequate to create the diversity of seral stages necessary to decrease the potential for wildland fires. Using wildland fire for resource benefit would reintroduce fire, reducing large fire suppression efforts over the long term.	The increase in vegetation and weed treatments (24,400 acres/year) would reduce the annual size of wildland fires to an estimated 2,000 acres. Emphasis on fire suppression of all wildland fires would limit the reintroduction of wildland fire, increasing the need for and complexity of rehabilitation and restoration.	A large number of smaller vegetation treatments (11,800 acres/year) would increase the mosaic vegetation patterns but would not be adequate to slow the spread of wildland fires, or to reduce potential fire size and intensity. Emphasis on the use of wildland fire for resource benefit could achieve the goal of reintroduction of the role of wildland fire into fire-dependent ecosystems.	Vegetation treatments (an estimated 16,400 acres/year) would create more diverse vegetation communities in treated areas and reduce the size and intensity of wildland fires. Emphasis on the use of wildland fire for resource benefit would result in an increase in fuels treatments, creating more diverse vegetation communities in treated areas, and reducing the size and intensity of wildland fires.
Impacts on Forest Resources			
The overall health of timber stands would be improved through increased access and forest management actions. There would be some loss of harvestable acreage from minerals, OHV, and cultural resource management actions.	Impacts under this alternative would be similar to those under Alternative 1, except access to isolated parcels would not be pursued, potentially reducing overall forest health in localized areas. Also, fewer VRM restrictions would result in more timber available for harvest.	Impacts under this alternative would be similar to those under Alternative 1, except the use of wildland fire for resource benefit would result in improved forest health. Also, there would be no commercial timber available for harvest.	Reductions in commercial harvest would require other forest management practices to improve forest health. Impacts under this alternative would be similar to those under Alternative 1, except that there would be more timber available for harvest with fewer VRM restrictions. Also, restrictions on timber harvest within ¼ mile of the Shirley Mountain Bat Cave ACEC and along steep slopes would reduce the acres available for timber harvest.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Lands and Realty			
There would be no reduction in ROW authorizations and development activities. The protection of sensitive resources would greatly influence the location, opportunity, and timing of ROWs and other land and realty authorized facilities. No significant impacts would occur to the lands and realty program. Withdrawals of approximately 8,105 acres would be proposed.	Impacts under this alternative would be the same as under Alternative 1. Withdrawals of approximately 8,825 acres would be proposed.	Impacts under this alternative would be similar to those under Alternative 1, except there would be a slight reduction in ROW authorizations and development activities. Withdrawals of approximately 402,280 acres would be proposed.	Impacts under this alternative would be similar to those under Alternative 1, except there would be no substantial reduction in land tenure adjustments. Withdrawals of approximately 34,024 acres would be proposed.
Impacts on Livestock Grazing			
The proliferation of noxious and invasive weeds and the lack of weed treatments under this alternative would result in a significant loss of forage (and ultimately AUMs). Forage loss from surface disturbance would result in a loss of 1,860 AUMs.	Long-term forage quality and quantity would be improved, as a result of substantial increases in both vegetation and noxious and invasive weed treatments. Forage loss from surface disturbance would result in a loss of 1,880 AUMs.	Long-term forage quality would be improved as a result of managing for DPC and increased vegetation and noxious and invasive weed treatments. Forage loss from surface disturbance would result in a loss of 1,730 AUMs. The loss of up to 30,000 AUMs resulting from a lack of predator control and the increase of wild horses in the Lost Creek HMA would create a significant impact.	Impacts under this alternative would be similar to those under Alternative 3, except vegetation and noxious and invasive weed treatments would be slightly reduced.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Minerals			
Implementation of restrictions on surface disturbing and other disruptive activities would limit oil and gas development and activities. An estimated 8,945 wells would be developed during the planning period. Closing about 8,105 acres to locatable mineral entry and mineral material disposals would limit the amount of land available for development.	Fewer restrictions on surface disturbing and other disruptive activities would allow more time to develop wells and construct facilities resulting in an increase of leasing and drilling activities. An estimated 9,198 wells would be developed during the planning period. Closing about 8,825 acres to locatable mineral entry and mineral material disposals would limit the amount of land available for development.	An increase in restrictions on surface disturbing and other disruptive activities would limit the time available to develop wells and construct ancillary facilities, resulting in a decrease of leasing and drilling activities. An estimated 8,632 wells would be developed during the planning period. Closing about 402,280 acres to locatable mineral entry and mineral material disposals would limit the amount of land available for development.	An increase in restrictions on surface disturbing and other disruptive activities would limit the time available to develop wells and construct ancillary facilities, resulting in a decrease of leasing and drilling activities. An estimated 8,822 wells would be developed during the planning period. Closing about 28,724 acres to locatable mineral entry and mineral material disposals would limit the amount of land available for development.
Impacts on Off-Highway Vehicle Management			
Long-term impacts on OHV use would likely occur in sensitive resource areas as a result of road closures and restrictions. Closing Ferris Mountain WSA, High Savery Dam SMA, and Encampment River WSR (23,020 acres) would limit OHV opportunities.	Long-term impacts on OHV use would likely occur in sensitive resource areas as a result of road closures and restrictions; however, they would be less than those identified in Alternative 1 as a result of reduced restrictions in big game crucial winter range and parturition areas. Closing Ferris Mountain WSA, High Savery Dam SMA, and Encampment River WSR (23,020 acres) would limit OHV opportunities.	This alternative provides the greatest protection to resources that enhance the recreational OHV experience. As a result of this protection, many areas restrict or preclude OHV use, reducing OHV opportunities throughout the RMPPA. Impacts would occur on OHV users seeking open, unconfined OHV opportunities because the Dune Ponds OHV area, all WSAs, and the High Savery Dam ACEC would be closed to off-road use (71,980 acres).	To preserve some important resource values, some areas could limit or preclude OHV use. However, based on the anticipated amount of roads and vehicle routes that would remain available to OHV use within the RMPPA, these impacts would be negligible. Impacts under this alternative would be similar to those under Alternative 1, except that the Adobe Town would be limited to designated roads and vehicle routes (34,030 acres).
Impacts on Paleontology			
98,339 acres of surface disturbing activities could damage and/or dislocate resources through unanticipated discoveries.	Impacts under this alternative would be similar to those under Alternative 1, except that 98,793 acres would be disturbed.	Impacts under this alternative would be similar to those under Alternative 1, except that 92,719 acres would be disturbed.	Impacts under this alternative would be similar to those under Alternative 1, except that 87,583 acres would be disturbed.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Recreation Resources			
Impacts on wildlife and fish would potentially impact recreation opportunities. Conflicting uses from motorized vehicle users and recreationists seeking solitude and natural settings for recreational activities would likely occur as a result of the anticipated increase in OHV use.	Impacts on wildlife and fish would potentially impact recreation opportunities. Similar to Alternative 1, conflicting uses from motorized vehicle users and recreationists seeking solitude and natural settings for recreational activities would likely occur as a result of the anticipated increase in OHV use.	Minimal impacts would occur to recreation management under this alternative. Similar to Alternative 1, conflicting uses from motorized vehicle users and recreationists seeking solitude and natural settings for recreational activities would likely occur as a result of the anticipated increase in OHV use.	Similar to Alternative 1, minimal impacts would occur to recreation management under this alternative. Also, conflicting uses from motorized vehicle users and recreationists seeking solitude and natural settings for recreational activities would likely occur as a result of the anticipated increase in OHV use.
Impacts on Socioeconomics			
Continued management actions within the RMPPA are expected to support jobs and income in the local economy, with most employment opportunities occurring in western portions of the RMPPA. Continuation of management actions is expected to contribute to changes in population trends and government services.	Increased oil and gas development is expected to have positive economic impacts in the form of increased employment, earnings, and mineral tax revenues. Negative impacts could occur on certain social activities as a result of a decline in wildlife resources. Increases in population could lead to greater demands on government services in certain parts of the study area. Increases in ad valorem taxes are expected to be significant toward the later part of the study period.	Restrictions on oil and gas development are expected to have negative economic impacts as a result of potential declines in employment, earnings, and mineral tax revenues. Positive impacts are likely to occur to certain social activities as a result of increased protection of wildlife resources. Population trends in western portions of the study area may be impacted while future mineral ad valorem taxes are expected to decline.	Impacts under this alternative would be the same as under Alternative 1.
Impacts on Special Management Areas			
Wilderness Study Areas			
Management actions in the IMP would result in negligible impacts to wilderness characteristics.	Impacts under this alternative would be the same as under Alternative 1.	Impacts under this alternative would be the same as under Alternative 1.	Impacts under this alternative would be the same as under Alternative 1.
Como Bluff Area			
Significant impacts would not be expected to occur because the level of development and activity that would occur in the ACEC/NNL would be compatible with the objectives and management prescriptions for the area.	The area would be managed as a wildlife habitat management area. Impacts under this alternative would be the same as under Alternative 1.	The area would be managed as an ACEC. Although additional protections are afforded, impacts under this alternative would be the same as under Alternative 1.	The area would be managed as a national natural landmark (NNL). Impacts under this alternative would be the same as under Alternative 1.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Sand Hills Area and Potential JO Ranch Expansion			
Surface disturbing activities would impact the area by removing and degrading portions of the unique bitterbrush/big sagebrush vegetation community. The values of the area would be protected only within the existing ACEC boundaries.	Managing the area for multiple use would result in significant loss of relevant and important values.	Impacts under this alternative would be similar to those under Alternative 1, except implementation of intensive restrictions on surface disturbing and other disruptive activities would result in the greatest level of protection to the unique vegetation community. Incorporating the JO Ranch Expansion into the ACEC would provide additional protection to the unique values of the area.	Impacts under this alternative would be similar to those under Alternative 1, except implementation of additional restrictions on surface disturbing and other disruptive activities would reduce impacts. Also, similar to Alternative 3, incorporating the JO Ranch Expansion into the ACEC would provide additional protection to the unique values of the area.
Jep Canyon Area			
The relevant and important values of the ACEC would be protected. Surface disturbing and other disruptive activities from mineral development would not significantly impact crucial elk winter range or the productivity of raptor nesting pairs because of restrictions and mitigation that would be applied under this alternative.	The ACEC designation would not be maintained. Reduction in restrictions would decrease protection of aspen stands, crucial elk winter range, and the productivity of raptor nesting pairs	The area would be designated an ACEC. Increased restrictions would increase protection of aspen stands, crucial elk winter range, and the productivity of raptor nesting pairs	The ACEC designation would not be maintained because of complexities associated with checkerboard land ownership. Wildlife management actions identified under this alternative would reduce impacts to big game species, raptors, and other species and improve their habitat.
Shamrock Hills Area			
The Shamrock Hills ACEC would be maintained. Existing wildlife restrictions would help reduce impacts; however, surface disturbing activities could impact the productivity of raptor nesting pairs.	The ACEC designation would not be maintained. Impacts to the Shamrock Hills area from other management actions would be greatest under Alternative 2. Fewer stipulations placed on surface disturbing activities would impact the productivity of wildlife.	The ACEC designation would be maintained. This alternative has more restrictive management for minerals management activities and off-road vehicular travel for "necessary tasks." Under this alternative, impacts to raptors and other wildlife within the area would be reduced.	The ACEC designation would not be maintained because of complexities of management associated with the checkerboard land ownership. Wildlife restrictions and mineral management actions identified under this alternative would provide adequate protection to raptors and other species and improve their habitat.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Stratton Sagebrush Steppe Area			
The area would be managed as a research area. The research potential of the area could be compromised. Impacts would be significant because grazing and vegetation treatment actions may not be compatible with the research objectives and management prescriptions for the area.	Impacts under this alternative would be the same as under Alternative 1.	The area would be designated as an ACEC. A lower level of surface disturbance from grazing and vegetation treatment actions under this alternative would reduce related impacts. Significant impacts would not be expected to occur because the level of development and activity that would occur in the area would be compatible with the objectives and management prescriptions for the area.	The area would be managed as a research area. A lower level of surface disturbance grazing and vegetation treatment actions under this alternative would reduce related impacts. Significant impacts would not be expected to occur because the types of disturbances from BLM-approved activities would be compatible with the research goals for the area.
Chain Lakes Area			
The area would be managed as a wildlife habitat management area Mineral development activities and associated infrastructure would potentially result in significant impacts to the unique alkaline lake system.	The area would not be designated as an ACEC and would be managed as a wildlife habitat management area. Mineral development activities and associated infrastructure would result in significant impacts to the unique alkaline lake system. Reductions in wildlife and surface disturbance restrictions would increase impacts.	The Chain Lakes Area would be designated as an ACEC. The ACEC designation would restrict or prohibit new mineral development within the area, allowing for increased protection of the unique alkaline desert wetlands.	The area would not be designated as an ACEC and would be managed as a wildlife habitat management area. Stipulations designed to protect wildlife habitat would be adequate but would not provide as much protection as under Alternative 3.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Laramie Peak Area			
The area would be managed as a wildlife habitat management area. Because of the proliferation of cheatgrass in disturbed areas and the dominance of late seral condition plant communities throughout, habitat and forage would be compromised.	The area would be managed as a wildlife habitat management area. Increased vegetation and weed treatments would maintain and enhance forage and habitat for wildlife and livestock. Not pursuing land tenure adjustments would reduce BLM's ability to effectively manage for wildlife objectives. Reduced restrictions on surface disturbing activities would increase the potential for forage loss, human-induced stress to wildlife species, and habitat fragmentation.	Laramie Peak would be designated as an ACEC. Crucial habitat for bighorn sheep, elk, and mule deer would be afforded the greatest protection because of restrictions on surface disturbing activities. Relevant and important values would be conserved through management actions of other resource programs.	The area would be managed as a wildlife habitat management area. Vegetation treatments designed to achieve DPC, restrictions on surface disturbing activities, and restriction on off-road motorized vehicle use would benefit wildlife habitat used by big horn sheep, elk, and other big game animals.
Red Rim-Daley Area			
The area would be managed as a wildlife habitat management area. Surface disturbing activities would result in localized habitat loss and degradation as well as short-term wildlife displacement. However, seasonal restrictions on surface disturbing activities would help reduce these impacts.	The area would be managed as a wildlife habitat management area. Surface disturbing activities would not be mitigated to the extent under Alternative 1, resulting in a potential loss of wildlife forage and habitat. A reduction in the timing stipulations would increase human-induced stress to wildlife species, potentially resulting in displacement.	The Red Rim-Daley Area would be designated as an ACEC. Management objectives for the ACEC would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area. Increased restrictions on surface disturbing activities would reduce the loss of habitat and forage and stress to wildlife species. Pursuing land acquisitions would potentially result in contiguous management of wildlife habitat.	The area would be managed as a wildlife habitat management area. Restrictions on surface disturbing activities would reduce the loss of wildlife forage and habitat and stress to wildlife species during critical periods. Increased vegetation management actions would enhance wildlife habitat.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Pennock Mountain Area			
The area would be managed as a wildlife habitat management area. Seasonal restrictions would protect the area from disturbing activities during winter.	The area would be managed as a wildlife habitat management area. Seasonal restrictions would be less restrictive.	The area would be managed as a wildlife habitat management area. Restrictions on surface disturbing activities, reduced human presence during critical times, and using livestock as a management tool for wildlife objectives would provide protection of crucial winter habitat for elk and mule deer.	The area would be managed as a wildlife habitat management area. Management actions from wildlife, vegetation, and livestock management would maintain and enhance critical habitat and forage. Wildlife habitat objectives would be considered for all surface disturbing activities.
Wick Beumee Area			
The area would be managed as a wildlife habitat management area. There would be no impacts to the continued ability of the unit to serve its intended purpose from any BLM program activity.	Impacts under this alternative would be the same as under Alternative 1.	Impacts under this alternative would be the same as under Alternative 1.	Impacts under this alternative would be the same as under Alternative 1.
Shirley Mountain Bat Cave Area			
The Shirley Mountain Caves SRMA would not be maintained. Alternative 1 would provide adequate protection to most wildlife resources in the area. However, because timber harvesting would be allowed in the watershed above the caves would alter the hydrology, the climatic and ecological conditions required for the bat species within the cave system would not be protected.	The Shirley Mountain Caves SRMA, including the Cave Creek Cave, would not be maintained. Intensive management of timber harvesting within ¼-mile of the cave complex would help maintain the hydrology that creates the climatic and ecological conditions required for bat species to maintain a viable population within the cave system.	The Shirley Mountain Caves SRMA would not be maintained, and the area would be managed as an ACEC (520 acres). Not allowing timber harvesting within ½-mile of the cave complex would maintain the hydrology that creates the climatic and ecological conditions required for bat species to maintain a viable population within the cave system.	The Shirley Mountain Caves SRMA would not be maintained, and the area would be managed as an ACEC (240 acres). Not allowing timber harvesting within ¼-mile of the cave complex would maintain the hydrology that creates the climatic and ecological conditions required for bat species to maintain a viable population within the cave system. Increasing the seasonal closure under this alternative would afford additional protection of the bat species.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Laramie Plains Lakes Area			
The area would be managed as a wildlife habitat management area. Pursuit of public land acquisitions could increase the potential for expansion of the Wyoming toad habitat. However, increased access associated with acquisitions could increase impacts from surface disturbing and other disruptive activities.	The area would be managed as a wildlife habitat management area. Public land acquisitions would not be pursued within the Laramie Plains Lakes Area, potentially limiting management opportunities for the benefit of Wyoming toad habitat.	The Laramie Plains Lakes area would be designated as an ACEC. Management actions from other resource programs would protect the potential habitat for the endangered Wyoming Toad.	The area would be managed as a wildlife habitat management area Impacts would be similar to those under Alternative 1. However, limiting off-road vehicular use for necessary tasks and mineral entry activity would also help to maintain habitat for the endangered Wyoming toad.
Historic Trails			
Surface disturbing activities could create visual intrusions and degrade the visual integrity and historic values of the trails. However, restrictions on such activities (e.g., avoidance within 1/4-mile, or the visual horizon, in contributing sections) would help to reduce impacts.	Impacts would be similar to those under Alternative 1, except increased mineral development and reduced restrictions on surface disturbing and other disruptive activities from other resource management would potentially result in collective impacts to the values that make the trails eligible for NRHP.	Surface disturbing activities could create visual intrusions on existing leases and degrade the visual integrity and historic values of the trails. However, restrictions on such activities (e.g., NSO within 1/4-mile, or the visual horizon, in contributing sections on existing leases) would reduce impacts. Increase in VRM Class II areas (e.g., 5 miles from trail trace) would reduce related impacts. These measures would help protect both the physical and visual integrity of the trails.	Surface disturbing activities could create visual intrusions and degrade the visual integrity and historic values of the trails. However, restrictions on such activities (e.g., NSO within 1/4-mile, or the visual horizon, in contributing sections) would reduce impacts. Increase in VRM Class II areas (e.g., 2 miles from trail trace in contributing sections) would reduce related impacts. These measures would help protect both the physical and visual integrity of the trails.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Blowout Penstemon Area			
Surface disturbing activities that occur in blowout penstemon potential habitat would indirectly affect the future expansion of the population. Land tenure adjustments would be pursued to reduce the effects of surface disturbance associated with non-federal inholdings and thereby protect additional blowout penstemon habitat areas. Intensive management of surface disturbing and other disruptive activities would prevent direct impacts to blowout penstemon on BLM-administered lands.	Impacts under this alternative would be similar to those under Alternative 1, except land tenure adjustments would not be pursued, potentially limiting management opportunities for the benefit of blowout penstemon habitat.	Impacts under this alternative would be similar to those under Alternative 1, except designating the area as an ACEC would promote additional protection for blowout penstemon habitat through restrictions on surface disturbing and other disruptive activities. Although surface disturbing and other disruptive activities would still affect the future expansion of the population, the relevant and important values of the ACEC would be protected.	Impacts under this alternative would the same as under Alternative 3.
Upper Muddy Creek Watershed/Grizzly Area			
The grizzly allotment portion of the Upper Muddy Creek Watershed would be managed as a wildlife habitat management area (26,850 acres). Management would not specifically address the conservation of Colorado River fish fauna and terrestrial wildlife species. There would be significant impacts to the area (e.g., such as reduction of fish habitat, sedimentation of creeks).	The area would be managed as a wildlife habitat management area (70,780 acres). Impacts under this alternative would be similar to those under Alternative 1, except the magnitude of development activities would be greater, and impacts would be proportionally larger.	The area would be designated as an ACEC (70,780 acres). Management would emphasize the conservation of Colorado River fish fauna and terrestrial wildlife species. Increased wildlife protection measures would result in proportionally fewer impacts. Prohibiting surface discharge of produced water would maintain hydrologic function for fish habitat	The area would be managed as a wildlife habitat management area (70,780 acres). Consideration would be given to the conservation of Colorado River fish fauna and terrestrial wildlife species. Prohibiting surface discharge of produced water would maintain hydrologic function for fish habitat

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
White-Tailed Prairie Dog Area			
The area would not be designated as an ACEC. Surface disturbing and other disruptive activities would be avoided near white-tailed prairie dog towns or complexes. Intensive management and continuation of existing management practices would meet the needs of the white-tailed prairie dog populations and protect the area by relocating activities outside of white-tailed prairie dog towns.	The area would not be designated as an ACEC. Not avoiding surface disturbance would degrade white-tailed prairie dog habitat. Increased predation and stress of white-tailed prairie dogs would occur.	The area would be designated as an ACEC. Surface disturbing and other disruptive activities would be prohibited within white-tailed prairie dog towns or complexes. Intensive management would meet the needs of the white-tailed prairie dog populations and protect the area by relocating activities outside of white-tailed prairie dog towns.	The area would not be designated as an ACEC. Impacts under this alternative would be the same as under Alternative 1.
High Savery Dam Area			
The area would not be designated as an ACEC. Management actions would result in protection of the dam and reservoir area, as per the MOU.	The area would not be designated as an ACEC. Impacts under this alternative would be the same as under Alternative 1.	The area would be designated as an ACEC. Management actions would provide an additional level of protection for the dam and reservoir area. Alternative 3 would provide protection of riparian habitat and would move the vegetation communities toward DPC, through intensive management of riparian habitat and proposed vegetation management and minerals management.	The area would be designated as an ACEC. Impacts under this alternative would be the same as under Alternative 3.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Continental Divide National Scenic Trail			
Based on the objectives for the SRMA, which encourages multiple use of lands adjacent to the trail, resource program management actions would not impact the SRMA.	Impacts under this alternative would be the same as under Alternative 1.	Impacts under this alternative would be similar to those under Alternative 1, except public lands 30 feet either side of the centerline along the trail would be closed to locatable mineral entry and land tenure adjustments. These actions would limit industrial development that would potentially reduce the quality of the recreational experience of some users of the trail.	Impacts under this alternative would be the same as under Alternative 3.
North Platte River Area			
The area would be designated as an SRMA. Lands and realty management actions to improve access to the river would help disperse usage and improve the recreational experience. Significant impacts from noxious and invasive weeds would occur, which would detract from the recreational experience along the river.	The area would not be designated as an SRMA. Impacts under this alternative would be the same as under Alternative 1.	The area would be designated as an SRMA. Visitor access would be limited to existing public access points along the river. Both a wider corridor on either side of the river and a VRM Class II designation would protect the recreational experience of the North Platte River SRMA. Noxious and invasive weeds management actions would improve the overall recreational experience.	The area would be designated as an SRMA. Lands and realty management actions to improve access to the river would help disperse usage and improve the recreational experience. Noxious and invasive weeds management actions would improve the overall recreational experience.
Rawlins Off-Highway Vehicle Area			
This area would not be managed as an SRMA. OHV use would be constrained within the designated area, which would enhance public safety and minimize resource conflicts.	The area would be designated as an SRMA. OHV use would not be constrained within the SRMA. Riders would have unrestricted use of the designated area. This would lead to potential threats to public safety, and resource conflicts.	The area would be designated as an SRMA. OHV use would be limited to a designed recreational course, which would improve public safety, limit resource damage, and minimize conflicts between users.	The area would not be designated as an SRMA. Impacts under this alternative would be the same as under Alternative 3.
National Natural Landmarks			
There would be negligible impacts to the NNLs from any management action.	Impacts under this alternative would be the same as under Alternative 1.	Impacts under this alternative would be the same as under Alternative 1.	Impacts under this alternative would be the same as under Alternative 1.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Encampment River (Wild and Scenic)			
There would be a significant impact from the proliferation of invasive weed species, which would impact the outstandingly remarkable characteristics of the WSR. The area proposed for WSR designation falls entirely within the Encampment River WSA, which constrains the development of alternate interim management prescriptions.	Although the river would not be designated a WSR, values would be protected under the management of the Encampment River Canyon WSA unless Congress were to release the WSA from wilderness consideration.	This alternative would provide the most protection to the outstandingly remarkable characteristics of the proposed WSR, and significant impacts would not occur.	Although the level of protection would not be as great as that under Alternative 3, the outstandingly remarkable characteristics of the proposed WSR would be protected, and significant impacts would not occur.
Impacts on Transportation and Access			
Restrictions on surface disturbing activities to protect sensitive resources would influence the placement of roadways and access during certain times of the year. However, substantial restrictions on public access and opportunities for access easement acquisitions and subsequent road development would not occur. Therefore, significant impacts to the transportation and access management program would not occur under this alternative.	Impacts under this alternative would be the same as under Alternative 1, except impacts would be the least extensive under this alternative because of less restrictive requirements for surface disturbing activities.	Impacts under this alternative would be the same as under Alternative 1, impacts would be the most extensive under this alternative because of more restrictive requirements for surface disturbing activities.	Impacts under this alternative would be the same as under Alternative 1, except impacts would be slightly greater because of more restrictive requirements for surface disturbing activities.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Vegetation			
Surface disturbing activities would result in direct removal of vegetation resources. Loss of vegetation in general can affect the viability and uniqueness of vegetation communities and impair the ability of vegetation to support other resource values. Insufficient vegetation treatment would result in an increase in decadent plant communities and noxious and invasive weed proliferation, which would cause the majority of vegetation to remain in late successional stages. This would not allow plant communities to adequately support other resource uses. The treatment of noxious and invasive weeds would not be sufficient to slow the proliferation of noxious and invasive weed species, further reducing the productivity of vegetation communities. No significant impacts to sensitive or special status plant species would likely occur.	Impacts under this alternative would be the same as under Alternative 1, except increased surface disturbance would increase related effects. This level of vegetation treatment, emphasizing landscape-scale projects, would increase the proportion of early- and mid-seral plant communities. This would result in vigorous, diverse, and productive plant communities. Treatments would, in the long term, control the introduction and proliferation of noxious and invasive weeds in the RMPPA. Occupied special status plant habitat would be protected; however, potential habitat for expansion of these species would not be protected and, therefore, opportunities for population increases would be reduced.	Impacts under this alternative would be the same as under Alternative 1, except decreased surface disturbance would reduce related effects. This level of vegetation treatment, emphasizing smaller and more numerous projects combined with the use of fire for resource benefit, would help to increase the proportion of early- and mid-seral plant communities. This would improve the vigor, diversity, and productivity of plant communities. Treatments would keep pace with the establishment of new noxious and invasive weed populations and attempt to control the proliferation of noxious and invasive weeds over the long term. There would be no significant impacts to special status plants or their communities.	Impacts under this alternative would be the same as under Alternative 1, except decreased surface disturbance would slightly reduce related effects. This level of vegetation treatment, emphasizing landscape-scale projects combined with the use of fire for resource benefit, would increase the proportion of early- and mid-seral plant communities, which would result in vigorous, diverse, and productive plant communities. Treatments would keep pace with the establishment of new noxious and invasive weed populations and attempt to control the proliferation of noxious and invasive weeds over the long term. There would be no significant impacts to special status plants or their communities.
Impacts on Visual Resources			
Surface disturbing activities designed to be consistent with the VRM Class would maintain VRM Classifications.	Impacts would be the same as under Alternative 1.	Impacts would be the same as under Alternative 1.	Impacts would be the same as under Alternative 1.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Water Quality, Watershed, and Soils			
The combined impact of surface disturbing activities would likely have impacts on water quality and watersheds in localized areas. BMPs for non-point source pollution (Appendix 13) would be applied to mitigate impacts. Produced water from minerals actions would be surface discharged and would likely have significant impacts on water quality and watersheds in the Colorado River Basin or in the North Platte River above Seminoe Reservoir. Surface disturbing activities would impact soil resources in localized areas, resulting in soil loss above natural levels.	Similar to Alternative 1, the combined impact of surface disturbing activities would likely have impacts on water quality and watersheds in localized areas. BMPs for non-point source pollution (Appendix 13) would be applied to mitigate impacts. Also, surface disturbing activities would impact soil resources in localized areas, resulting in soil loss above natural levels. Produced water from minerals actions would be surface discharged and would result in the greatest likely impacts on water quality and watersheds in the Colorado River Basin or in the North Platte River above Seminoe Reservoir. The potential for impacts is most likely under Alternative 2.	Similar to Alternative 1, the combined impact of surface disturbing activities would likely have impacts on water quality and watersheds in localized areas. BMPs for non-point source pollution (Appendix 13) would be applied to mitigate impacts. Also, surface disturbing activities would impact soil resources in localized areas, resulting in soil loss above natural levels. Reinjecting produced water into the Colorado River Basin and only allowing surface discharge in the North Platte and Great Divide basins that would meet BLM management objectives would result in the least number of water quality standards exceedences.	Similar to Alternative 1, the combined impact of surface disturbing activities would likely have impacts on water quality and watersheds in localized areas. BMPs for non-point source pollution (Appendix 13) would be applied to mitigate impacts. Also, surface disturbing activities would impact soil resources in localized areas, resulting in soil loss above natural levels. Similar to Alternative 3, reinjecting produced water into the Colorado River Basin and only allowing surface discharge in the North Platte and Great Divide basins that would meet BLM management objectives would result in the least number of water quality standards exceedences. However, there would be additional surface discharges of produced water in the North Platte and Great Divide basins under this alternative.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Wild Horses			
Wild horses would be temporarily displaced from preferred locations by human presence and activities. Habitat components, such as forage and water, would be stable or improve in quality and quantity. Genetic viability of wild horses in all HMAs would be maintained. Preservation of the New World Iberian genotype in the Lost Creek HMA would not be guaranteed.	Increased development would increase the short-term displacement of wild horses, leading to a greater loss in the wild and free-roaming nature than any other alternative. Habitat components, such as forage and water, would decrease. Similar to Alternative 1, genetic viability of wild horses in all HMAs would be maintained. Preservation of the New World Iberian genotype in the Lost Creek HMA would not be guaranteed.	Increased restrictions on surface disturbing and other disruptive activities would reduce human activity, thereby preserving the wild and free-roaming nature of wild horses. Habitat components, such as forage and water, would increase and improve in quality and quantity. Viability of the genetically significant New World Iberian genotype in the Lost Creek HMA would be ensured.	Increased protection would decrease human presence in HMAs related to surface disturbing and other disruptive activities and preserve the wild and free-roaming nature of wild horses. Similar to Alternative 1, genetic viability of wild horses in all HMAs would be maintained. Preservation of the New World Iberian genotype in the Lost Creek HMA would not be guaranteed. Also, habitat components, such as forage and water, would decrease.

SUMMARY COMPARISON OF IMPACTS			
Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4 (Preferred)**
Impacts on Wildlife and Fish			
Impacts would result from minerals management year round, and particularly in seasonally sensitive wildlife habitats. Minerals development would continue to impact wildlife and fish through loss, alteration, and fragmentation of habitats and displacement of wildlife. An increased number of roads, pipelines, and infrastructure for surface water disposal would increase habitat loss, fragmentation, and changes in surface hydrology. Vegetation treatments would not be adequate to achieve wildlife habitat goals. The combined impacts from these actions would lead to significant impacts in localized areas. Additional impacts could result from livestock management, minerals development, OHV activities, wild horse use, vegetation management, road crossings, impoundments, and instream structures.	Under Alternative 2, more surface disturbance is estimated to occur. Impacts would result from yearlong drilling. Minerals development would continue to impact wildlife and fish through loss, alteration, and fragmentation of habitats and displacement of wildlife. An increased number of roads, pipelines, and infrastructure for surface water disposal would increase habitat loss, fragmentation, and changes in surface hydrology. The combined impacts from these actions would lead to significant impacts in localized areas, and would be more likely under this alternative. Additional impacts would result from livestock management, minerals development, OHV activities, wild horse use, SMA, vegetation management, road crossings, impoundments, and instream structures.	The greatest amount of protection for wildlife and fish species, associated habitats, and sensitive life cycles would be provided under this alternative from SMA designations and other protective measures. Additional impacts would result from management of vegetation, livestock, mineral, OHV use, wild horses, and fire and fuels management.	Conservation measures and BMPs designed to reduce surface disturbing and other disruptive activities in sensitive habitats during critical times of the year would be used to minimize impacts. Vegetation management in wetland/riparian areas to meet DPC would result in significant, long-term benefits to wildlife, especially big game. Additional impacts would result from livestock management, minerals management, OHV activities, and wild horse use. Increased numbers of SMAs would benefit wildlife. In addition, fire and fuels management would displace wildlife but provide natural disturbance regimes to maintain diversity.

Table 2-5. Utility/Transportation Systems and Wind Energy Avoidance Areas

Avoidance Areas	Acres[1]			
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
WSAs (VRM I)	67,730	67,730	67,730	67,730
Steep slopes greater than 25%	210,410	210,410	210,410	210,410
Identified 100-year floodplains; 500 feet from perennial surface waters, wells, springs and wetland/riparian areas; 100 feet from the inner gorge of ephemeral channels[2]	60,430	60,430	60,430	60,430
Greater-Sage and Sharp-Tailed Grouse Leks (1/4 Mile)	46,360	46,360	46,360	46,360
VRM class II	359,610	233,930	941,820	590,430
Como Bluffs ACEC/National Natural Landmark	1,690	1,690	1,690	1,690
Sand Hills/JO Ranch Expansion ACEC	7,960	7,960	12,700	12,700
Jep Canyon ACEC/WHMA	13,810	13,810	13,810	13,810
Shamrock Hills ACEC/WHMA	18,400	18,400	18,400	18,400
Blowout Penstemon SMA/ACEC	90	90	4,020	4,020
Shirley Mountain Bat Cave SMA/ACEC	NA	240	520	240
Shirley Mountain Caves SRMA	24,440	NA	NA	NA
Chain Lakes SMA/ACEC	NA	NA	30,520	NA
Red Rim-Daley SMA/ACEC	NA	NA	15,980	NA
Laramie Peak SMA/ACEC	NA	NA	18,940	NA
Upper Muddy Creek Watershed/Grizzly SMA/ACEC	NA	NA	70,780	70,780
Pennock Mountain SMA/ACEC	NA	NA	7,770	7,770
Laramie Plains Lakes SMA/ACEC	NA	NA	1,600	1,600
Wick-Beumee WHMA	280	NA	280	NA
High Savery Dam SMA/ACEC	530	530	530	530
Stratton Sagebrush Steppe Research Area SMA/ACEC	5,530	5,530	5,530	5,530
Hogback Lake OHV SRMA	480	480	480	480
White-Tailed Prairie Dogs SMA/ACEC[3]	NA	NA	ND	NA
NRHP Contributing Portions of Historic Trails	41,000	41,000	66,260	41,000
Existing and proposed recreation sites	9,660	9,660	24,310	16,090
Special Status Plant Species Areas and Unique Plant Communities[4]	ND	ND	ND	ND

Notes:

1 Alternatives 1, 2, and 4 indicate acres, with important resource values, that would be avoided for new facility placement. Alternative 3 indicates acres with important resource values that would be closed to new facility placement, including routes·

2 Acreage only reflects 500 feet from perennial surface waters, wells, springs, and wetland/riparian areas.

3 Not shown on map; covers 59, 261 acres of RMPPA.

4 Those avoidance areas not calculated and acres not mapped would be assessed on a case-by-case basis.

NA Not applicable to the alternative
ND Could not be determined at this time

Table 2-6. Areas of Fluid Mineral Lease Conditional Requirements by Hydrocarbon Potential (Approximate Federal Subsurface Acres)[1]

Area	Hydrocarbon Potential (Federal subsurface acres)			Total
	High	Moderate	Low	
ALTERNATIVE 1:				
NO LEASE[2]				
WSAs	0	27,050	37,100	64,150
Encampment River Wild and Scenic River	0	0	620	620
Total Affected Area (in acres)[5]	**0**	**27,050**	**37,100**	**64,150**
NO SURFACE OCCUPANCY[3,4]				
High Savery Dam and Reservoir area	0	0	1,050	1,050
Active raptor nest areas	15,900	37,040	45,350	98,290
Stratton Sagebrush Steppe Research Area	0	0	0	0
JO Ranch Site	1	0	0	1
Cemeteries	0	0	120	120
Black footed ferret	N/D	N/D	N/D	N/D
Towns + ¼ mile	480	40	150	670
Campgrounds and recreation sites	0	540	9,430	9,970
Identified or known Preble's meadow jumping mouse hibernation habitat	0	0	1,340	1,340
Total Affected Area (in acres)[5]	**16,290**	**37,480**	**55,900**	**109,660**
CONTROLLED SURFACE USE[3,4]				
Chain Lakes ACEC (Delineated Wetlands)	0	1,320	2,350	3,670
Jep Canyon – aspen vegetation	20	80	1,420	1,520
Blowout penstemon habitat	0	0	90	90
Shirley Mountain SRMA/Bat Caves			11,270	11,270
Non-trail cultural eligible properties + ¼ mile	0	130	110	240
North Platte River SRMA + ¼ mile either side of the river	0	100	5,240	5,340
Rawlins OHV Area	480	0	0	480
Perennial waters, Wetland/Riparian Areas + 500 feet	5,460	3,880	57,650	66,990
Historic Trails + ¼ mile	5,080	15,670	14,810	35,560
Black-tailed prairie dog complexes	N/D	N/D	N/D	N/D
White-tailed prairie dog complexes	N/D	N/D	N/D	N/D
Ute ladies' tresses[6]	N/D	N/D	N/D	N/D
Greater and sharp-tailed sage-grouse leks + ¼ mile	8,050	5,930	18,010	31,990
Western boreal toad[6]	N/D	N/D	N/D	N/D
Wyoming toad	0	0	0	0
Yellow-billed cuckoo[6]	N/D	N/D	N/D	N/D
VRM Class II	11,800	17,870	483,980	513,650
Total Affected Area (in acres)[5]	**29,530**	**43,310**	**535,960**	**608,800**
SEASONAL LIMITATIONS[3,4]				
Big game parturition areas	0	0	16,690	16,690

Area	Hydrocarbon Potential (Federal subsurface acres)			Total
	High	Moderate	Low	
Bald eagle communal winter roost sites[7]	0	0	10	10
Bald eagle nesting habitat + 1 mile	0	600	3,680	4,280
Big game crucial winter range	100,180	208,390	538,540	847,110
Golden eagle, bald eagle, and ferruginous hawk nesting habitat + 1 mile	60,940	152,480	174,070	387,490
Raptor nests + ¾ mile	55,300	146,120	133,310	334,730
Greater sage-grouse nesting habitat + 2 miles	221,650	211,020	553,900	986,570
East of Highway 789: Greater sage-grouse leks + 2 miles	146,000	46,490	31,480	223,970
Sharp-tailed grouse nesting habitat + 1 mile	5,350	3,630	3,950	12,930
East of Highway 789: Sharp-tailed grouse leks + 1 mile	5,350	3,630	3,940	12,920
Greater sage-grouse winter habitat	90	270	0	360
Mountain plover habitat	89,790	166,680	372,750	629,220
Total Affected Area (in acres)[5]	**323,730**	**543,190**	**1,184,400**	**2,051,320**
ALTERNATIVE 2:				
NO LEASE[2]				
WSAs	0	27,050	37,100	64,150
Rawlins OHV SRMA (new leases)	0	0	0	0
Encampment River Wild and Scenic River	0	0	610	610
Total Affected Area (in acres)[5]	**0**	**27,050**	**37,100**	**64,150**
NO SURFACE OCCUPANCY[3,4]				
High Savery Dam and Reservoir area	0	0	1,050	1,050
JO Ranch Site	1	0	0	1
Cemeteries	0	0	120	120
Black footed ferret	N/D	N/D	N/D	N/D
Identified or known Preble's meadow jumping mouse breeding habitat	0	0	1,340	1,340
Towns + ¼ mile	480	40	150	670
Campgrounds and recreation sites (1/4 Mile Buffer)	0	540	9,430	9,970
Gibben's Beard Tongue	0	20	0	20
Total Affected Area (in acres)[5]	**480**	**600**	**12,040**	**13,120**
CONTROLLED SURFACE USE[3,4]				
Non-tail cultural eligible properties + ¼ mile radius	0	130	110	240
Historic Trails + ¼ mile	5,340	16,380	14,850	36,570
Stratton Sagebrush Steppe Research Management Area	0	0	0	0
Blowout penstemon area	0	0	90	90
Shirley Mountain Bat Cave area	0	0	240	240
Rawlins OHV SRMA (existing leases)	480	0	0	480
Perennial waters, Wetland/Riparian Areas + 500 feet	5,810	4,140	62,560	72,510
Black-tailed prairie dog complexes	N/D	N/D	N/D	N/D
White-tailed prairie dog complexes	N/D	N/D	N/D	N/D
Preble's meadow jumping mouse[6]	N/D	N/D	N/D	N/D

Area	Hydrocarbon Potential (Federal subsurface acres)			Total
	High	Moderate	Low	
Ute ladies' tresses[6]	N/D	N/D	N/D	N/D
Western boreal toad[6]	N/D	N/D	N/D	N/D
Wyoming toad	0	0	0	0
Yellow-billed cuckoo[6]	N/D	N/D	N/D	N/D
VRM Class II	0	1,400	328,520	329,920
Total Affected Area (in acres)[5]	**10,840**	**21,110**	**369,820**	**401,770**
SEASONAL LIMITATIONS[3,4]				
Bald eagle communal winter roost sites	0	0	10	10
Bald eagle nesting habitat + ½ mile	0	80	710	790
Raptor nests + ½ mile	72,570	167,960	192,410	432,940
Mountain plover habitat	89,790	166,680	372,750	629,220
Total Affected Area (in acres)[5]	**141,880**	**294,980**	**496,780**	**933,640**
ALTERNATIVE 3:				
NO LEASE[2]				
WSAs	0	27,050	37,100	64,150
West end of Ferris Mountains	0	0	2,960	2,960
Adobe Town fringe areas	0	26,540	3,490	30.030
North Platte River SRMA + ½ mile either side of the river	0	340	14,490	14,830
Wick-Beumee Wildlife Habitat Management Area	0	0	1,930	1,930
Stratton Sagebrush Steppe Research Area ACEC	0	0	0	0
Chain Lakes ACEC (New Leases)	0	3,120	630	3,750
Jep Canyon Wildlife Habitat Management Area	80	0	200	280
Laramie Plains Lakes ACEC (New Leases)	0	0	0	0
Shirley Mountain Bat Cave ACEC	0	0	520	520
Rawlins OHV SRMA (New Leases)	0	0	0	0
Encampment River Wild and Scenic River	0	0	620	620
Sand Hills ACEC and JO Ranch Expansion (New leases)	2,440	10	80	2,530
Raptor concentration areas (RCAs)	6,530	13,590	15,950	36,070
Total Affected Area (in acres)[5]	**9,010**	**70,530**	**77,220**	**156,760**
NO SURFACE OCCUPANCY[3,4]				
High Savery Dam ACEC	0	0	1,050	1,050
Non-tail cultural eligible properties + ¼ mile radius	0	130	110	240
Greater and sharp-tailed sage-grouse leks + ¼ mile	8,050	5,930	18,010	31,990
Active raptor nest areas (1320 ft.)	23,830	58,220	65,710	147,760
Bald Eagle Nesting Area (1/2 Mile)	0	80	710	790
Big game parturition areas	0	0	16,690	16,690
Upper Muddy Creek/Grizzly (New Leases - Located 1/4 mile from Perennial Streams)	140	40	10	190
JO Ranch Site	1	0	0	1
Como Bluff ACEC (new leases)	0	0	0	0
Blowout Penstemon ACEC	0	0	5,070	5,070

Area	Hydrocarbon Potential (Federal subsurface acres)			Total
	High	Moderate	Low	
Identified or known Preble's meadow jumping mouse breeding habitat	0	0	1,340	1,340
Cemeteries	0	0	120	120
Towns + ¼ mile	480	40	150	670
Campgrounds and recreation sites + ½ mile	0	1,200	14,880	16,080
Perennial waters, Wetland/Riparian Areas + 500 feet	5,810	4,140	62,560	72,510
Black footed ferret	N/D	N/D	N/D	N/D
Historic Trails + ¼ mile (new leases)	860	700	13,880	15,440
Gibben's beardtongue	0	20	0	20
Total Affected Area (in acres)[5]	**34,710**	**62,560**	**171,250**	**268,520**
CONTROLLED SURFACE USE[3,4]				
Upper Muddy Creek Watershed/Grizzly ACEC (Existing Leases - Located ¼ Mile from Perennial Water)	10,050	14,590	11,000	35,640
Sand Hills ACEC and JO Ranch Expansion (existing leases)	7,690	980	0	8,670
Jep Canyon Wildlife Habitat Management Area (existing leases)	5,120	4,760	2,380	12,260
Chain Lakes ACEC (existing leases)	0	8,920	14,980	23,900
Stratton Sagebrush Steppe Research Area ACEC (existing leases)	0	0	0	0
Rawlins OHV SRMA (existing leases)	480	0	0	480
Historic Trails + ¼ mile (existing leases)	10,770	16,590	11,460	38,820
Black-tailed prairie dog complexes	N/D	N/D	N/D	N/D
White-tailed prairie dog complexes	N/D	N/D	N/D	N/D
Ute ladies' tresses[6]	N/D	N/D	N/D	N/D
Western boreal toad[6]	N/D	N/D	N/D	N/D
Wyoming toad	0	0	0	0
Yellow-billed cuckoo[6]	N/D	N/D	N/D	N/D
VRM Class II	107,650	207,160	546,850	947,330
Total Affected Area (in acres)[5]	**114,540**	**226,550**	**571,190**	**912,280**
SEASONAL LIMITATIONS[3,4]				
Bald eagle communal winter roost sites	0	0	10	10
Bald eagle nesting habitat + 1 ½ miles	0	1,750	8,500	10,260
Bald eagle communal roosting + 2 miles	0	3,370	14,840	18,210
Raptor nests + 1 ½ miles	276,030	546,480	690,610	1,513,120
Greater sage-grouse nesting habitat + 2 miles	221,650	211,020	553,900	986,570
East of Highway 789: Greater sage-grouse leks + 4 miles	178,290	83,590	71,200	333,080
Sharp-tailed grouse nesting habitat + 1 mile	5,350	3,630	3,950	12,930
East of Highway 789: Sharp-tailed grouse leks + 2 miles	14,540	7,750	10,100	32,390
Mountain plover habitat	89,790	166,680	372,750	629,220
Big game crucial winter range	100,180	208,380	538,540	847,100
Total Affected Area (in acres)[5]	**357,900**	**681,080**	**1,337,201**	**2,376,170**

Area	Hydrocarbon Potential (Federal subsurface acres)			Total
	High	Moderate	Low	
ALTERNATIVE 4:				
NO LEASE[2]				
WSAs	0	27,050	37,100	64,150
West end of Ferris Mountains	0	0	2,960	2,960
Stratton Sagebrush Steppe Research Management Area (new leases)	0	0	0	0
Encampment River Wild and Scenic River	0	0	620	620
Total Affected Area (in acres)[5]	**0**	**27,050**	**40,040**	**67,090**
NO SURFACE OCCUPANCY[3,4]				
High Savery Dam and Reservoir area	0	0	1,050	1,050
Greater and sharp-tailed sage-grouse leks + ¼ mile	8,050	5,930	18,010	31,990
Active raptor nest areas (825 ft. to 1200 ft.)	15,900	37,040	45,350	98,290
JO Ranch Site	1	0	0	1
Blowout Penstemon ACEC	0	0	5,070	5,070
Gibben's beardtongue	0	20	0	20
Cemeteries	0	0	120	120
Non-tail cultural eligible properties + ¼ mile radius	0	130	110	240
Towns + ¼ mile	480	40	150	670
Bald Eagle + ½ Mile	0	80	710	790
Identified or known Preble's meadow jumping mouse hibernation habitat	0	0	1,340	1,340
Campgrounds and recreation sites + ¼ mile	0	540	9,430	9,970
Black footed ferret	N/D	N/D	N/D	N/D
Historic Trails + ¼ mile (New Leases)	140	700	11,470	12,310
Total Affected Area (in acres)[5]	**24,160**	**44,110**	**90,470**	**158,740**
CONTROLLED SURFACE USE[3,4]				
Stratton Sagebrush Steppe Research Management Area (existing leases)	0	0	0	0
Shirley Mountain Bat Cave ACEC	0	0	240	240
Sand Hills ACEC and JO Ranch Expansion	10,140	980	80	11,200
North Platte River area + ¼ mile either side of the river	0	100	6,040	6,140
Como Bluff NNL (within ¼ mile of exposures of the Morrison Formation)	0	0	0	0
Rawlins OHV SRMA (existing leases)	480	0	0	480
Perennial waters, Wetland/Riparian Areas + 500 feet	5,810	4,140	62,560	72,510
Historic Trails + ¼ mile (Existing Leases)	5,200	15,680	3,380	24,260
Black-tailed prairie dog complexes	N/D	N/D	N/D	N/D
White-tailed prairie dog complexes	N/D	N/D	N/D	N/D
Ute ladies' tresses[6]	N/D	N/D	N/D	N/D
Western boreal toad[6]	N/D	N/D	N/D	N/D
Wyoming toad	0	0	0	0
Yellow-billed cuckoo[6]	N/D	N/D	N/D	N/D

Area	Hydrocarbon Potential (Federal subsurface acres)			Total
	High	Moderate	Low	
VRM Class II	33,580	132,150	443,140	608,870
Total Affected Area (in acres)[5]	**45,140**	**127,100**	**480,800**	**653,040**
SEASONAL LIMITATIONS[3,4]				
Big game parturition areas	0	0	16,690	16,690
Big game crucial winter range	100,180	208,390	538,540	847,110
Bald eagle communal winter roost sites	0	0	10	10
Bald eagle nesting habitat + 1 mile	0	600	3,680	4,280
Bald eagle communal roosting + 2 miles	0	3,370	14,840	18,210
Raptor nests + ¾ mile to 1 mile	86,450	208,510	225,860	520,820
Greater sage-grouse nesting habitat + 2 miles	221,650	211,020	553,900	986,570
East of Highway 789: Greater sage-grouse leks + 2 miles	146,000	46,490	31,480	223,970
Sharp-tailed grouse nesting habitat + 1 mile	5,350	3,630	3,950	12,930
East of Highway 789: Sharp-tailed grouse leks + 1 mile	5,350	3,630	3,940	12,920
Mountain plover habitat	89,790	166,680	372,750	629,220
Total Affected Area (in acres)[5]	**323,710**	**543,070**	**1,184,720**	**2,051,500**

[1]Lease parcels are designed on aliquot parts. The actual acreage for the lease may vary.

[2]Although closed to leasing and related oil and gas activity, any other surface disturbing or disrupting use would follow the surface disturbance prescriptions.

[3]All activities would be subject to intensive mitigation including offsite placement of facilities, remote control monitoring, restricted or prohibited surface use including road construction, multiple wells from a single pad, central tank batteries/facilities, pipelines and power lines concentrated in specific areas, etc. based on site-specific analysis.

[4]Refer to Appendix 1 (Wyoming Standard Mitigation Guidelines). These requirements apply to all surface disturbing activities.

[5]Acres may not add due to overlap of land resources and land restrictions.

[6]Habitat is protected by riparian stipulations.

[7]10 acres assumed for each nesting roost.

Table 2-7. Summary of Proposed Special Management Area Designations by Alternatives

Special Management Area	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Como Bluff ACEC	ACEC/NNL (1,690 acres)	NNL (1,690 acres)	ACEC/NNL (1,690 acres)	NNL (1,690 acres)
Sand Hills ACEC and Potential JO Ranch Expansion	ACEC (7,960 acres)	WHMA (7,960 acres)	ACEC (12,700 acres)	ACEC (7,960 acres)
Jep Canyon ACEC/ Jep Canyon Wildlife HMA	ACEC (13,810 acres)	WHMA (13,810 acres)	WHMA (13,810 acres)	WHMA (13,810 acres)
Shamrock Hills ACEC	ACEC (18,400 acres)	WHMA (18,400 acres)	RCA (18,400 acres)	RCA (18,400 acres)
Stratton-Steppe Sagebrush Research Area (potential ACEC)	Research Management Area (5,530 acres)	Research Management Area (5,530 acres)	ACEC (5,530 acres)	Research Management Area (5,530 acres)
Chain Lakes (potential ACEC)	WHMA (30,470 acres)	WHMA (30,470 acres)	ACEC (30,470 acres)	WHMA (30,470 acres)
Laramie Peak (potential ACEC)	WHMA (18,940 acres)	WHMA (18,940 acres)	ACEC (18,940 acres)	WHMA (18,940 acres)
Red Rim-Daley (potential ACEC)	WHMA (15,980 acres)	WHMA (15,980 acres)	ACEC (15,980 acres)	WHMA (15,980 acres)
Pennock Mountain Wildlife HMA	WHMA (7,770 acres)	WHMA (7,770 acres)	WHMA (7,770 acres)	WHMA (7,770 acres)
Wick-Beumee Wildlife HMA	WHMA (280 acres)	WHMA (280 acres)	WHMA (280 acres)	WHMA (280 acres)
Shirley Mountain Caves/ Bat Cave potential ACEC	SRMA (24,400 acres)	No special designation.	ACEC (Bat Caves Area) (520 acres)	ACEC (Bat Caves Area)(240 acres)
Laramie Plains Lakes (potential ACEC)	WHMA (1,600 acres)	WHMA (1,600 acres)	ACEC (1,600 acres)	WHMA (1,600 acres)
Historic Trials (potential ACEC)	No special designation.	No special designation.	ACEC (41,000 acres)	No special designation.
Blowout Penstemon (potential ACEC)	No special designation.	No special designation.	ACEC and Endangered Plant Habitat Area (4,020 acres)	ACEC and Endangered Plant Habitat Area (4,020 acres)
Upper Muddy Creek Watershed Grizzly (potential ACEC)	WHMA (allotment only) (26,850 acres)	WHMA (70,780 acres)	ACEC (70,780 acres)	WHMA (70,780 acres)

Special Management Area	Alternative 1	Alternative 2	Alternative 3	Alternative 4
White-tailed Prairie Dog (potential ACEC)	No special designation.	No special designation.	ACEC (acreage not available)	No special designation.
High Savery Dam (potential ACEC)	No special designation.	No special designation.	ACEC (520 acres)	No special designation.
Continental Divide National Scenic Trail SRMA	SRMA (600 acres)	SRMA (600 acres)	SRMA (600 acres)	SRMA (600 acres)
North Platte River SRMA	SRMA (5,060 acres)	No special designation.	SRMA (5,060 acres)	SRMA (5,060 acres)
Rawlins OHV SRMA	No special designation.	SRMA (480 acres)	SRMA (480 acres)	No special designation.
National Natural Landmarks	Retain all NNLs (640 combined acres)	Retain all NNLs (640 combined acres)	Retain all NNLs (640 combined acres)	Retain all NNLs (640 combined acres)
Encampment River WSR	Propose as WSR (wild)	No special designation.	Propose as WSR (wild)	Propose as WSR (wild)
Ferris Mountains WSA	WSA (21,880 acres)	WSA (21,880 acres)	WSA (21,880 acres)	WSA (21,880 acres)
Adobe Town WSA	WSA (34,220 acres)	WSA (34,220 acres)	WSA (34,220 acres)	WSA (34,220 acres)
Prospect Mountain WSA	WSA (1,150 acres)	WSA (1,150 acres)	WSA (1,150 acres)	WSA (1,150 acres)
Encampment River Canyon WSA	WSA (4,510 acres)	WSA (4,510 acres)	WSA (4,510 acres)	WSA (4,510 acres)
Bennett Mountains WSA	WSA (5,960 acres)	WSA (5,960 acres)	WSA (5,960 acres)	WSA (5,960 acres)

Table 2-8. Areas of Priority Access for Easement Acquisition

Areas of Importance[1]	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Areas of High Importance				
Arlington (forestry)	X	NA	X	X
Atlantic Rim (recreation)	X	NA	X	X
Big Creek (recreation)	X	NA	X	X
Ferris Mountains (recreation)	X	NA	X	X
Little Medicine (forestry)	X	NA	X	X
Miller Hill (recreation)	X	NA	X	X
Shirley Mountain (forestry and recreation)	X	NA	X	X
Seminoe-Pathfinder (recreation)	NA	NA	X	X
Continental Divide National Scenic Trail (recreation)	NA	NA	X	X
Rawlins Uplift (recreation)	NA	NA	X	X
Areas of Moderate Importance				
North Laramie River (forestry)	X	NA	X	X
Pine Mountain-Split Rock (forestry)	X	NA	X	X
Rawlins Uplift (recreation)	X	NA	NA	NA
Seminoe-Pathfinder (recreation)	X	NA	NA	NA
Toltec (forestry)	X	NA	X	X
White Rock Canyon (forestry)	X	NA	X	X
Areas of Low Importance				
Seven Mile (forestry)	X	NA	X	X
Sugarloaf (forestry)	X	NA	X	X
Woodedge (forestry)	X	NA	X	X
High Savery Dam and Reservoir Project (recreation)	NA	NA	X	X

Notes:

[1] Alternatives 1, 3, and 4 indicate areas for opportunities to acquire or maintain legal access as listed by alternative above. Alternative 2 would pursue opportunities only as they arise; therefore, this row is not applicable.

NA Not applicable.

Table 2-9. Visual Resource Management Classifications and Acreage

VRM Classification	Acreage	Percentage of Total Land Area
Alternative 1 (Map 2-51)		
I	67,630	1.9
II	359,610	10.1
III	2,677,480	75.4
IV	446,760	12.6
Alternative 2 (Map 2-52)		
I	67,630	1.9
II	233,950	6.6
III	2,578,990	72.6
IV	670,910	18.9
Alternative 3 (Map 2-49)		
I	67,630	1.9
II	941,810	26.5
III	1,967,960	55.4
IV	574,080	16.2
Alternative 4 (Map 2-50)		
I	67,630	1.9
II	589,530	16.6
III	2,275,180	64.1
IV	619,140	17.4
TOTAL	3,551,480	100

Source: BLM 2004.

Note: All lands in the RMPPA were rated; however, only the BLM-administered lands are managed within the VRM system, and only BLM lands are included in the above-referenced acreages.

Table 2-10. Seasonal Wildlife Stipulations for all Surface Disturbing Activities

Affected Areas	Restriction	Restricted Area
Alternative 1		
Big Game Crucial Winter Ranges	November 15–April 30	Antelope, elk, moose, and mule deer crucial winter ranges
Parturition Areas	May 1–June 30	Identified parturition areas
Greater sage-grouse and Columbian Sharp Tailed grouse Nesting Habitat	March 1–June 30	Within 2 miles of Greater sage-grouse lek and 1-mile radius of Columbian sharp-tailed grouse lek
Greater sage-grouse leks and Columbian Sharp Tailed grouse	March 1–June 30	East of State Highway 789, south of Interstate 80, west of State Highway 71 and Carbon County Road 401, and north of State Highway 70. Within 2 miles of Greater sage-grouse lek and 1-mile radius of Columbian sharp-tailed grouse lek
Greater sage-grouse and Columbian Sharp Tailed grouse Winter Concentration areas.	November 15–April 30	Within identified winter habitat
Mountain Plover	April 10–July 10	Occupied habitat
Yellow billed Cuckoo	April 15–August 15	Within ½ mile radius
Bald Eagle Nest	February 1–July 31	Within 1 mile radius
Bald Eagle Communal Roost	Year round	½ mile of communal roost sites
Golden Eagle Nest	February 1–July 31	Within 1 mile radius
Osprey Nest	February 1–July 31	Within ¾ mile radius
Swainson's Hawk Nest	February 1–July 31	Within ¾ mile radius
Ferruginous Hawk Nest	February 1–July 31	Within 1 mile radius
Goshawk Nest	February 1–July 31	Within ¾ mile radius
Prairie Falcon Nest	February 1–July 31	Within ¾ mile radius
Northern Harrier Nest	February 1–July 31	Within ¾ mile radius
Great Horned Owl Nest	February 1–July 31	Within ¾ mile radius
Red-tailed Hawk Nest	February 1–July 31	Within ¾ mile radius
Burrowing Owl	February 1–July 31	Within ¾ mile radius
Active Raptor Nests	Year round	Within 825 feet (ferruginous hawks, 1,200 feet)
Other Raptors	February 1–July 31	Within ¾ mile radius
Alternative 2		
Big Game Crucial Winter Ranges	None	None
Parturition Areas	None	None
Greater sage-grouse and Columbian Sharp Tailed grouse Nesting Habitat	None	None
Greater sage-grouse leks and Columbian Sharp Tailed grouse	None	None

Affected Areas	Restriction	Restricted Area
Greater sage-grouse and Columbian Sharp Tailed grouse Winter Concentration areas.	None	None
Mountain Plover	April 10–July 10	Occupied habitat
Yellow billed Cuckoo	April 15–August 15	Within ½ mile radius
Bald Eagle Nest	February 1–July 15	Within 1 mile radius
Bald Eagle Communal Roost	Year round	½ mile of communal roost sites
Golden Eagle Nest	February 1–July 1`5	Within ½ mile radius
Osprey Nest	April 1–July 31	Within ½ mile radius
Swainson's Hawk Nest	April 1–July 31	Within ½ mile radius
Ferruginous Hawk Nest	March 1–July 31	Within ½ mile radius
Goshawk Nest	April 1–August 31	Within ½ mile radius
Prairie Falcon Nest	April 1–July 31	Within ½ mile radius
Northern Harrier Nest	April 1–July 31	Within ½ mile radius
Great Horned Owl Nest	February 1–July 15	Within ½ mile radius
Red-tailed Hawk Nest	February 1–July 15	Within ½ mile radius
Burrowing Owl	April 15–September 15	Within ½ mile radius
Active Raptor Nests	Year round	None
Other Raptors	February 1–July 15	Within ¾ mile radius
Alternative 3		
Big Game Crucial Winter Ranges	November 15–April 30	Antelope, elk, moose and mule deer crucial winter ranges
Parturition Areas	Prohibited year round	Identified parturition areas
Greater sage-grouse and Columbian Sharp Tailed grouse Nesting Habitat	(1) March 1–May 20 Prohibit surface disturbance/occupancy Avoid human activity 6:00 p.m.–9:00 a.m. (2) Within nesting/early brood rearing habitat March 15–July 15	(1) Within ¼ mile of occupied Greater sage-grouse and Columbian sharp tailed grouse nesting habitat (2) Within 2-mile radius for Greater sage-grouse and within 1-mile radius for Columbian sharp-tailed grouse identified early brood rearing habitat.
Greater sage-grouse leks and Columbian Sharp Tailed grouse	March 1–May 20 Avoid human activity between 6:00 p.m.–9:00 a.m.	Prohibit surface disturbance/occupancy ¼ mile of perimeter of occupied Greater sage-grouse and Colombian sharp tailed-grouse. East of State Highway 789, south of Interstate 80, west of State Highway 71 and Carbon County Road 401, and north of State Highway 70.
Greater sage-grouse and Columbian Sharp Tailed grouse Winter Concentration areas.	November 15–March 14	Within identified winter habitat
Mountain Plover	April 10–July 10	Occupied habitat
Yellow billed Cuckoo	April 15–August 15	Within ½ mile radius

Affected Areas	Restriction	Restricted Area
Bald Eagle Nest	February 1–July 31	Within 1½ mile radius
Bald Eagle Communal Roost	Year round	At least ½ mile of communal roost sites, in coordination with FWS.
Golden Eagle Nest	February 1–July 15	Within 1½ mile radius
Osprey Nest	April 1–July 31	Within 1½ mile radius
Swainson's Hawk Nest	April 1–July 31	Within 1½ mile radius
Ferruginous Hawk Nest	March 1–July 31	Within 1½ mile radius
Goshawk Nest	April 1–August 31	Within 1½ mile radius
Prairie Falcon Nest	April 1–August 31	Within 1½ mile radius
Northern Harrier Nest	April 1–August 31	Within 1½ mile radius
Great Horned Owl Nest	February 1–July 15	Within 1½ mile radius
Red-tailed Hawk Nest	February 1–July 15	Within 1½ mile radius
Burrowing Owl	April 15–September 15	Within 1½ mile radius
Active Raptor Nests	Year round	Within ¼ mile (1, 320 feet)
Other Raptors	February 1–July 15	Within 1½ mile radius
Alternative 4		
Big Game Crucial Winter Ranges	November 15–April 30	Antelope, elk, moose, and mule deer crucial winter ranges
Parturition Areas	May 1–June 30	Identified parturition areas
Greater sage-grouse and Columbian Sharp Tailed grouse Nesting Habitat	(1) March 1–May 20 Prohibit surface disturbance/occupancy Avoid human activity 6:00 p.m.–9:00 a.m. (2) Within nesting/early brood rearing habitat March 15–July 15	(1) Within ¼ mile of occupied Greater sage-grouse and Columbian sharp tailed grouse nesting habitat (2) Within 2-mile radius for Greater sage-grouse and within 1-mile radius for Columbian sharp-tailed grouse identified early brood rearing habitat.
Greater sage-grouse leks and Columbian Sharp Tailed grouse	March 1–May 15 Avoid human activity between 8:00 p.m.–8:00 a.m.	Prohibit surface disturbance/occupancy ¼ mile of perimeter of occupied Greater sage-grouse and Colombian sharp tailed-grouse. East of State Highway 789, south of Interstate 80, west of State Highway 71 and Carbon County Road 401, and north of State Highway 70.
Greater sage-grouse and Columbian Sharp Tailed grouse Winter Concentration areas.	November 15–March 14	Within identified winter habitat
Mountain Plover	April 10–July 10	Occupied habitat
Yellow billed Cuckoo	April 15–August 15	Within ½ mile radius
Bald Eagle Nest	February 1–July 31	Within 1 mile radius
Bald Eagle Communal Roost	Year round	At least ½ mile of communal roost sites, in coordination with FWS.
Golden Eagle Nest	February 1–July 31	Within 1 mile radius
Osprey Nest	February 1–July 31	Within ¾ mile radius

Affected Areas	Restriction	Restricted Area
Swainson's Hawk Nest	April 1–July 31	Within ¾ mile radius
Ferruginous Hawk Nest	March 1–July 31	Within 1 mile radius
Goshawk Nest	April 1–August 31	Within ¾ mile radius
Prairie Falcon Nest	April 1–July 31	Within ¾ mile radius
Northern Harrier Nest	April 1–July 31	Within ¾ mile radius
Great Horned Owl Nest	February 1–July 15	Within ¾ mile radius
Red-tailed Hawk Nest	February 1–July 15	Within ¾ mile radius
Burrowing Owl	February 1–July 31	Within ¾ mile radius
Active Raptor Nests	Year round	Within 825 feet (ferruginous hawks, 1,200 feet)
Other Raptors	February 1–July 15	Within ¾ mile radius

CHAPTER 3—AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter characterizes the existing environment of the Rawlins Resource Management Plan Planning Area (RMPPA). Although all environmental resources are described to some degree, emphasis is placed on those resources that are managed by BLM or on which BLM's management actions have substantial influence. Further, one or more of the management alternatives under consideration in this environmental impact statement (EIS) for the Rawlins RMP development process places emphasis on those resources that have the highest potential to be impacted. To facilitate ease of reference, the sections below are arranged alphabetically.

3.2 AIR RESOURCES

3.2.1 Climate

The climate of the RMPPA is classified as desert and semiarid steppe, with areas of mid-latitude highland or alpine (Trewartha and Horn 1980; Martner 1986).

Steppe climate is characterized by large seasonal variations in temperature (cold winters and warm summers) and by precipitation levels that are low but still sufficient for the growth of short sparse grass. The dryness of the mid-latitude steppe climate of southeast Wyoming is due to the area's distance from the Pacific Ocean, the main source of precipitation for storms in the western portion of the Rawlins Field Office (RFO). This aridity is intensified by the Sierra Nevada, Pacific Coast, and Rocky Mountain Ranges, which intercept the flow of humid coastal air. In addition, annual rainfall amounts can vary greatly from year to year.

Mountainous areas within the RMPPA are classified as alpine. Alpine climate is characterized by large variations in local climates depending on altitude and slope exposure, but it is generally a similar but cooler version of the nearby lowland climate (Trewartha and Horn 1980). Temperature and precipitation vary as a function of several factors, including season, time of day, and elevation.

Weather stations in the RMPPA include stations located in Encampment and Rawlins in Carbon County, Wamsutter in Sweetwater County, and Centennial in Albany County. Rawlins is located at an elevation of 6,736 feet and is in the western part of the RMPPA. Centennial is located at an elevation of 8,140 feet and is in the southeastern part of the RMPPA. Meteorological data available from the Rawlins weather station from 1951 through 2000 and from the Centennial weather station from 1948 through 2000 form the basis of the climate characterization below.

3.2.2 Temperature

Diurnal (morning to night) and seasonal (summer to winter) ranges in temperature are greater in valleys than on slopes (Martner 1986). Mean annual temperatures range from 43 degrees Fahrenheit (°F) in Rawlins to 40 degrees Fahrenheit in Centennial. Mean maximum summer temperatures are 80 °F in Rawlins and 74 °F in Centennial. Mean minimum winter temperatures are 14 degrees Fahrenheit in Rawlins and Centennial. Figure 3-1 shows mean monthly temperatures at Rawlins and Centennial (Western Regional Climate Center 2002).

The mean maximum monthly temperatures in Rawlins and Centennial reflect a slight warming over time in Rawlins (Figure 3-2) and a very slight cooling in Centennial (Western Regional Climate Center 2002) (Figure 3-3).

3.2.3 Precipitation

High elevations generally experience greater amounts of precipitation than lower elevations. Mean annual precipitation is 9 inches in Rawlins and 14.5 inches in higher-elevation Centennial. Mean annual precipitation in Rawlins ranges from 5 inches in dry years to 13 inches in wet years. In Centennial, mean annual precipitation ranges from 9 inches in dry years to 20 inches in wet years (Western Regional Climate Center 2002).

Figure 3-4 shows the mean monthly water content of precipitation in Rawlins and Centennial. Mean monthly precipitation varies from 0.5 to 1.4 inches throughout the year in Rawlins, while precipitation in Centennial varies from 0.8 to 1.7 inches (Western Regional Climate Center 2002).

Mean total snowfall is 4.3 feet in Rawlins and 9.5 feet in Centennial, with the greatest snowfall occurring from November through April. Figure 3-5 shows mean monthly winter snowfall ranges from 7 to 8 inches in Rawlins and 15 to 20 inches in Centennial (Western Regional Climate Center 2002).

Data for mean monthly water content of precipitation in Rawlins and Centennial since 1951 show a very slight precipitation increase (<0.3 inch) in most months in Rawlins (Figure 3-6) and a variable pattern in Centennial (Figure 3-7). Data for mean annual total water content of precipitation in Rawlins and Centennial since 1951 (Figure 3-8) show a very slight increase in precipitation in Rawlins and an extremely slight decrease in Centennial (Western Regional Climate Center 2002).

3.2.4 Dispersion

Atmospheric stability is a measure of the atmosphere's capacity to disperse pollutants. Although stability data are not available for the RMPPA, they are available for Rock Springs, WY (about 100 miles west of Rawlins). Figure 3-9 shows that mean annual dispersion at Rock Springs is very strong to moderate less than 20 percent of the time, weak to very weak about 20 percent of the time, and fair more than 60 percent of the time (BLM 1999).

3.2.5 Wind Velocity

Wind speed and direction are highly variable because of the effect of local topography in the RMPPA. The annual average wind speed in Rawlins is 12 miles per hour (Martner 1986), and annual wind direction is generally from the west-northwest, west, or west-southwest.

Wind data are often presented graphically by a "wind rose," which shows the occurrence frequency of wind speeds and wind directions. Figure 3-10 shows a wind rose for Centennial, WY. In mountainous areas like Centennial, local topography can strongly affect wind direction, particularly at night and under low wind speed conditions (Figure 3-10). Winds in Rawlins are relatively strong and are generally from the west-northwest, west, and west-southwest (BLM 1999).

3.2.6 Air Quality

Elements of air quality addressed in this analysis include ambient air quality concentrations, visibility, and atmospheric deposition. Regulations governing these air quality elements are provided in Appendix 4.

3.2.6.1 Ambient Air Quality Concentrations

Ambient air concentration refers to the mass of pollutants present in a volume of air and can be reported in units of micrograms per cubic meter ($\mu g/m^3$) or parts per billion (ppb). For comparison, both units are shown only in the ambient air quality standards tables in the Air Quality Technical Support Document (AQTSD). Data provided by the Wyoming Department of Environmental Quality, Air Quality Division WDEQ-AQD are used to establish background air quality levels. Information collected from the nearest applicable monitoring stations indicate that current concentrations are in compliance with applicable standards. However, current and complete data on the concentrations of criteria air pollutants for the RMPPA are not available. Ambient air concentrations of criteria air pollutants provided by the WDEQ-AQD for the Rawlins region are shown in Table 3-1.

Table 3-1. Concentrations of Criteria Air Pollutants—West-Central Wyoming Rawlins.

Pollutant/ Averaging Time	Measured Background Concentration (µg/m3)	Percent of Standards (%)		Data Source
		NAAQS	WAAQS	
Carbon Monoxide (CO)				
1-hour	3,336	8	8	Data collected by Amoco at Ryckman Creek for an 8-month period during 1978–1979, summarized in the Riley Ridge EIS (BLM 1983).
8-hour	1,381	14	14	
Nitrogen Dioxide (NO_2)				
Annual	3.4	3	3	Data collected at Green River Basin Visibility Study site, Green River, WY, during January–December 2001 (ARS, 2002)
Ozone (O_3)				
1-hour	169	72	72	Data collected at Green River Basin Visibility Study site, Green River, WY, during June 10, 1998–December 31, 2001(ARS, 2002)
8-hour	147	94	94	
Particulate Matter (PM_{10})				
24-hour	47	31	31	Data collected by WDEQ at Emerson Building, Cheyenne, WY, 2002 (WDEQ)
Annual	16	32	32	
Particulate Matter ($PM_{2.5}$)				
24-hour	15	23	23	Data collected by WDEQ at Emerson Building, Cheyenne, WY, 2002 (WDEQ)
Annual	5	33	33	
Sulfur Dioxide (SO_2)				
3-hour	132	10	19	Data collected at LaBarge Study Area at the Northwest Pipeline Craven Creek site, 1982–1983
24-hour	43	12	17	
Annual	9	11	15	

3.2.6.2 Carbon Monoxide

Carbon monoxide (CO) data were collected at Ryckman Creek by Amoco in conjunction with the proposed oil and gas development of the late 1970s. Because CO data are generally collected only in urban areas where automobile traffic levels are high, recent data are often unavailable for rural areas (see Table 3-1).

3.2.6.3 Nitrogen Dioxide and other Nitrogen Compounds

For the criteria pollutant nitrogen dioxide (NO_2), concentration data were collected at the Green River Basin Visibility Study site from January to December 2001. Annual NO_2 concentrations were 3 percent of both the Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) (see Table 3-1).

Monitoring of nitrogen-containing pollutants in Centennial and Rocky Mountain National Park shows that concentrations of nitric acid (HNO_3), nitrate (NO_3^-), and particulate ammonium (NH_4^+) are fairly low and are not increasing over time.

The Clean Air Status and Trends Network (CASTNet) has measured concentrations of nitrogen-containing pollutants (HNO_3, NO_3^-, and NH_4^+) and sulfur-containing pollutants (sulfur dioxide [SO_2], sulfate [SO_4^{-2}]), and ozone [O_3]) in the United States since the late 1980s. There are three CASTNet stations in Wyoming (Centennial, Yellowstone National Park, and Pinedale) and several stations in Colorado, including one in Rocky Mountain National Park. CASTNet data are available for Centennial from 1990 through 2000 and for Rocky Mountain National Park from 1995 through 2000.

Figures 3-11 and 3-12 show mean annual CASTNet concentrations of nitrogen-containing pollutants in Centennial and Rocky Mountain National Park. Mean annual concentrations of HNO_3 are less than 0.6 ppb at Centennial (Figure 3-11) and less than 1 ppb in Rocky Mountain National Park (Figure 3-12). HNO_3 concentrations typically range from 0.02 to 0.3 ppb in remote areas and from 3 to 50 ppb in urban areas (Seinfeld 1986). Although HNO_3 concentrations are well below urban levels, concentrations are slightly above levels typical in remote areas.

Mean annual concentrations of NO_3^- are less than 0.25 ppb in Centennial and less than 0.4 in Rocky Mountain National Park. NO_3^- concentrations are typically about 0.2 ppb in remote areas and 1 ppb in urban areas (Stern et al. 1973). Although NO_3^- concentrations are well below urban levels, concentrations in Rocky Mountain National Park are above levels typical in remote areas.

Mean annual concentrations of NH_4^+ are 0.3 ppb in Centennial and 0.4 ppb in Rocky Mountain National Park. NH_4^+ concentrations are typically 0.3 ppb in remote areas and 1.4 ppb in urban areas (Stern et al. 1973).

The Wyoming Air Resources Monitoring System (WARMS) has measured concentrations of NO_3^- and NH_4^+ in Wyoming since 1999. There are five WARMS stations in Wyoming: Centennial (discontinued in 2003), Buffalo, Sheridan, Newcastle, and Pinedale. Figures 3-13 and 3-14 show, respectively, that weekly concentrations of NO_3^- in Centennial are below 1.5 $\mu g/m^3$ and that weekly concentrations of NH_4^+ are below 0.5 $\mu g/m^3$. Because of the chemistry of nitrogen- and sulfur-containing compounds and the manner in which data are collected, it would not be appropriate to compare CASTNet and WARMS data to ambient air quality standards. In addition, there are questions concerning WARMS' lack of data consistency.

3.2.6.4 Sulfur Dioxide and Other Sulfur Compounds

For the criteria pollutant SO_2, data were collected in the LaBarge Study Area at the Northwest Pipeline Craven Creek site during 1982–1983 (Table 3-1).

More recent SO_2 data, as well as SO_4^{-2} data, were collected by CASTNet in Centennial and Rocky Mountain National Park, and by WARMS in Centennial.

Figures 3-15 and 3-16 show mean annual CASTNet concentrations of SO_2 and SO_4^{-2} in Centennial and Rocky Mountain National Park. Concentrations of SO_2 are about 0.5 ppb in Centennial (Figure 3-15) and less than 0.7 ppb in Rocky Mountain National Park (Figure 3-16). SO_2 concentrations typically range from 1 to 10 ppb in remote areas and from 20 to 200 ppb in urban areas (Seinfeld 1986). SO_2 concentrations in Centennial and Rocky Mountain National Park are consistent with concentrations typical of remote areas.

Mean annual concentrations of SO_4^{-2} are below 1 ppb in Centennial and Rocky Mountain National Park. SO_4^{-2} concentrations are typically about 0.6 ppb in remote areas and about 2.5 ppb in urban areas (Stern et al. 1973). Although SO_4^{-2} concentrations are well below urban levels, concentrations in Centennial and Rocky Mountain National Park are slightly above levels typical of remote areas.

Figures 3-17 and 3-18 show weekly WARMS concentrations of SO_2 and SO_4^{-2}, respectively, in Centennial from mid-1999 through 2001 to be less than 1.5 $\mu g/m^3$; SO_4^{-2} concentrations alone are also less than 1.5 $\mu g/m^3$ but are closer to that value. It would be inappropriate to compare weekly WARMS concentrations directly with mean annual concentrations. [1]

3.2.6.5 Ozone

Ozone concentration data were collected at the Green River Basin Visibility Study site from June 10, 1998, to December 31, 2001. O_3 concentrations were 94 percent of the WAAQS and NAAQS 8-hour standard (See Table 3-1).

Ozone levels of concern (LOC) have been estimated for several areas, including the Bridger Wilderness in Wyoming (Fox et al. 1989). Estimated total deposition LOC include the "red line" (defined as the ozone concentration the area can tolerate) and the "green line" range (defined as the acceptable level of ozone). The ozone LOC for Bridger include the green line (set at 35–75 ppb/year).

CASTNet stations in Pinedale, Centennial, and Rocky Mountain National Park also collected O_3 data. Figure 3-19 shows mean annual O_3 concentrations in Centennial and Rocky Mountain National Park have remained steady from 1989 through 2000, are typical for remote areas in the western United States (Singh et al. 1978), and are within the LOC as an acceptable level of ozone (green line range).

3.2.6.6 Particulate Matter

Particulate matter (PM_{10}, $PM_{2.5}$) concentration data were collected in Cheyenne, WY in 2002. PM_{10} concentrations were 32 percent or less of the WAAQS and the NAAQS. $PM_{2.5}$ concentrations were 33 percent or less of the WAAQS and NAAQS (Table 3-1).

3.2.6.7 Hazardous Air Pollutants

Hazardous Air Pollutants (HAPs) data do not exist for the RMPPA. There are no ambient air quality standards for HAPs. WDEQ-AQD regulates HAP emissions through the New Source Review permitting process and applicable NESHAP MACT standards. However, HAP emissions will be addressed in Section 4.2, Air Resources.

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1 Because of the chemistry of nitrogen- and sulfur-containing compounds and the manner in which data are collected, it would not be appropriate to compare CASTNet and WARMS data to ambient air quality standards. In addition, there are questions concerning WARMS' data lack of data consistency.

3.2.6.8 Visibility

Interagency Monitoring of Protected Visual Environments (IMPROVE) has measured visibility in national parks and wilderness areas in the United States since the 1980s. There are six IMPROVE aerosol monitoring stations in Wyoming: Brooklyn Lake (near Centennial), Bridger Wilderness (near Pinedale), Yellowstone National Park, North Absaroka Wilderness (near Dead Indian Pass), Cloud Peak, and Thunder Basin. Some of the best visibility monitored in the contiguous United States is at the Bridger Wilderness station in western Wyoming. Visibility can be expressed in terms of deciviews (dv), a measure for describing perceived changes in visibility. One dv is defined as a change in visibility that is just perceptible to an average person, about a 10 percent change in light extinction.

Monitored aerosol concentrations are used to reconstruct visibility conditions for each day monitored, ranked from clearest to haziest. Conditions are reported in three categories:

- 20 percent clearest—mean visibility for the 20 percent of days with the best visibility
- Average—the annual mean visibility
- 20 percent haziest—mean visibility for the 20 percent of days with the poorest visibility.

Figure 3-20 shows annual visibility in Rocky Mountain National Park from 1989 through 2001. Visibility on the 20 percent clearest days varies from 4 to 6 dv (visual range of about 150 to 173 miles). Average visibility varies from 8 to 10 dv (about 112 to 126 miles). Visibility for the 20 percent haziest days varies from 12 to 14 dv (about 71 to 88 miles). Trend analysis of Rocky Mountain National Park visibility data reveals no significant worsening of visibility from 1989 trough 2001. Also, for comparison, Figure 3-21 provides the reconstructed fine mass data (1-year average) for Rocky Mountain National Park from 1989 through 2002. Similar to the visibility data, no upward trend was noted.

An IMPROVE monitoring station visibility station was installed in 2001 near Centennial (Brooklyn Lake). The visibility data for 2001 include the following:

- 20% cleanest days: 3.2 dv, 178 miles
- Mean days: 7.3 dv, 117 miles
- 20% haziest days: 11 dv, 81 miles

These data indicate that visibility was better than that measured in 2001 in Rocky Mountain National Park, but is in the range of visibility measured over the last 10 years at Rocky Mountain National Park. Visibility data from the Long-Term Study (Wyoming 2003) suggest that visibility is comparable to other sites around Wyoming.

3.2.6.9 Atmospheric Deposition

Atmospheric deposition refers to the processes by which air pollutants are removed from the atmosphere and deposited in terrestrial and aquatic ecosystems. It is reported as the mass of material deposited on an area (kilograms per hectare [kg/ha]) per year (-yr). Air pollutants are deposited by wet deposition (precipitation) and dry deposition (gravitational settling of particles and adherence of gaseous pollutants to soil, water, and vegetation). Substances deposited include—

- Nitrogen and sulfur compounds (nitrates, nitrites, and sulfates and sulfites).
- Acids, such as sulfuric acid (H_2SO_4) and HNO_3. This acid deposition is sometimes referred to as acid rain.
- Air toxics, such as pesticides, herbicides, and volatile organic compounds (VOC).
- Nutrients, such as NO_3^- and NH_4^+.

Estimation of atmospheric deposition is complicated by contribution to deposition of several components: rain, snow, cloud water, particle settling, and gaseous pollutants. Deposition varies with precipitation, which in turn, varies with elevation and time.

3.2.6.10 Wet Deposition

The National Atmospheric Deposition Program (NADP) assesses wet deposition by measuring the chemical composition of precipitation (rain and snow). There are eight NADP stations in Wyoming. Figure 3-22 shows the precipitation acidity (pH) in the Snowy Range, Brooklyn Lake, and South Pass City through 2002. The natural acidity of rainwater is generally considered to be represented by a range of pH values from 5.0 to 5.6 (Seinfeld 1986). The mean annual pH in the Snowy Range and South Pass City was below this range from 1987 through 1989, indicating acidification of precipitation during that period. Mean annual pH ranged from 4.9 to 5.1 from 1990 through 2002.

Figures 3-23 and 3-24 show mean annual wet deposition of NH_4^+, NO_3^-, and SO_4^{-2} at the Snowy Range and Brooklyn Lake NADP stations. Wet ammonium deposition values are low, below 2.0 kg/ha-yr in the Snowy Range and around 1.0 kg/ha-yr in Brooklyn Lake.

Wet deposition of both NO_3^- and SO_4^{-2} at the Snowy Range station is elevated. Wet NO_3^- deposition ranged from 3 to 13 kg/ha-yr, and wet SO_4^{-2} deposition ranged from 3 to 10 kg/ha-year (Figure 3-23).

Wet deposition of both NO_3^- and SO_4^{-2} is low (below 4 kg/ha-yr) at Brooklyn Lake (Figure 3-24). Deposition values from 1985 through 2002 were low and steady, indicating that deposition did not worsen during that time.

3.2.6.11 Dry Deposition

Dry deposition refers to the transfer of airborne gaseous and particulate material from the atmosphere to the Earth's surface. CASTNet measures dry deposition of SO_2, HNO_3, SO_4^{-2}, NO_3^-, and NH_4^+. Figures 3-25 and 3-26 show mean annual dry deposition of sulfur- and nitrogen-containing compounds for Centennial from 1991 through 2000 (Figure 3-25) and for Rocky Mountain National Park from 1995 through 2000 (Figure 3-26).

Dry deposition values in Centennial have been low and steady for all pollutants except HNO_3. Dry HNO_3 deposition ranged from 3.5 to about 4.5 kg/ha-yr. Dry deposition for other pollutants was less than 1 kg/ha-yr.

Dry deposition values in Rocky Mountain National Park were also low and steady for all pollutants except HNO_3. Dry HNO_3 deposition ranged from 4.6 to 5.7 kg/ha-yr.

3.2.6.12 Total Deposition

Total deposition refers to the sum of airborne material transferred to the Earth's surface by both wet and dry deposition. Total deposition guidelines have been estimated for several areas, including the Bridger Wilderness in Wyoming (Fox et al. 1989). Estimated total deposition LOC include the "red line" (the total deposition that the area can tolerate) and the "green line" (the acceptable level of total deposition). Total nitrogen deposition LOC for Bridger include the red line (set at 10 kg/ha-yr) and the green line (set at 3–5 kg/ha-yr). Total sulfur depositions LOC for Bridger include the red line (5 kg/ha-year) and the green line (20 kg/ka-yr).

Figures 3-27 and 3-28 compare total deposition in the Snowy Range near Centennial, WY, with the total deposition LOC set for the Bridger Wilderness. Total nitrogen deposition has been equal to or lower than the Bridger Wilderness in the Snowy Range from 1986 through 2002[2], although values exceeded 5 kg/ha-yr in 1999 (Figure 3-27). Total sulfur deposition has been well below both the LOC for the same period (Figure 3-28).

Total nitrogen and sulfur deposition is calculated from dry deposition CASTNet data and wet deposition NADP data. Total deposition data are then compared to thresholds developed by the Forest Service (USFS) (Fox et al. 1989) as follows:

$$\text{Total N dep} = N/NO_3^- \text{dry} + N/NH_4^+ \text{dry} + N/HNO_3 \text{ dry} + N/NO_3 \text{ wet} + N/NH_4 \text{ wet}$$

Where

N/NO_3 dry = NO_3 * (7/31)
N/NH_4 dry = NH_4 * (7/11)
N/HNO_3 dry = HNO_3 * (7/32)
N/NO_3 wet = NO_3 * (7/31)
N/NH_4 wet = NH_4 * (7/11)

$$\text{Total S dep} = S/SO_2 \text{ dry} + S/SO_4 \text{ dry} + S/SO_4 \text{ wet}$$

Where

S/SO_2 dry = SO_2 * (16/32)
S/SO_4 dry = SO_4^{-2} * (16/48)
S/SO_4 wet = SO_4^{-2} * (16/48)

3.2.6.13 Summary of Existing Air Quality

Air quality monitoring data provided by the State of Wyoming show that air quality in the Rawlins region is considered to be in compliance with state and Federal ambient air quality standards (Table 3-2). Best available data indicate potential issues with deposition.

Table 3-2. Summary of Air Quality in the Vicinity of the RMPPA.

Air Quality Component	Comment
Air Pollutant Concentrations	
Criteria Air Pollutants	Concentrations are in compliance with NAAQS and WAAQS.
Nitrogen Compounds	• Nitric acid (HNO_3) concentrations in Centennial and Rocky Mountain National Park are slightly higher than concentrations in other remote areas. • Concentrations of nitrate (NO_3) and ammonium (NH_4) are consistent with other remote areas
Sulfur Compounds	• Sulfur dioxide (SO_2) and sulfate (SO_4^{-2}) concentrations in Centennial and Rocky Mountain National Park are consistent with concentrations in remote areas.
Visibility (Rocky Mountain National Park)	

[2] Please note that wet deposition data are available from 1986 through 2000, while dry deposition data are available only from 1991 through 1999.

Visual Range	• 20% cleanest: 150–173 miles • Average: 112–126 miles • 20% haziest: 71–88 miles
Atmospheric Deposition	
Precipitation pH	• Precipitation acidification from 1987 through 1989 (pH: 4.7–4.9) • Precipitation near natural from 1990 through 2000 (pH: 4.9–5.1)
Total Deposition	• Centennial: Nitrogen deposition from ammonium (NH_4^+) and nitrate (NO_3^-) is less than 9.8 kg/ha-yr[1]. Sulfur deposition from sulfate (SO_4^{-2}) and sulfur dioxide (SO_2) is less than 3.7 kg/ha-yr[2].

Notes:
1 Proposed acceptable level of total nitrogen deposition is from 3 to 5 kg/hayr (Fox et al. 1989).
2 Proposed acceptable sulfur deposition is 5 kg/hayr (Fox et al. 1989).

3.3 CULTURAL RESOURCES

3.3.1 Introduction

Archaeological investigations in the RMPPA indicate that prehistoric people have inhabited the area for at least 12,000 years, from Paleo-Indian occupation to the present. Although prehistoric sites represent the largest percentage of cultural resource sites within the planning area, historic-age sites including expansion era trails, freight roads, and stage stations are quite common throughout the area.

As of 2002, approximately 11 percent of the RMPPA has been inventoried for cultural resources at the Class III (intensive) level. From this 11 percent inventory of the planning area, approximately 12,485 cultural resource sites have been documented. These sites include prehistoric and protohistoric archaeological sites, historic sites, linear historic sites, and properties that are sacred to Native American cultures (e.g., Traditional Cultural Properties [TCP]). The majority of cultural resource sites have been documented during compliance-related activities resulting from federal management actions. The largest number of federal management actions within the Rawlins RMPPA has been related to oil and gas development, which is centered in the western portion of the planning area. This has resulted in an increased knowledge of cultural resources, particularly in the western portion of the RMPPA.

3.3.2 Prehistoric Sites

Prehistoric sites in the RMPPA are known to date from approximately 12,000 years before present (B.P.) to the time of European contact (roughly 1650 A.D.) Native American sites dating after 1650 A.D. are often assigned to the protohistoric period, in which material culture consists of traditional Native American artifacts and European trade goods. Site types in the RMPPA include lithic scatters, lithic material quarries, open camps, stone circles, rock shelters, house pits, rock cairns and alignments, game drive lines and kill sites, brush or pole structures, rock art, and human burials.

The entire RMPPA is within the larger Northwestern Plains cultural area (Frison 1991). The area can be further broken down geographically, with the Wyoming Basin (Great Divide and Washakie basins) located in the west and the eastern plains/Denver Basin in the extreme east. The North Platte River and surrounding mountain ranges and basins are located in the central portion of the region. Prehistoric sites throughout the planning area exhibit numerous similarities with respect to artifact assemblages, feature types, and function, but can also exhibit differences based on ecological setting and cultural influences from surrounding regions. For example, the cultural resources from the western portion of the planning area generally exhibit characteristics most similar to sites in southwest Wyoming, whereas cultural influences from the Plains are more likely to be recognized in eastern assemblages.

Most significant cultural resources are found along major ephemeral drainages and along the lower benches of escarpments found commonly throughout the western half of the RMPPA. Certain topographic settings have higher archaeological sensitivity, such as aeolian deposits (sand dunes, sand shadows, and sand sheets), alluvial deposits along major drainages, and colluvial deposits along lower slopes of ridges.

Prehistoric sites represent a wide range of human activities. Many of the sites are surface manifestations of hunter-gatherer campsites representing repeated, inseparable occupations over hundreds or thousands of years. Other sites are buried and contain intact, vertically separated cultural components. The most common site types are short-term occupation sites with limited activity loci. At these locations, stone tools were made or repaired, plant resources were processed, or animals were killed or butchered. These site types were common throughout prehistory and are found throughout the RMPPA. The most common type of short-term occupation sites are lithic scatters containing flaked stone tools and debitage (waste flakes and debris) but little evidence of subsistence strategies.

Open camps contain evidence of a broad range of activities, including subsistence-related activities. Cultural remains at these site types include formal features, lithic debris, chipped stone tools, and evidence of milling/vegetable processing activities. Remains from animal butchering activities, including bones and lithic tool types, also are often found at open campsites. Open campsites often show evidence that they were occupied for longer periods of time or were used repeatedly.

Lithic procurement areas are quite common in the RMPPA. These are manifested as lithic scatters resulting from testing, procurement, and reduction of toolstone at their sources. Source stones are primarily cherts and quartzites, occurring in either secondary gravel and cobble deposits or in primary bedrock exposures. Secondary lithic procurement sites are the most common in the RMPPA. They often occur diffusely over large areas as lithic "landscapes." Major sources of high-quality fossiliferous cherts occur in portions of the Washakie Basin, which makes lithic procurement sites common in the area (Michaelsen 1983; Miller 1991).

Stone circle sites are in most instances another type of campsite. Also known as "tipi rings," stone circles are widely believed to be the result of rock placement along the base of tipis or other similar habitation structures. The possibility that at least some stone rings are the result of ritualistic/spiritual functions rather than habitation activities has also been proposed (Davis 1983). These site types are relatively common on ridge tops, upper stream terraces and benches, and mountain foothills in the North Platte River region and the eastern plains. They are considerably rarer in the western basins. Lithic debris and formal tools (e.g., flaked stone artifacts) are often found in conjunction with stone circles, although usually in low densities. Other types of rock features, such as cairns and alignments, may be present as well. These sites are often found to be sacred to Native American groups and are designated TCPs.

House pits, though still relatively uncommon, are increasingly being recognized and documented in portions of the RMPPA. These features generally have been interpreted as the remnants of cold weather habitation structures (Frison 1991) that consisted of semi-subterranean dwellings with wooden or brush superstructures. Recent analyses suggest that many of these structures were occupied for short periods in more than one season and were repeatedly used over a number of years (Smith 2003). Archaeological remains usually include a large circular area of charcoal-stained sediment that upon excavation reveals a generally shallow, basin-shaped living floor containing internal features including hearths and storage pits. There is generally a paucity of artifacts within the house pits, although flaked stone, ground stone, and bone have been recovered. House pits have been found in the intermontane basins of the western and central portions of the RMPPA, with a particularly large sample identified and investigated in the Bairoil oil fields in the northeastern Great Divide Basin (Reust et al. 1993).

Less common site types in the RMPPA include rock shelters, rock art, mass kill sites, brush and pole structures (i.e., wickiups or "war lodges"), burials, and certain types of rock features such as medicine

wheels, drive lines, or cairn lines. These less common site types are often found to be sacred to Native American groups and are designated TCPs.

3.3.2.1 Paleo-Indian Period

The oldest period for which there is archaeological evidence is the Paleo-Indian, beginning ca. 12,000 years B.P. and ending around 8500 B.P. This is the transition period from the periglacial conditions of the Wisconsin ice advance during the terminal Pleistocene to the warmer and drier climatic conditions of the Holocene. A savanna-like environment with higher precipitation than occurs today was prevalent in southwest Wyoming. Understanding paleoenvironmental conditions operating at the end of the Pleistocene and into the Holocene provides insights into the articulation between human populations and the environment (Thompson and Pastor 1995).

The archaeological record indicates that a highly nomadic, hunting lifeway persisted throughout the Paleo-Indian period. Primary subsistence strategies appear to have focused on the procurement of large animals (mammoth and extinct species of bison), with increasing dependence on small mammal and wild plant foods toward the end of the Pleistocene (Creasman et al. 1982).

The practical difficulty of locating and identifying Paleo-Indian sites, which tend to be deeply buried, is compounded by the small number of sites likely to be preserved through time. A current compilation of radiocarbon dates from archaeological sites in Wyoming indicates that less than three percent of excavated sites contain datable Paleo-Indian components. Because of this small and unrepresentative sample, very little is known at this time of Paleo-Indian culture dynamics, subsistence strategies, and demography in the planning area.

Radiocarbon dated Paleo-Indian sites or components within the RMPPA include the Union Pacific Mammoth site (Frison 1978, 1991), the James Allen site (Mulloy 1959), the Rattlesnake Pass site (Smith and McNees 1990), the China Wall site, and the Pine Bluffs Site (Frison 1991). A few other sites reportedly have yielded early dates, however data on these are limited. Isolated surface finds of Paleo-Indian projectile points are not uncommon in the planning area and suggest that site preservation may be a major factor affecting the number of known sites.

3.3.2.2 Archaic Period

The Archaic period dates from approximately 7,500 to 1,500 years B.P. and is split into Early, Middle, and Late Archaic periods based on Frison's chronology (Frison 1978, 1991) for the Northwestern Plains. The term "Archaic" refers to both a temporal segment in the prehistoric record and a particular lifeway. The demise of the Paleo-Indian big game hunting cultures, resulting from the extinction of the late Pleistocene megafauna by approximately 7,000 B.P. marks the onset of the Archaic period. The environmental change at the end of the Paleo-Indian period led to a pattern of broad spectrum resource exploitation, reflected in the subsistence and settlement practices of the Archaic period which became more diverse over time.

Archaic period sites generally exhibit more diverse assemblages of cultural remains, indicating a broader range of subsistence practices compared to the big game hunting focus of the preceding Paleo-Indian period. Archaic period subsistence involved the exploitation of both plant and animal resources to a greater extent than the Paleo-Indian period, and hunting involved a greater variety of animal species.

Slab-lined plant processing pits, characteristic of Early Archaic occupations, progressively decrease in frequency in the archaeological record during the Middle Archaic period. A decrease in the overall frequency of groundstone artifacts is also noted. These trends have been interpreted by Creasman et al.

(1983:160–161) as indicating a balanced hunting and gathering subsistence strategy, with less emphasis on small mammal and wild plant foods.

Settlement and subsistence patterns for the Late Archaic in the RMPPA are poorly understood. The mixed hunting/plant-gathering orientation that characterized the preceding period seems to continue into the Late Archaic, although perhaps more emphasis was placed on big game hunting during the last 500 years of this period (2000-1500 B.P.). The paleoenvironmental record for the area suggests gradual cooling, with conditions, on average, not much different than today.

Numerous sites have been dated to the Archaic period in the RMPPA, particularly the Middle and Late Archaic periods. Important sites include the Seminoe Beach site (Frison 1991), the Scoggin site (Lobdell 1973), the Muddy Creek site (Hughes 1981), the Mill Creek Bison Jump, and Sorenson Shelter. The China Wall and Pine Bluffs sites also contained Archaic components. Archaic sites containing house pits include the Medicine House site (Miller and McGuire 1997), the Shoreline site (Walker et al. 1997), the Sinclair site (Smith and Reust 1992), and several sites at Bairoil, most notably the Bald Knob site (Reust et al. 1993).

3.3.2.3 Late Prehistoric Period

The Late Prehistoric period began approximately 1,500 years B.P. and continued until European contact at around 1650 A.D. The beginning of this period is marked by the introduction of the bow and arrow and consequently an overall reduction in projectile point sizes. Pottery begins to appear (although rarely) in Late Prehistoric assemblages, and stone circles become an increasingly common element of sites, particularly east of the Wyoming Basin. House pits are less common than in earlier periods, although they have been identified.

An increase in aboriginal populations apparently began toward the end of the Archaic period and continued through the first half of the Late Prehistoric period (Frison 1991). Consequently there is a dramatic increase in sites radiometrically dated (as well as cross-dated through diagnostic artifacts) to this period. A large percentage of excavated sites in the RMPPA either date to the Late Prehistoric period or at least have a Late Prehistoric period component overlying older components.

Aside from the overall increase in site frequency, Late Prehistoric settlement and subsistence patterns do not appear to have diverged markedly from those of the Late Archaic (Creasman et al. 1983:161). Large mammal resources, including antelope and bison, were of primary importance, while plant foods continued as a significant dietary element. Ash-filled basins and cobble-filled hearths are dominant feature types.

3.3.2.4 Protohistoric Period

The Protohistoric period began at first contact between Native Americans and Euro-Americans around 1650 A.D. in the RMPPA. Ever increasing contact led to the introduction of the horse to Native Americans and the appearance of trade goods such as beads and metal items in the archaeological record.

The adoption and use of horses significantly increased the mobility of Native Americans in the area. The early acquisition of horses put certain groups at a decided advantage over groups who had not yet obtained the horse.

3.3.2.5 Historic Period

The historic era began in earnest by the early 1800s, with the arrival of well-organized fur trading expeditions in the region. Major themes represented by historic cultural resources in the RMPPA include ranching, transportation, and mining.

Historic sites in the RMPPA include emigrant trails; stage and freight roads; stage stations; railroads and sidings; early automobile roads; ranches and ranching-related features; cabins, buildings, and other structures; towns and camps; dams and irrigation ditches; stockherder camps and trash scatters; trash dumps; mines and mining facilities and debris; and oil and gas facilities.

Transportation routes (i.e., trails, roads, and railroads) command a great amount of management attention because of their overall historic importance in western settlement and expansion and their presence over long distances within the RMPPA. Some of these properties are encountered on a frequent basis during cultural resource inventories. The general locations of selected National Register of Historic Places (NRHP)-eligible linear properties across the RMPPA are shown on Map 2-46.

The Overland Trail crosses the southern portion of the RMPPA from east to west. The trail was the principal mail and stage route west from 1862 to 1868, and its use continued thereafter as an emigrant road. Only three of the stage stations built along the trail occur on currently administered public lands: the Midway, Sage Creek, and Washakie stations. The Washakie station is listed on the NRHP and still retains some of the original structure. Evidence of the trail remains in the form of ruts and swales as well as associated artifacts.

The Cherokee trail crosses the southern portion of the RMPPA from east to west. Groups en route from Oklahoma to the California gold fields pioneered the Cherokee Trail in 1849. Two main routes of the trail occur in the RMPPA, as subsequent groups in 1849 and 1850 forged different paths. Portions of the northernmost route were used later as part of the Overland Trail. Some of the Cherokee Trail routes were eventually used to some degree as freight and stage roads. Today, evidence of the Cherokee Trail is scarce but can be found in the form of ruts and swales.

The Lodgepole Trail was essentially a variant of the Overland Trail, diverging from the Oregon Trail at Sidney, Nebraska, and connecting up to the Overland Trail west of Laramie. It was used lightly as an emigration route and for regional travel even after completion of the Union Pacific Railroad (U.P.R.R.) in 1869. Most of this trail has not been formally recorded, and scant physical evidence has been located on the ground. This lack of evidence mainly may be due to the paucity of cultural resource inventories in the trail's vicinity, as little BLM land is present along its route.

The Rawlins-to-Baggs freight road was a 19th century road connecting Rawlins and the town of Baggs to the southwest and continuing on to the White River Ute Indian Agency at Meeker, Colorado. Originally the route was used for freight, but mail and passenger services were added as the region became more populated. The military used the road to transport troops and supplies from Fort Steele to Meeker during a massacre in 1879. The Rawlins-to-Baggs freight road parallels the 20-mile road out of Rawlins. Portions of the road are in excellent condition, with deep swales and ruts present.

The Rawlins-to-Fort Washakie Freight Road was created by the military after the establishment of Camp Auger at present-day Lander. The military used the route from Rawlins north, as Rawlins was the closest rail and supply point for Camp Auger. Later the route was extended north to Fort Washakie after the Indian Agency was established there. In 1885, a tri-weekly stage was established between Rawlins and Lander, using the Rawlins-to-Fort Washakie Trail until 1906, when the Chicago and Northwestern Railroad reached Lander and the Wind River Valley.

The Cheyenne-to-Fort Laramie Road was constructed in 1876 as part of the Cheyenne-to-Deadwood Stage Road. The road followed the Chugwater and Laramie rivers to Fort Laramie and continued northward to the goldfields of South Dakota. None of these roads have been completely and thoroughly recorded along their entire routes, and modern roads have likely destroyed much of their physical remains.

Completion of the transcontinental U.P.R.R. in 1869 greatly reduced the need for trails for emigrant travel to the west. The railroad reached southern Wyoming in 1868 and, soon after, the emigrant trails were relegated for use primarily as regional freight and stage roads, contributing to the settlement and development of the state. The original U.P.R.R. was abandoned in 1901, the tracks and ties were removed, and the railroad was realigned and rebuilt. Much of the original grade has been impacted by pipelines and roads and other developments over the years (as well as by the Lincoln Highway and the modern U.P.R.R.), but portions of the original grade still remain and have been recorded in the RMPPA.

The first transcontinental automobile road, the Lincoln Highway, also passed through southern Wyoming and generally followed closely to the route of the U.P.R.R.. In fact the first alignment of the road in 1913 utilized large portions of the abandoned U.P.R.R. grade (Franzwa 1999). Portions of the highway were upgraded, rebuilt, and realigned in each succeeding decade through the 1940s with the culmination in construction of U.S. Highway 30. Remnants of the various grades are frequently encountered in the RMPPA, although many have been altered or destroyed by Interstate 80 and U.S. Highway 30.

3.3.3 Native American Cultural Resources

Cultural resources that are considered sensitive and potentially sacred to modern Native American tribes include burials, rock art, rock features and alignments (such as cairns, medicine wheels, and stone circles), Indian trails, and certain religiously significant natural landscapes and features. These resources may be formally designated as TCPs or Indian Sacred Sites. A TCP is a site considered eligible for inclusion on the National Register because of its association with cultural practices or beliefs of a living community that are (a) rooted in that community's history, and (b) important in maintaining the continuing cultural identity of the community. Indian Sacred Sites, as defined in *Executive Order* (E.O.) 13007, are "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion." Indian Sacred sites are not always eligible for the National Register; however, pursuant to the guidelines in E.O. 13007, they receive the same protective measures as NRHP-eligible historic properties. A particularly high concentration of sensitive Native American sites in the RMPPA occurs on Foote Creek Rim. Designated the Foote Creek Rim Archaeological District, the area contains 564 rock features, including cairns, stone circles, medicine wheels, and other alignments (Schneider et al. 1995). The district is the only officially designated TCP in the RMPPA.

Major rock art areas include Sand Creek in the southern Laramie Basin and Upper Powder Springs in the southern Washakie Basin. Rock art in the Upper Powder Springs complex (located primarily on BLM land) includes charcoal pictographs of hunters, horses and other animals, as well as pecked anthropomorphic figures (Murcray 1993).

3.3.4 Cultural Resource Management Use Allocations

As mandated in BLM Information Bulletin 2002-101, all cultural resources in the RMPPA must be allocated to a use category. These categories include—

a. Scientific Use.
b. Conservation for Future Use.

c. Traditional Use.
d. Public Use.
e. Experimental Use.
f. Discharged from Management.

The majority of prehistoric age cultural resources in the RMPPA are allocated to category (a), Scientific Use, as this pertains to most historic and prehistoric archaeological resources that are evaluated for nomination to the NRHP under 36 CFR 60.4, Criterion D. NRHP-eligible cultural properties of this type are significant for the scientific information they contain. These sites are preserved until their research potential is realized, generally through data recovery investigations.

Archaeological resources allocated to category (f), Discharged from Management, are those sites which have no remaining identifiable use. Properties discharged from management remain in the inventory, but they are removed from further management attention and do not constrain other land uses. Particular classes of unrecorded cultural properties may be named and described in advance as dischargeable upon documentation, but specific cultural properties must be inspected in the field and recorded before they may be discharged from management.

Cultural resources in category (b), Conservation for Future Use, include significant properties that are deemed worthy of segregation from all other land or resource uses, including cultural resource uses, which threaten the maintenance of present conditions or setting. Properties assigned to this category will remain in this use category until specified provisions are met in the future. One property in the RMPPA, the Aimee Eaton Buffalo Kill Site, is allocated to this use category. Pursuant to a memorandum of agreement (MOA) between the Wyoming State Historic Preservation Officer and the Bureau of Land Management, Rawlins Field Office, the site will remain under the jurisdiction of BLM until adequate mitigation measures have been carried out. In addition, annual monitoring of the site will occur to determine whether any natural erosional processes have adversely impacted the site.

Cultural resources in category (c), Traditional Use, include those properties that are important to the identity, heritage, or well-being of specific social and/or cultural groups. In the RMPPA, this use category pertains mainly to Native American sensitive sites and TCPs. Specific properties allocated to Traditional Use in the RMPPA include the Foote Creek Rim Archaeological District and the Upper Powder Springs rock art complex.

Category (d), Public Use, includes cultural properties appropriate for interpretative, educational, or recreational uses by the general public. In the RMPPA, these would include the Overland Trail and other select historic emigrant trails and associated properties. The JO Ranch, a private historic ranch complex that is currently part of an ongoing exchange proposal, would be developed for public use once the exchange is complete and the JO ranch becomes public land.

Category (e), Experimental Use, would include cultural properties retained for controlled experimental studies, generally using experimental techniques that would result in at least partial alteration or destruction of the cultural resource. There are no cultural properties currently allocated to this use category in the RMPPA.

3.4 WILDLAND FIRE AND FUELS

Firefighter and public safety is the first priority in the wildland fire and fuels management program. Wildland fires in the RMPPA occur as the result of an act of nature, such as lightning, or are caused by humans either accidentally or with the intent to cause damage. Prescribed fire is used for beneficial purposes (such as reducing hazardous fuel accumulation) in a controlled manner under a specific

prescription and planned effort. Wildland fires resulting from an act of nature can sometimes be managed to achieve resource objectives.

The response to a wildland fire is based on an evaluation of risks to firefighter and public safety; the circumstances under which the fire has occurred, including weather and fuel conditions; natural and cultural resource management objectives; protection priorities; and values to be protected. Wildland fires can be used to protect, maintain, and enhance resources and, as nearly as possible, can be allowed to function in its natural ecological role. The evaluation must also include an analysis of the context of the specific fire within the overall local, geographic area, or national wildland fire situation. The full range of fire management activities will be used to help achieve ecosystem stability, including its interrelated ecological, economic, and social components.

3.4.1 Wildland Fire Occurrence and Ignition Sources

Lightning is the primary natural cause of wildland fire in the RMPPA. Natural ignitions occur throughout the RMPPA, although some areas, such as the Seminoe Mountains and Laramie Range, have higher wildland fire frequencies from lightning ignitions. Human-caused fires in the RMPPA have also been widespread. The majority of human-caused fires have occurred along the I-80 and railroad corridors, primarily in sagebrush and grassland communities. Historically, wildland fires have also occurred in camping and woodcutting areas by accidental ignition caused by fireworks, outdoor recreation fires, and machinery. Fireworks and railroad-associated fires account for the majority of human-caused ignitions in the RMPPA.

3.4.2 Fuels Management

Vegetation treatments are used in the Rawlins RMPPA to control the buildup of fuels and to meet the needs of other resources (including rejuvenating areas where vegetation has become decadent and setting back local succession so that diverse patches of habitat are present). Areas dominated by cheatgrass or other invasive species are examined on a case-by-case basis when planning prescribed burns. For a more complete discussion of prescribed fire and mechanical, chemical, and biological treatments, see Appendix 19.

3.4.3 Use of Wildland Fire

The use of wildland fire for resource benefit reduces fuel loading and the amount of effort needed to control large fires, and allows wildland fire to function in its natural ecological role where possible. The areas designated on Map 2-1 are where the use of wildland fire for resource benefit is most likely to occur. Opportunities to use wildland fire in the checkerboard and mixed land ownership areas are limited but would be pursued when wildland fire would not endanger private property.

3.4.4 Wildland Urban Interface (WUI)

Approximately 215,000 acres have been identified in the Rawlins RMPPA as having Wildland Urban Interface (WUI) characteristics (Map 2-1). WUIs are defined as communities in which humans and their development meet or intermix with wildland fuel, where there is a high probability of wildland fire occurrence. These areas contain large numbers of dispersed ranches and first and second homes. Sixty-one at-risk communities, identified on Map 2-1, are located in the RMPPA. WUIs and other at-risk communities receive priority for hazardous fuel reduction treatments. In addition, industrial developments located in the RMPPPA which are at risk from wildland fire would also receive priority for fuel reduction treatments.

3.4.5 Community Assistance

Community assistance in the Rawlins RMPPA consists of cooperative agreements, training, rural assistance, and monetary grants. There are currently six cooperative agreements concerning suppression of wildland fires. Wildland fire training is coordinated with cooperators to meet their training needs. Rural assistance and monetary grants have averaged between $80,000 and $110,000 annually. These grants are designed to improve the training and equipment of cooperating fire departments for firefighter and public safety.

3.4.6 The Role of Wildland Fire in Plant Communities of the RMPPA

Fire frequency and severity varies by plant community, and extensive suppression has altered natural fire cycles in some areas. In some plant communities in the RMPPA, this accumulation has changed the structure and composition of the vegetation community (i.e., resulted in the reduction of the natural variation of vegetative communities) and could result in undesirable fire behavior and fire effects. Drought also affects fire behavior and fire effects in many ways, such as by reducing the amount of fine fuels and reducing fuel moisture content.

Using the ecological provinces described in the Vegetation section, the Intermountain Semi-Desert Province of shrublands, with pockets of aspen, limber pine, and juniper, historically would have experienced fire frequencies of 35–100-plus years, resulting in a mixed severity of effects on the vegetation (Fire Regime III). The Great Plains Dry Steppe Province of mixed and short grass prairies would have experienced a fire frequency of 0–35 years, with stand replacement effects (Fire Regime II). The Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest Province consists of mixed shrub communities, forests of pine and spruce in seven mountain ranges in the RMPPA, and alpine tundra. Depending on the species, shrub communities would have experienced fire frequencies of 0–35 years with stand replacement severity (Fire Regime II) or frequencies of 35–100-plus years with mixed severity (Fire Regime III). The pine forests likely experienced fire frequencies of 35–100-plus years with either mixed severities (Fire Regime III) or stand replacement severity (Fire Regime IV). Spruce forests and alpine tundra areas with patches of spruce and fir trees burned with a 200-plus-year frequency with stand replacement severity (Fire Regime V).

As noted above, unnatural fuel loading in forest stands and other vegetative types would be reduced through prescribed fire and mechanical, chemical, or biological treatments for the purpose of restoring ecological conditions or other desired vegetative conditions. Most prescribed burns in sagebrush and mountain shrub communities will occur in areas where the percentage cover of shrubs exceeds 30 percent. To achieve objectives for prescribed fire in aspen stands in the RMPPA, the stand should have less than 40 percent canopy cover of aspen and at least 15 percent cover of sagebrush, or have 40 percent to 60 percent conifer cover in the stand.

3.4.7 Emergency Stabilization and Rehabilitation

Fires will be evaluated as to whether emergency stabilization (actions to stabilize and prevent unacceptable degradation to natural and cultural resources, minimize threats to life or property from the effects of fire, or repair/replace/construct physical improvements) is necessary to prevent degradation of land or resources. The need for rehabilitation (efforts to repair or improve lands unlikely to recover to a management-approved condition from wildland fire damage, or to repair or replace minor facilities damaged by fire), including tree planting to reestablish burned habitat, reestablishing native tree species lost in fire, repairing damage to minor facilities (campgrounds, exhibits, fences, guzzlers, etc.), habitat restoration, invasive plant treatment, road/trail maintenance, heritage site restoration, and fence replacement when such damage is cause by wildland fire, will also be evaluated.

3.5 FORESTRY

Forested areas within the RMPPA boundaries mainly are located within several mountainous areas: Shirley Mountain, located in the north-central part of the RMPPA; Elk Mountain, located in the south-central part of the RMPPA; Ferris Mountains Wilderness Study Area (WSA) in the north-central part of the RMPPA; Seminoe Mountain; Bennett Mountain; and Powder Rim. There are also a number of forested areas on the fringe of the national forest boundaries (Map 3-1). Forest acreage within the RMPPA is small compared with the RMPPA's total area. Total acreage of forested land managed by BLM within the RMPPA is 111,400, or approximately 1 percent of the total area.

The condition or health of forest stands varies by location. The general absence of large fires over the past 80 years has made forests more susceptible to disease such as dwarf mistletoe, mountain pine beetle infestations, and newly introduced diseases such as white pine blister rust, which has increased the mortality rate and the amount of dead standing timber in Federal forests. In addition, species such as lodgepole pine (Appendix 28) have not experienced the natural regenerative properties of fire. Conifers are encroaching on aspen stands, limiting aspen regeneration. The disease known as bleeding rust is currently killing the older mature aspen clones. There has also been a decline in timber harvesting over the past decade, allowing for additional buildup of overall biomass. The majority of commercial timber in the RMPPA is located within the Shirley Mountain and Elk Mountain areas. Descriptive summaries of the forest resources within these two areas follow.

3.5.1 Shirley Mountain Forest

The Shirley Mountains are a relatively isolated mountain range in the northern portion of Carbon County in south-central Wyoming. They are located entirely within the RMPPA and contain a mixture of BLM-managed public lands, state lands, and private land parcels. This forest encompasses approximately 25,600 acres of federal lands within the RMPPA. The Shirley Mountains provide diverse resource values and uses, such as forests, wildlife habitat, recreational opportunities, minerals, watershed, livestock grazing, communication sites, and cultural resources.

The condition of forest resources in the Shirley Mountain Forest is discussed below by forest type. Because of differences in forest management practices, the condition of BLM-managed public parcels and private parcels that have been timbered differs markedly. Diversity is low not only from the standpoint of relative acreage in the different forest types but also because of diversity within different successional stages for all these forest types. This condition is primarily due to the lack of stand-replacing disturbances over the past 80 years.

3.5.1.1 Lodgepole Pine Forest

The lodgepole pine forest type, comprising approximately 9,860 acres, is the result of past stand-replacing wildland fires, dating from the 1860s to the 1910s. This forest type is generally healthy but will decline in vigor and productivity as the forest becomes more decadent. In addition there are some insect and disease concerns that may compromise future health. Infestations of pine beetles and dwarf mistletoe are apparent. Current age class distribution is heavily unbalanced toward the mature age class, reflecting the long period since the last fires.

3.5.1.2 Spruce-Fir Forest

The major species component of the spruce-fir forest type is subalpine fir, with occasional Engelmann spruce. This forest type is found on only about 330 acres of the Shirley Mountain Forest. It is even-aged

and fairly young, considering the longevity of Engelmann spruce and subalpine fir. Spruce-fir exists as small, isolated stands away from the large acreages of dense lodgepole pine and has the same date of origin as its neighboring stands. Old, remnant lodgepole pine trees are not found in the spruce-fir stands. Occurrence of the spruce-fir forest type is probably a result of less intense wildland fire in their particular area and an available seed source. There is also an established understory (more than 50 trees per acre) of young subalpine fir seedlings and/or saplings on about 5,877 acres of lodgepole pine and aspen forest. These forested areas will convert to subalpine fir forests, but this process may take 100 years or more and will only occur if there are no wildland fires.

3.5.1.3 Aspen Forest

Comprising about 810 acres, the aspen forest type, like the spruce-fir type, is not well represented in the area. Aspen are found primarily on steep, rocky slopes or in low wet areas, therefore opportunities for management are limited. In addition, conifer invasion is occurring in most of the aspen stands, which could result in further reductions in aspen presence. Barring any major surface disturbance (e.g., fire or mechanical treatment), the majority of the aspen stands would eventually be replaced by conifers. However, this conversion is not anticipated to occur within the next 20 years. Aspen is a minor component in more than one-third of the lodgepole pine stands. Removal of the conifers would promote aspen regeneration.

3.5.1.4 Woodland Forest

The majority (14,600 acres) of the forested land in the Shirley Mountains is woodland forest type. The most common tree species is limber pine. Juniper woodlands also occur. The trend in vegetative structure in this type of forest is toward increasing tree density. The existing vegetation allows seedlings to establish in previously open areas. This filling in will increase crown cover and reduce forage for wild and domestic ungulates.

3.5.2 Elk Mountain Forest

Elk Mountain is located in the southeast quarter of Carbon County, just north of the Medicine Bow National Forest. BLM administers approximately 5,670 acres of forested land in this area.

Forest types in this area change in relation to elevation. In the subalpine zone, at 9,000 to 11,000 feet, Engelmann spruce and subalpine fir dominate. In the area below this elevation, the forest type is almost exclusively lodgepole pine. Below the lodgepole pine is an area of mixed lodgepole pine and Douglas fir. Aspen, limber pine, scattered ponderosa pine, some Douglas fir, and lodgepole pine predominantly cover the foothills of Elk Mountain. The more productive forest stands are located on areas with a north to northeast aspect. Stands that occur on the west and south slopes of the mountain are not as productive.

Forests on Elk Mountain are not in good condition. Past cutting practices, often in the form of high grading, along with past insect infestations and fire suppression, have resulted in a deteriorating forest resource on Elk Mountain on both public and private land. Many acres have had poor natural regeneration. Dwarf mistletoe occurs on all coniferous species on Elk Mountain, with considerable damage appearing in lodgepole pine. The condition of forest resources in the Elk Mountain Forest is discussed below by forest type.

3.5.2.1 Lodgepole Pine Forest

On Elk Mountain, 1,083 acres consist of the lodgepole pine forest type. The majority of lodgepole stands have reached their recommended rotation age of 100 years; thus growth has slowed. There are patches that

are in a severely deteriorated condition. Virtually all the lodgepole stands owe their origin to fires that occurred in the 1800s. Because of extensive even-aged lodgepole pine stand growth, overcrowding occurs. Lodgepole pine is generally considered a long-lived seral species, with subalpine fir and Engelmann spruce being the eventual climax species. Situations do exist, however, in which seral species remain on site instead of being replaced by normal climax species. In such a situation, the lodgepole pine could be considered the climax tree species.

The Douglas fir forest type is generally found in association with lodgepole pine in this area, on the lower reaches of the mountain. Many of these trees are residual trees from prior stands.

3.5.2.2 Spruce-Fir Forest

Subalpine fir and Engelmann spruce are generally becoming established under much of the lodgepole pine, following forest succession into a climax forest. There are large areas where subalpine fir constitutes a major portion of the overstory. Engelmann spruce occupies a mixed conifer forest with subalpine fir, the latter being the first species to grow. Spruce stands make up approximately 2,486 acres of the Elk Mountain forest.

3.5.2.3 Aspen Forest

Aspen occupy wet draws and drainages on Elk Mountain. Aspen stands generally provide an overstory for subalpine fir seedlings, with the probability that the stand will eventually reach a spruce-fir climax condition. Many of the aspen stands are disease-ridden and of poor quality.

3.5.2.4 Woodland Forest

Limber pine occupies the more exposed and harsh sites throughout the area. The drier south-facing slopes on Elk Mountain are often covered with widely spaced limber pine. In some locations, the limber pine appears to be invading sagebrush-covered meadows, competing successfully with the deep-rooted sagebrush. After the limber pine has been established for several decades, a desirable environment for other tree species, such as lodgepole pine, develops and the species composition of the site changes.

3.6 LANDS AND REALTY

The RMPPA manages approximately 3.5 million acres of public land. Uses of the land are diverse, ranging from oil and gas development to grazing, wildlife habitat, and recreation. The current land use environment is characterized by an increase in development by the oil and gas industry and in private and urban development. The expected increase in oil and gas production, as well as the potential for development of alternative energy sources such as wind energy, is likely to have a greater impact on land distribution and use in the near future. Changes in the ownership of surrounding private land also have an impact on the development of public lands. The most important characteristic of such ownership changes may be the resultant fragmentation and isolation of segregated parcels of public land.

Land ownership within the RMPPA is shown in Map 1-2. The most prominent land resource feature within the RMPPA is a large swath of land that is divided into a checkerboard pattern of ownership. This swath of land is approximately 40 miles wide and runs from east to west across the entire RMPPA. The checkerboard pattern, with alternating sections of private and public land, runs 20 miles to the south and 20 miles to the north of the Union Pacific railroad line. Each section within the checkerboard is 1 mile square. Ownership is divided between private, BLM-managed public land, and state land.

Over the years little consolidation has taken place within the checkerboard area, the principle control and use of the surface being by the livestock industry. However over the last 20 years there has been a trend of selling the private lands to realtors who sell 40-acre tracts to willing buyers who want to "own a piece of the West." As this ownership and land use changes in the future, there is potential for management of the public lands to become much more complicated, with potential conflicts and increased impacts to BLM-administered portions of the checkerboard. Over the last 12 years, Carbon County has developed a land use plan and zoning regulations to guide land development for preserving values such as open space and crucial wildlife habitat, protecting private property rights, and maintaining efficient services by promoting rural expansion closer to existing communities and infrastructure. Where similar values exist, BLM management prescriptions and permitted action should facilitate the planning and zoning implemented by Carbon County. Values on adjacent public lands benefit from these policies but would be better protected and still maintain private land values if further land surface exchanges were to occur.

Land and mineral ownership acreages and whether they are covered by Resource Management Plan (RMP) decisions are shown in Table 1-1. Generally RMP decisions cover all BLM-managed federal surface lands and their underlying minerals whether the minerals are federally or nonfederally owned, and nonfederal surface underlain by BLM-managed minerals. Federally owned mineral rights are shown in Map 1-3.

3.6.1 Land Ownership Adjustment

Under the disposal criteria of the *Federal Land Policy and Management Act* of 1976 (FLPMA), about 66,000 acres were identified for consideration of disposal. However, that acreage figure was reduced to 46,230 because parcels that contain legal access across them were eliminated from consideration for disposal. Lands identified for disposal under Sections 203 and 206 of FLPMA and identified as such in this plan are hereby classified for disposal under Section 7 of the *Taylor Grazing Act* of 1934 as amended (43 USC 315f). Exchanges are subject to the procedures outlined in CFR 43, Chapter II, Part 2200, Sections 0-6.

The RFO staff considers land exchanges on a case-by-case basis, as they are proposed. All lands considered for disposal must meet one or more of the criteria outlined in Section 203(a) of the FLPMA. These criteria characterize lands for potential disposal as lands that are difficult or uneconomical to manage; lands acquired for a specific purpose but no longer required for that or another Federal purpose; or lands that will serve important public objectives, including but not limited to expansion of communities and economic development, that outweigh other public objectives and values.

3.6.2 Withdrawals/Classifications

Withdrawals and classifications are typically placed on land or minerals to protect resource values or existing facilities, although they can selectively prohibit some management actions that would otherwise protect additional resource values. Most of the withdrawals and classifications that have been put in place at various times have prohibited mineral and agricultural entry and disposal, but some have also prohibited nonmetalliferous mineral entry and disposal of coal, limited rather than prohibited mineral entry, or protected water sources. Withdrawals and classifications are periodically reviewed to see whether they are serving their intended purpose and may be revoked if they are not.

Current withdrawals of public land comprise approximately 1,582,260 acres (Table 3-3) within the RMPPA (Valentine 2002). In the past, the largest withdrawals have been made for coal, oil shale, and stock driveways, with coal representing the largest withdrawal at over 600,000 acres. Bureau of Reclamation lands and public water reserves constitute more than 120,000 acres. The remaining acres that have been withdrawn include wildlife refuges, air navigation sites, power sites, and administrative sites.

Table 3-3. Withdrawal Summary

Type of Withdrawal	Acreage[1]
Stratton Hydrology	2,694
Administrative Sites (BLM)	93
Administrative Sites (FS)	720
Reclamation (BOR)	73,290
Wildlife Refuges	3,915
Air Navigation Sites (FAA)	440
Public Water Reserves[2]	46,095
Oil Shale	564,758
Coal Withdrawals	610,170
Power Sites[3]	5,150
Stock Driveways[3]	263,258
New Withdrawal Initiatives[4]	0
Encampment River Campground	11
Coral Creek Campground[5]	10
Bennett Peak Recreation Site	15
Teton Reservoir Recreation Site[5]	353
Prior Flat Campground[5]	82
Dugway Recreation Site[5]	43
Nine Mile Hill	126
Fort Washakie Stage Station	640
Overland Trail	680
Big Creek Proposed Recreation Site	30
Prospect Creek Proposed Recreation Site	66
Jelm Mountain Proposed Recreation Site	1,871
First Ranch Creek Proposed Recreation Site	522
Gibben's Beardtongue Site	10
Lake Hattie Reservoir	902
Twin Buttes Lake	104
Wheatland Reservoir #3	921
East Allen Lake	138
Dune Ponds	3,099
Shirley Basin Reservoir	354
Little Sage Reservoir	90
Little Robber Reservoir	448
Laramie River Access	1,162
Total Existing Withdrawals [4, 6]	**1,582,260**

ABBREVIATIONS: BLM = Bureau of Land Management, U.S. Department of the Interior; BOR = Bureau of Reclamation, U.S. Department of the Interior; FAA = Federal Aviation Administration; FS = Forest Service, U.S. Department of Agriculture; FWS = Fish and Wildlife Service, U.S. Department of the Interior.

1 Due to overlaps, acreages are not additive.

2 The original public water reserve withdrawals included segregation against the location of nonmetalliferous minerals. Withdrawal review reports completed in 1982 revealed that this segregation is unnecessary to protect the water sources. Public Water Reserve 107 also said that all water sources existing on the date of the withdrawal order were protected and withdrawn even if they were not noted to the official records. Therefore, 4,850 acres of previously unrecorded water sources are included.

Public water reserves withdrawn under Secretarial Order 107 and other classification orders will be reviewed to determine if they meet the retention requirements of legal opinions of the Solicitor of the Department of the Interior and the agreement made between the State of Wyoming and the Department of Justice (for the Department of the Interior) concerning the adjudication of water rights. Withdrawals will be terminated on public water reserves that do not meet retention

Type of Withdrawal	Acreage

requirements.
3 These withdrawals segregate the land against operation of the public land laws but not the 1872 General Mining Law.
4 Except for power sites and stock driveways, these withdrawals segregate the land against operation of the public land laws and from mineral location under the 1872 General Mining Law.
5 These withdrawal initiatives would replace segregations previously established with C&MU classification
6 These withdrawals are scheduled for future review. Recommendations from the reviews will be arrived at on a case-by-case basis. It is possible that portions of the BOR withdrawals may be revoked, returning the lands to the jurisdiction of BLM.

3.6.3 Utility/Transportation System

Leases and rights-of-way (ROW) grants are spread throughout the RMPPA. The majority of leases and grants within the RMPPA are for oil and gas development. Wind energy rights-of-way (Map 3-2) on BLM-managed land comprise approximately 17,000 acres, with 35 turbines (as of mid-2002) on public land.

3.6.4 Transportation and Utility Right-of-Way Corridors

Existing major transportation and utility ROWs (Map 2-2) provide an adequate net (defacto corridor) for the placement and development of future ROWs. Current ROWs are sufficient to meet the priorities for interstate transmission of telephone communication, electric power, fluid mineral resources and interstate commercial and private travel. These facilities include—

- The state and interstate highway system (I-80 and I-25), Federal Highway 287, and State Routes 789 and 230.
- Major natural gas delivery systems (i.e., Sinclair pipeline system from Sinclair, WY, to Billings, MT; CIG pipeline from Greasewood, CO, to Wamsutter, WY; Lost Creek pipeline from Crooks Gap to Wamsutter; Exxon/Frontier Pipeline in the northwest portion of the RMPPA; Pioneer/Conoco pipeline from Croydon, UT, to Sinclair, WY, along the I-80 corridor; I-80 and I-25 highway routes utilized for major natural gas pipeline transportation routes).
- Electric transmission lines (i.e., Wyoming Area Power Administration [WAPA] electric power delivery system corridor from Seminoe Reservoir to Cheyenne; the power line located in the northwest portion of the RMPPA, from I-80 heading north-northeast to the RMPPA boundary; the Spence-Bairoil-Jim Bridger 230 kV transmission line; the electric transmission line running northeast from Cheyenne, WY, to Nebraska).

These corridors, with the exception of the WAPA line, Federal Highway 287, and State Route 789, satisfy future needs for energy transmission and are identified by the Western Utility Group (WUG) Western Regional Corridor Study.

3.6.5 Land Consolidations

Land is consolidated through fee or easement acquisition, exchange, condemnation, and donation processes. Currently there are no active efforts to consolidate land within the RMPPA. However proposals are currently being evaluated, and RFO staff will consider any proposal in relation to their land exchange criteria (Appendix 6), determining future action based on the proposal's merits.

3.7 LIVESTOCK GRAZING

Livestock that graze on BLM-managed public lands are primarily cattle but also include sheep and, to a lesser extent, horses and bison. Relative numbers of livestock have varied in response to their economic value as a commodity (cattle, sheep, and bison) and their use in ranching operations (horses). Rangeland health standards and monitoring actions are summarized in Appendix 8.

3.7.1 Historic Use

Historically, there have been much higher numbers of sheep on RMPPA rangelands than cattle. However sheep numbers have steadily declined. Table 3-4 outlines the livestock populations in Albany, Carbon, and Laramie counties since approximately 1900. In 1920, the earliest year for which data are available for both cattle and sheep, 24.1 percent of the livestock were cattle. This percentage decreased until 1940 (17.7 percent) and then rose consistently to 73.5 percent in the year 2000.

Table 3-4. Cattle and Sheep Numbers in Albany, Carbon, and Laramie Counties from 1905 to 2000 (5-Year Intervals).

Year	Cattle Numbers	Sheep Numbers	Total Numbers	Percent Cattle
1905	750,000	NA	NA	NA
1910	746,000	NA	NA	NA
1915	887,000	NA	NA	NA
1920	950,000	3,000,000	3,950,000	24.1%
1925	795,000	2,700,000	3,495,000	22.7%
1930	790,000	3,540,000	4,330,000	18.2%
1935	858,000	3,599,000	4,457,000	19.3%
1940	811,000	3,778,000	4,589,000	17.7%
1945	1,043,000	3,040,000	4,083,000	25.5%
1950	991,000	1,924,000	2,915,000	34.0%
1955	1,096,000	2,036,000	3,132,000	35.0%
1960	1,175,000	2,360,000	3,535,000	33.2%
1965	1,352,000	2,092,000	3,444,000	39.3%
1970	1,476,000	1,883,000	3,359,000	43.9%
1975	1,690,000	1,386,000	3,076,000	54.9%
1980	1,340,000	1,050,000	2,390,000	56.1%
1985	1,365,000	860,000	2,225,000	61.3%
1990	1,220,000	805,000	2,025,000	60.2%
1995	1,470,000	790,000	2,260,000	65.0%
2000	1,580,000	570,000	2,150,000	73.5%

3.7.2 Current Use

The percentage of actual use by cattle and sheep on public lands over a recent 10-year period (1991–2000) is presented in Table 3-5.

Table 3-5. Livestock Actual Use in Animal Unit Months (AUM) for the RMPPA from 1991 to 2000.

Year	Cattle Actual Use (AUMs)	Sheep Actual Use (AUMs)	Total Actual Use (AUMs)	Percent Cattle Use (AUMs)
1991	158,670	29,085	187,755	84.5%

Year	Cattle Actual Use (AUMs)	Sheep Actual Use (AUMs)	Total Actual Use (AUMs)	Percent Cattle Use (AUMs)
1992	173,422	29,015	202,437	85.7%
1993	212,129	37,496	249,625	85.0%
1994	224,270	32,503	256,773	87.3%
1995	228,893	31,172	260,065	88.0%
1996	280,655	31,433	312,088	89.9%
1997	278,748	30,977	309,725	90.0%
1998	273,561	26,591	300,152	91.1%
1999	318,098	26,474	344,572	92.3%
2000	294,329	21,855	316,184	93.1%
Mean Actual Use	244,278	29,660	273,938	89.2%

The average use by all livestock in this table is about 274,000 AUMs, with a range from 187,755 to 344,572. Livestock use typically varies depending on forage conditions, market prices, and changes in livestock operations. The trend of shifting from sheep to cattle, discussed under Historic Use above, is also reflected in livestock actual use. The percentage of cattle use in AUMs has increased from 84.5 percent in 1991 to 93.1 percent in 2000. High numbers of wild horses, combined with drought conditions, have recently been a factor affecting livestock actual use within the herd management areas (HMA). Within the RMPPA, expansion of poisonous invasive species such as halogeton has also led to higher levels of nonuse by livestock (see the weeds section for further discussion).

There are a total of 582 grazing allotments within the RMPPA (Map 3-3). These include 3,492,744 acres of public land (52.9 percent), other federal land (0.8 percent), state land (5.3 percent), and private land (40.9 percent). Allotments range in size from 20 acres to 291,954 acres of public land. There are 222 allotments that contain 640 acres (one section) or less of public land, 160 allotments that contain between 640 and about 2,500 acres of public land, 115 allotments that contain between 2,500 and 10,000 acres of public land, and 80 allotments that each contain more than 10,000 acres of public land. The 80 allotments make up 76 percent of the public land in the RMPPA. The public and other federal lands for which BLM administers grazing have a total permitted use of 469,575 AUMs for livestock grazing. The number of AUMs used continues to fluctuate for a variety of reasons. Reductions occur as a result of such actions as sheep-to-cattle conversions, or following changes in season or duration of use. Over the past 15 years, there have also been increases in AUMs available for use, with an additional 4,225 AUMs becoming available as a result of improvements in management and forage availability. Other actions taken to achieve the objectives identified in the land use plan include the use of best management practices in activity plans for livestock, wild horses, watershed, and other managed resources.

Of the 582 allotments in the RMPPA, 87 percent are used by cattle alone, 9 percent are used by cattle and sheep, and 1.4 percent are used by sheep alone. The remaining 2.6 percent are used by a combination of the following: cattle with horses, cattle with bison, horses alone, goats, or alpacas. Small numbers of horses used in ranching operations are also licensed in other allotments. Nine allotments currently do not have permitted livestock use. Two of these are wildlife management units where the private lands are controlled by the Wyoming Game and Fish Department (WGFD), and grazing use is authorized on a temporary, nonrenewable basis in conjunction with WGFD. Other private lands with attached public land grazing have been purchased by individuals who are not in the livestock business. The public lands in these allotments are relatively small and may be managed for other uses (i.e., wildlife habitat), incorporated into a neighboring allotment, or identified for sale or exchange. Appendix 29 outlines the public, other federal, private, and state acreage per allotment; the total federal AUMs, the class of livestock; the timing of grazing; and the grazing management for each allotment.

Improvement projects and grazing systems, which have become known as "best management practices" (BMP), have been under way for over 40 years. These practices have occurred singly or cooperatively

among livestock operators, local conservation districts, the University of Wyoming Extension Service, and state and Federal agencies. The practices have been further improved over the past 10 years through educational workshops and seminars, Federal and nonprofit cost-sharing opportunities, and more active participation by local conservation districts in all aspects of this process. The goal of such practices is to enable sustained livestock use without damaging the vegetation and watershed resource, while also supporting healthy wildlife and fish habitat or wild horse populations. Grazing management plans are devised with consideration of other resource values, vegetation production and type, topography, water locations, and needs of the livestock owner.

Historic priorities for improved livestock management usually addressed the larger blocks of public land, followed by resource issues, particularly the condition of watersheds in general, and, more recently, riparian habitat. Of the 80 largest allotments, 75 percent have grazing systems or adequate management for the resources present. Current guidance for evaluating rangeland standards on a watershed basis will widen the management focus to all problem areas related to meeting the standards, with less emphasis on the amount of public land involved. In the past 5 years (the period after rangeland standards were adopted), 189 allotments (2,547,070 acres of public land) were assessed, including 23 allotments that failed to meet one or more standards because of livestock management. Riparian and wetland health is the typical standard that is not being met because of the season and/or duration of livestock use. Other standards that have not been met include wild horse use, wildlife use, oil and gas development, weed expansion, gradient adjustments, and plant succession/community decadence.

Grazing strategies that are used with existing permits in the RMPPA include the following:

- **Season-Long**—grazing occurs for part or for the duration of the permitted time, often lasting from late spring through fall
- **Yearlong**—grazing is permitted for any time during the year
- **Rotation**—grazing is rotated during the growing season between pastures in the allotment to provide partial growing season rest before use or recovery time after use
- **Deferred Rotation**—grazing is rotated between pastures or allotments to provide full growing season rest every second or third year
- **Dormant Season**—grazing occurs after seed-set by grasses (includes late summer, fall, and/or winter grazing)
- **Split Season**—grazing occurs during two separate time periods by removing livestock from the allotment and returning them later in the year to provide partial growing season rest.
- **Rest Rotation**—grazing is rotated between pastures, with each pasture receiving no grazing use for an entire year, usually every third or fourth year.

Within the RMPPA, 56 percent of allotments are used on a season-long basis, 20 percent are managed with a deferred rotation system, and 16 percent are managed with a rotation system. Four percent of allotments are designated for yearlong use, thus these allotments are often used as utility pastures when needed. Dormant season, split season, and rest rotation management systems make up the balance of the allotments (in listed order by their percentage of use). The emphasis for livestock management within the RMPPA is to promote partial growing season rest on all allotments to maintain or improve plant vigor and health.

3.7.3 Recent Results of Rangeland Best Management Practice Application

Rangeland BMPs have been implemented on many allotments to solve problems particular to vegetation type, topography, availability of water, and needs of the livestock operators. The following subsections present examples of successful BMPs used to improve grazing and ecological stability on individual allotments, and they describe the existing conditions for these allotments.

3.7.3.1 Pine Grove-Bolten Allotment

The 277,369 acres of the Pine Grove-Bolten Allotment (Allotment Number 10632) include public (120,012 acres), private (148,017 acres), and state (9,340 acres) holdings. Grazing management has improved, and resource-oriented objectives have been established with the current livestock operator. Many range improvements have been completed within the allotment, which have greatly benefited grazing flexibility. These improvements include additional fencing (55 miles, 34 of which are electric), resulting in over 50 pastures within the allotment instead of the original 21 large pastures. A number of water developments have also been completed: 70 wells, 30 miles of pipelines, 18 spring developments, and 11 reservoirs. In addition, a long-term vegetation treatment program to diversify habitat has been developed during 2001–2003: 12,100 acres were treated with tebuthiuron (i.e., Spike), and a prescribed burn is being planned. Control of noxious weeds through a cooperative effort of BLM, Carbon County Weed and Pest, and the livestock operator is ongoing.

Wyoming Department of Environmental Quality, Water Quality Division (WDEQ-WQD) has determined that reaches of McKinney and Sage Creek have impaired water quality within the allotment. Both these streams drain areas of highly erosive shale formations and in turn carry sediment loads that exceed beneficial use standards. Because the current livestock operator has improved grazing management, portions of McKinney Creek have been removed from the Wyoming 303(d) list of impaired streams. Work continues along Sage Creek, including intensive water quality monitoring and improvements on diversions that were engineered to reduce siltation. The livestock operator has hired consultants who, along with BLM, monitor range conditions and improvements in the allotment.

3.7.3.2 Riner Allotment

The 56,962 acres of the Riner Allotment (Allotment Number 10615) include federal (26,530), private (28,998 acres), and state (1,434 acres) holdings. Water development, improved livestock management, and electric fences are management practices that have been implemented. The current livestock operator acquired the permitted use on public land within the Riner Allotment in 1993. The allotment is in a mixed-ownership, checkerboard land pattern, with less than 50 percent public land. Upon permit, the livestock operator immediately changed livestock management from an essentially season-long use cycle to rotation, especially within the largest pasture. To accomplish this change, existing water sources were improved and additional water sources were developed on both public and private land. Rotation within the largest pasture initially relied on extensive herding of livestock, which soon proved impractical. Electric fences have since been constructed to split the largest pasture into five smaller pastures. With these changes, conditions near the water sources that existed prior to 1993 have greatly improved. Conditions throughout the allotment also appear to have improved.

3.7.3.3 Beaver Hills Allotment

The 4,832 acres of the Beaver Hills Allotment (Allotment Number 01021) include public (960 acres) and private (3,872 acres) holdings. Although the Beaver Hills Allotment was originally categorized as custodial

(low priority), the current livestock operator is enthusiastic about developing a cooperative management plan for the unit, with the goal of benefiting the livestock operation as well as important big game species habitat. A deferred rotation grazing system is currently employed on the allotment, which uses short-duration grazing treatments after early summer but before moving the livestock onto summer USFS grazing allotments. A prescribed burn in four pastures is being initiated to improve forage conditions, wildlife habitat values, and watershed health. Several spring developments are planned to protect important riparian habitat and to improve livestock distribution. Cooperators include BLM, the WGFD, the landowner, and the Natural Resources Conservation Service. Important big game habitat, including bighorn sheep winter range, winter and crucial winter elk range, and transitional habitat for mule deer, will be enhanced through this process.

3.7.3.4 Doty Mountain Allotment

The 84,008 acres of the Doty Mountain Allotment (Allotment Number 00415) include public (59,504 acres), private (22,904 acres), and state (1,600 acres) holdings. The main stem of Muddy Creek flows through the Doty Mountain Allotment in the southwestern portion of the RMPPA. Objectives established on the Doty Mountain Allotment included enhanced bank cover, increased stream width-to-depth ratio, improved herbaceous species composition, riparian shrub regeneration, decreased upland shrub density and diversified age structure, and improved waterfowl habitat. These objectives were attained through better livestock distribution, deferring grazing past the hot season, and the creation of riparian pastures.

Implemented BMPs included converting the two-pasture rotation to a nine-pasture rotation, which defers grazing in five riparian pastures until late summer or early fall. Use of the remaining pastures is limited to 2 to 6 weeks. Range improvements include 10 upland water developments and 28 miles of pasture fencing, as well as two well and pipeline projects. Range vegetation on 3,500 acres was treated using burns and Spike. Constructed ponds and wetlands also created 220 acres for wildlife habitat. Photographs, vegetation inspections, and riparian cross-section survey data show major improvements in bank cover, channel morphology, and enhanced species composition. Livestock conception rates have also improved.

3.7.3.5 Grizzly Allotment

The 38,091 acres of the Grizzly Allotment (Allotment Number 00417) include public (27,533 acres), private (1,226 acres), and state (9,332 acres) holdings. WGFD controls the private land within this allotment and leases the cattle use to a private livestock operator. Before 1990, a rest rotation system was in place with seven pastures. This has been replaced with a high–intensity, short-duration grazing system utilizing 12 pastures and several new water developments (such as spring improvements and reservoir construction). Recent vegetation treatments consisting of three prescribed burns and two Spike treatments have reduced shrub cover and increased herbaceous plant diversity. Improvement in both riparian and upland conditions has resulted, and the recent allotment evaluation indicated that there is increased vegetation production in the allotment. Littlefield Creek and Muddy Creek within the allotment have both been removed from the Wyoming 303(d) list of impaired streams. The Grizzly Allotment was the primary target for the reintroduction of Colorado River cutthroat trout (a sensitive species), and a portion of this effort was completed in 2001. Additional areas for reintroduction have been identified, and the reintroduction will be accomplished as resources allow. Cooperators include BLM, WGFD, the landowners, and the Little Snake River Conservation District.

3.7.3.6 Monument Draw Allotment

The 15,417 acres of the Monument Draw Allotment (Allotment Number 00710) include only public holdings. Livestock management, water development, and vegetation treatment are a few of the BMPs instituted within the allotment. A new livestock operator acquired the allotment in 1997. The season of use

was extended, with a more intensive management system using the two existing pastures and available water sources. Additional water sources were needed for the more intensive management. The new livestock operator cleaned and repaired existing reservoirs and also greatly extended a livestock water pipeline. Livestock watering sources continue to be developed, including additions to the pipeline. The allotment had also been identified as having areas of excessively high sagebrush cover, especially on the plateau in the southeast third of the allotment. A spike chemical treatment was completed in 2003. The management changes have improved ground cover to more than 75 percent in an area with limited rainfall.

3.7.3.7 Powder Rim Allotment

The 46,812 acres of the Powder Rim Allotment (Allotment Number 10520) include public (46,532 acres) and private (280 acres) holdings. The original Powder Rim Allotment Management Plan (AMP), implemented in the late 1960s, had proved to be impractical because of conflicting uses and increased activation of previously rested (voluntary nonuse) privileges. As a result of the livestock operators' concerns about declining forage conditions and a Standards and Guidelines review of the allotment, the AMP was revised in 2001 to take into account current conditions and issues. Two livestock operators were split from the allotment and allocated use in separate pastures. Improvements currently being developed in these pastures include 6 to 7 miles of fencing, several new water developments (two wells, one spring development, and several small pit reservoirs), and two separate vegetation treatments. In addition, split-season livestock use, designed to rest the vegetation during the peak growing season and defer use until late fall, has been initiated in two pastures. Three other pastures in the rotation receive split-season and deferred summer cattle use in conjunction with winter sheep use.

Fencing of two natural spring sites, determined to be nonfunctional during the Standards and Guidelines review, resulted in increased flow and water quality. Protecting the associated riparian areas improved stream and riparian stability. One additional spring-seep complex will be developed, and several water wells will be completed to provide reliable, controllable water in dry portions of the pastures. Management of the pastures will enhance habitat for mule deer and elk, including crucial winter range.

3.7.3.8 Bar Eleven Allotment

The 54,256 acres of the Bar Eleven Allotment (Allotment Number 10205) include public (51,570 acres), private (1,635 acres), and state (1,051 acres) holdings. Objectives were set to reduce the stream width-to-depth ratio, increase riparian shrub regeneration, change herbaceous species composition from Kentucky bluegrass to Nebraska sedge, reduce bare areas in the riparian areas, and increase trout size and population. Implemented BMPs included adjustments to the duration of use from June through September by fencing the allotment into pastures. This action reduced grazing duration from 4 months to 1 month or less. Riparian pastures were established on Pete Creek to limit grazing to the fall. The remaining upland pastures now employ a deferred rotation grazing system. Grazing distribution was improved with the installation of proper pasture fencing and upland water improvements.

Recent monitoring data, such as photo point pictures, riparian cross-sections, and vegetation inspections, have been encouraging. The BMP measures resulted in narrowing stream widths, improving stream bank cover, diversifying riparian and upland vegetation, and increasing willow regeneration.

3.8 Minerals, Geology, And Topography

This section describes the geologic and mineral resources found within the RMPPA. Specific topics include geologic units; topography; and the leasable, locatable, and common variety minerals found within the RMPPA. Unless otherwise noted, the information in this section is based on the Mineral Occurrence

and Development Potential Report (ENSR and Booz Allen, 2002), which was prepared in support of this planning process.

3.8.1 Geologic Units

The formations in the RMPPA range in age from Precambrian to recent. In the eastern Green River Basin, at the western edge of the RMPPA, the total thickness of sedimentary rock is about 30,000 feet in the Washakie Basin (Kent 1972). The Hanna Basin contains a thick sequence of post-Precambrian rocks that is estimated to be greater than 42,000 feet thick (Law 1995). Precambrian rocks are generally exposed in the cores of the mountain ranges and smaller uplifts, such as the Rawlins Uplift. In southeastern Wyoming, in the northwest portion of the Denver-Cheyenne Basin, the sedimentary rock section is slightly more than 10,000 feet thick (Kent 1972). Paleozoic, Mesozoic, and Cenozoic rocks are exposed throughout the RMPPA.

The Precambrian rocks that are exposed in the mountain ranges are complex assemblages of igneous and metamorphic rocks (Houston 1993). Nearly all Paleozoic and younger rocks are sedimentary. The Paleozoic formations were mostly deposited in a shallow marine environment and include limestone, dolomite, sandstone, and shale. Cambrian rocks are present in the west and northwest portions of the RMPPA (Boyd et al. 1993). There are no widespread rocks representing Ordovician through Devonian because these layers were eroded after being deposited. The Mississippian System is represented by the Madison Limestone and the Darwin Sandstone in the western portion of the RMPPA. The Mississippian rocks thin from west to east until eventually they are absent east of the line from Centennial, WY, to northwest Laramie County (Boyd et al. 1993). Pennsylvanian rocks in the RMPPA consist of the Amsden Formation, the Tensleep Sandstone, the Casper Formation, and the Fountain Formation. In the western part of the RMPPA, Permian rocks are represented by the Phosphoria Formation and the Goose Egg Formation. Triassic and Jurassic rocks alternate between marine and continental environments. The Dinwoody Formation, Chugwater Group, and the Nugget Sandstone represent Triassic rock in the western and northern parts of the RMPPA. Jurassic formations throughout the RMPPA consist of the Nugget Sandstone, Sundance, and Morrison Formations. In the eastern Hanna Basin at Como Bluff, outcrops of the Morrison Formation have yielded abundant dinosaur bones (Mears et al. 1986). Cretaceous rocks include sandstones, siltstones, and shales that were deposited as the western edge of a shallow interior seaway transgressed westward and retreated eastward several different times. The lower part of the lower Cretaceous is represented by sandstones that are loosely correlated and referred to as the Lakota Sandstone and the Fall River Sandstone (Inya Kara Group) or Cloverly Formation. Above the Lakota and the Fall River sandstones is the Thermopolis Shale. Above the Thermopolis Shale is the Muddy Sandstone (Watson 1980).

In the western parts of the RMPPA, the Upper Cretaceous consists of the Mowry Shale, the Frontier Formation, the Niobrara Formation, the Steele (Baxter) Shale, the Mesaverde Group, the Lewis Shale, Fox Hills Sandstone, and the Lance Formation. The Mesaverde Group designates widespread sedimentary rocks in the Greater Green River Basin, consisting of sandstone, carbonaceous shale, and coal (Ver Ploeg, 1992). The Lance Formation is made up of carbonaceous shale, sandstone, siltstone, mudstone, and coal (Watson 1980). In the Hanna, Shirley, and Laramie basins, the most recent upper Cretaceous units are the Medicine Bow and Ferris Formations, which are composed of carbonaceous shale, coal, mudstone, and sandstone. In the Denver-Cheyenne Basin portion of the RMPPA, the lowest Upper Cretaceous units, in ascending order, are the Graneros Shale, the Greenhorn Formation, the Carlile Shale, and the Niobrara Shale overlain by a dark gray marine shale called the Pierre Shale. Overlying the Pierre Shale is the Fox Hills Sandstone. The Fox Hills Sandstone documents the last retreat of the Cretaceous interior seaway from Wyoming towards the east. The Lance Formation and all later Tertiary and Quaternary formations were deposited in continental environments by rivers, streams, swamps, and lakes, as well as by wind and glaciers in some

areas. The Lance Formation overlies the Fox Hills Sandstone in the northern part of the Denver-Cheyenne Basin (Lilligraven 1993).

The earliest Tertiary rocks (Paleocene Series) in the western portions of the RMPPA are in the Paleocene Fort Union Formation, which is composed of sandstone, conglomerate, shale, and coal (Watson 1980) deposited in the intermountain basin. In the Hanna, Shirley, and Laramie basins, the Paleocene is represented by the Ferris and Hanna formations (carbonaceous shale, sandstone, conglomerate, and numerous coalbeds). The Hanna Formation extends into the Eocene Series rocks. There are no lower Tertiary rocks in the Denver-Cheyenne Basin (Lilligraven 1993). Eocene Series rocks in the western part of the RMPPA are the Wasatch Formation (mudstone, red sandstone, carbonaceous shale, and sub bituminous coal [Watson 1980]) and Green River Formation (shale, oil shale, marlstone, and occasional sandstone). In the Shirley and Laramie basins, the Eocene is represented by the Wind River Formation (sandstone, conglomerate, mudstone, carbonaceous shale, and minor coal [Watson 1980]) and Wagon Bed Formation. In the Denver-Cheyenne Basin, there are no Eocene rocks (Love et al. 1993). The Oligocene White River Formation is present in the western part of the RMPPA and in the Hanna, Shirley, and Laramie basins. The White River in the Denver-Cheyenne Basin may contain vertebrate fossils in isolated localities (Watson 1980). In the western parts of the RMPPA, the Miocene is represented by the Browns Park Formation and the Split Rock Formation. In northeastern Laramie County, the Miocene Arikaree Formation and the upper Oligocene is present. In the Denver-Cheyenne Basin, the Miocene Ogallala Formation covers the surface in most of Laramie County (Love and Christiansen 1985). Unconsolidated Quaternary deposits consist of alluvium, terraces gravels, colluvium, pediments, and glacial deposits (Love and Christiansen 1985). Alluvial deposits are generally associated with alluvial valleys of the major rivers and tributaries. Glacial deposits are limited to the Medicine Bow Mountains and the Sierra Madre and are largely composed of boulders, cobbles, and fine materials that were scoured from the mountains by the glaciers. More detail on geologic units can be found in the RMPPA Minerals Report.

3.8.2 Structural Geology and Tectonics

Map 3-4 shows the major structural elements of the RMPPA. The Laramie Range, Medicine Bow Mountains, Sierra Madre, and Sweetwater Arch are composed of Precambrian, Paleozoic, Mesozoic and early Tertiary rocks that have been uplifted as the rock layers were compressed into anticlines and uplifted along low-angle thrust faults and high-angle reverse faults. Most of the uplift occurred 75 to 50 million years ago in latest Cretaceous and early Tertiary time. This mountain-building period, known as the Laramie Orogeny, occurred through much of the Western states of Wyoming, Colorado, Utah, Montana, Arizona, and New Mexico (Snoke 1993).

The cores of the ranges contain Precambrian rocks that have been uplifted many thousands of feet through movement on low-angle to high-angle reverse faults. The adjoining basins are deepest at the thrust front and an isostatic balance is achieved with the mountain range being held up by the basin and the basin held down by the mountain.

In addition to the major mountain ranges, there are secondary scale uplifts with Precambrian cores within the RMPPA, such as the Ferris, Seminoe, and Shirley mountains, and the Rawlins Uplift. The Rawlins Uplift is an asymmetric anticline bounded by a reverse fault on the west. An anticline is a geologic structure in which the rocks have been folded in a convex upward shape (Gary et al. 1974). The third scale of uplift or anticlines is located on the platforms between the basins and the secondary uplifts and along the major basin margins. These anticlines are generally asymmetric and faulted at depth and provide traps for hydrocarbons. The structural style is generally comprised of a series of anticlines, such as the Lost Soldier-to-O'Brian Springs complex, that are related to the adjacent major uplift, or the Ferris–Seminoe trend. Another complex is the Oil Springs-to-South Big Medicine Bow, which is a structural divide between the Hanna and Carbon basins. A third complex is the Rock River-to-Quealy Dome series of anticlines that

mark the front between the Medicine Bow Mountains and the Laramie Basin. Oil and gas was first discovered in the RMPPA in the third scale of anticlines starting in 1916 at the Lost Soldier anticline. These structural oil and gas fields are very mature and will probably be depleted within the next 20 years unless new applications, such as carbon dioxide (CO_2) sequestration, are initiated. The platform areas between the major structural elements have only been lightly explored in relation to stratigraphic traps, and these may be discovered in the future.

In addition to major faults at the boundaries of the mountain ranges and smaller uplifts, there is a major shear zone in the RMPPA called the Cheyenne Belt (Map 3-4). The Cheyenne Belt is a series of southwest-to-northeast-trending fault blocks that cut through the Precambrian rocks of the Sierra Madre, the Medicine Bow Mountains, and the Laramie Mountains (Houston 1993). The Cheyenne Belt separates metamorphic sedimentary rocks that are among the oldest rock on the North American continent, on the north side, from much younger, largely igneous rocks to the south of the belt.

On the west side of the RMPPA are sub-basins on the eastern edge of the Greater Green River Basin, called the Washakie Basin and Great Divide Basin. The Washakie and Great Divide basins are separated by a structural high called the Wamsutter Arch, which generally trends from west to east paralleling Interstate 80. The Washakie Basin is bounded on the south by another west-to-east-trending structural high called the Cherokee Arch. The Cherokee Arch lies generally along the Wyoming-Colorado state line and separates the Washakie Basin from the Sand Wash Basin in northwest Colorado (Law 1995). Other smaller basins entirely within the RMPPA are the Hanna, Shirley, and Laramie basins. In the eastern part of the RMPPA is the Denver-Cheyenne Basin, which occupies northeast Colorado, southwest Nebraska, and the southeastern corner of Wyoming.

3.8.3 Topography

The RMPPA is located in three major physiographic provinces: the Wyoming Basin, the Southern Rocky Mountains, and the Great Plains (Howard and Williams 1972). The western and northwestern portions of the RMPPA are located in the Wyoming Basin, a 40,000-square-mile area that includes much of southwestern Wyoming and part of northwestern Colorado. The Wyoming Basin Province is typified by topographic and structural basins that are either bounded by mountains in the adjacent provinces or bounded by ranges within the province itself (Map 3-4). There are several west-east-trending mountain ranges in the north-central part of the RMPPA. The ranges are, from west to east, the Ferris Mountains, the Seminoe Mountains, and the Shirley Mountains. The Ferris Mountains rise to 10,000 feet elevation above sea level, whereas the Seminoe and Shirley mountains peak at about 9,500 feet above sea level.

Sub-basins of the Wyoming Basin within the RMPPA boundaries include the Washakie and Great Divide Basins of the eastern Greater Green River Basin, the Hanna Basin, the Shirley Basin, and the Laramie Basin. In the basin areas, the topography is typified by extensive prairies that intersect with badlands, playas, and sand dunes (Howard and Williams 1972).

Elevations in the Wyoming Basin portion of the RMPPA generally range from 6,500 to 7,500 feet elevation above sea level. The Great Divide Basin is bounded by branches of the Continental Divide and has no external drainage outlet. Major river drainages in the Wyoming Basin portion of the RMPPA are the North Platte River, Laramie River, and the Little Snake River. All these rivers have their origins in the Southern Rocky Mountains.

A small part of the Southern Rocky Mountains Province is in the south and south-central portions of the RMPPA. The Southern Rocky Mountains extend through northern New Mexico, Colorado, and southern Wyoming. Mountain ranges in the RMPPA consist of the northernmost portions of the Southern Rocky Mountains. Those ranges are the Laramie Mountains, the Medicine Bow Mountains, and the Sierra Madre

(the northern extension of Colorado's Park Range). The portions of the RMPPA on the flanks of the mountains generally range from 7,500 to 8,000 feet elevation above sea level. The highest point in the RMPPA is Medicine Bow Peak, at 12,013 feet elevation above sea level. In many places, hogback ridges mark the flanks of the mountain ranges.

The eastern portion of the RMPPA is located in the Great Plains Province, in a subprovince called the High Plains (U.S. Geological Survey [USGS] 1970). The High Plains are characterized by nearly flat-lying Tertiary deposits, with mesas and badland topography. A prominent physiographic feature in southeastern Wyoming is called the "Gangplank," so-called because the Tertiary rocks form a long sloping surface up to the 7,000-foot level of the Laramie Range (Howard and Williams 1972). Elevations in the High Plains portion of the RMPPA range from 7,000 feet above sea level on the east flank of the Laramie Range to less than 5,000 feet above sea level in northeastern Laramie County.

In the High Plains portion of the RMPPA, drainages originate in the Laramie Range and flow from west to east. The important drainages from south to north include Crow Creek, Lodgepole Creek, Horse Creek, and Little Bear Creek. Crow Creek eventually empties into the South Platte River in Colorado. The other drainages are in the North Platte River Basin.

3.8.4 Mineral Resources

Terms used in the management of mineral resources on federally administered lands within the RMPPA include the following:

- **Leasable minerals**—include but are not limited to oil and gas, coal, geothermal resources, helium, oil shale, phosphate, trona, and sulfate. Leasable minerals are governed by the *Mineral Leasing Act* of 1920, as amended, which authorized specific minerals to be disposed of through a leasing system
- **Locatable minerals**—include bentonite, limestone, gypsum, uranium, titaniferous magnetite, stratabound gold, copper-gold deposits, and diamonds
- **Common variety minerals**—include sand and gravel, limestone aggregate, building stone, moss rock, cinders (clinker), clay, and petrified wood (Maley 1997).

3.8.4.1 Leasable Minerals

Oil and Natural Gas

The Rawlins RMP will distinguish between conventional natural gas and coalbed natural gas only to define their two different reservoir systems: sandstone/limestone and coal. The sandstone/limestone reservoirs trap gas as a separate fluid within pores and fractures in the rock, and only in the case of limestone can the gas be generated within the reservoir. Coal, on the other hand, is a reservoir where the gas is generated within. Gas is defined by 43 CFR 3000.0-5a as a "fluid, either combustible or noncombustible, which is produced in a natural state from the earth and which maintains a gaseous or rarefied state at ordinary temperatures and pressure conditions." In discussing oil and gas leasing, 43 CFR 3100.0-3 does not distinguish between the two types of reservoirs. All other aspects of the regulation of oil and gas, such as Onshore Orders 1, 2, 3, 5, 7 and Notice to Lessee (NTL) 3A and 4A, also do not distinguish between the two types of reservoirs. Research suggests that the deep "conventional" gas in the Greater Green River Basin is probably coalbed gas trapped in a sandstone reservoir.

The majority of the oil and gas fields are located in the western portion of the RMPPA (Map 3-5). Based on production figures through year 2000, three of Wyoming's top 25 gas-producing fields are within or

partially within the RMPPA. These fields and the associated year 2000 production rank within Wyoming are as follows: Standard Draw (10), Wild Rose (14), and Wamsutter (16) (Wyoming Oil and Gas Conservation Commission [WOGCC], 2002). In addition, the RMPPA contains two of the top 25 oil fields in the state: Lost Soldier (3) and Standard Draw (24).

Records indicate that before 1910 only one well had been drilled in the RMPPA. Since that time there has been a pronounced upward trend in the number of wells drilled (ENSR and Booz Allen 2002). As the number of wells drilled has increased during this period, the depth of the wells also has increased. Since 1990, 74 percent of the wells drilled have been between 8,000 and 12,000 feet deep. The average total depth was 9,249 feet.

As of October 2003, the RMPPA contains 2,690 wells (WOGCC 2003). Since 1980, 37 percent of the total number of wells drilled in the RMPPA have been abandoned. Abandoned wells are either unproductive (dry holes) or have become depleted and no longer economical.

Within the RMPPA, drilling activity has been concentrated in three regions. The first and most heavily drilled region is in the eastern Greater Green River Basin, including the Great Divide Basin, Wamsutter Arch, and the Washakie Basin. This region is located in the westernmost part of the RMPPA. Despite the heavy drilling in parts of these areas, there are some townships in this region that have been only lightly tested. The primary objectives in these areas are stratigraphic traps within the Upper Cretaceous.

The two other regions of concentrated activity lie in the eastern part of the RMPPA and in a region across its center. These regions have been less heavily explored and developed than the region in the west. Many townships within these two regions have been only lightly tested. The primary objectives in the eastern region are stratigraphic traps in the Lower Cretaceous and fractured reservoirs in the Upper Cretaceous. The central region is mainly developed in structural traps that may include production from the Precambrian to the Upper Cretaceous. The central region is very mature, and unless stratigraphic traps are discovered, it will not be very active in the future. Outside of these three drilling activity regions, many townships have not been tested.

Gas production was flat beginning at least as early as 1974, but it began a steady increase in 1978 that carried through 1981 (ENSR and Booz Allen 2002). After a period of fluctuation during 1982–1985, production increases resumed. From 1986 through 1997, production increased at a nominal annual rate of 4.2 percent. Gas production was 7.5 times higher in 2001 than in 1974. A decline in production during 2000 was mostly due to decline in production from private wells. Gas production from the RMPPA in 2001 represented 11 percent of Wyoming's total gas production, based on data from WOGCC.

From 1978 to 1990, oil production fluctuated around an annual rate of 8 million barrels. Beginning in 1990, annual production began declining and has declined at a nominal rate of 2.8 percent per year through 2001. About half the oil produced in the RMPPA during 2000 and 2001 was from the Lost Soldier-Wertz Fields near Bairoil. This field complex is in a tertiary phase of oil recovery via CO_2 injection, and it is expected that no future oil production enhancement can be accomplished. In 2001, only 7 percent of Wyoming's total oil production came from the RMPPA.

Although there is increased interest in exploration for and development of gas resources in coalbeds within the RMPPA, there has been little production. Only 0.179 billion cubic feet (BCF) of gas and 10.3 million barrels of water have been produced in the RMPPA as of January 2002 (WOGCC 2002). Exploration for gas reserves in coalbeds is progressing in Atlantic Rim, along Seminoe Road, and in Hanna Draw. In Atlantic Rim, testing of Upper Cretaceous-aged coals of the Mesaverde Group began in 2002. Initial wells for the pilot tests have already been tested and, surprisingly, have produced gas from the start. Although the overall success of finding economic methane resources in the Atlantic Rim area is still unknown, recent

exploratory activity suggests gas production from coal reservoirs will be successful at least in some portions of the area. Exploration is active along the crest of the Wamsutter Arch between the Great Divide and Washakie basins and on the east flank of the Washakie Basin (between Townships 13 and 20 North, and Ranges 89 and 92 West). In the vicinity of Seminoe Road, initial wells for the pilot tests have already been drilled west of Seminoe Reservoir in coals of the Mesaverde Group. In Hanna Draw, the coal tested is in the Tertiary-aged Hanna Formation. Testing was terminated in April 2002 to reevaluate the economics of the project. However interest in the project has recently revived, and drilling may occur to the north of the last project area.

The question of how produced water from coalbeds (as well as other formations) should be disposed of is another ongoing issue. Options considered include dumping the water in drainages that do not contact the Colorado River system, treating the produced water to adjust its chemical ratios, and injecting the water into formations that contain water of poorer quality. Despite these concerns, there is sufficient confidence in the coalbed reservoirs' economic viability for major proposals to have been made. These proposals currently are being evaluated by means of EISs (for example, an EIS is being prepared for the collective proposals in the Atlantic Rim).

The large structures in the central portion of the RMPPA may have applicability for CO_2 sequestration. This is a positive environmental factor, with disposal of the greenhouse gas. In the case of productive structures, CO_2 sequestration could increase oil recovery. Coal is also known to allow CO_2 sequestration and to have the added benefit of enhancing coalbed natural gas recovery by preferentially replacing methane from the coal structure. Studies show that low-rank coals have the highest replacement factor, and all the coals in this area are low-rank. CO_2 is readily available from large reserves to the west of the RMPPA, and a CO_2 pipeline is already in place.

Coal

There are six identified coalfields within the RMPPA. Of these, the Hanna Field has been the most significant in terms of both historic and projected coal production. Most activity within the remaining fields typically has been of small scale, and in some cases the coal resource has yet to be economically exploited. Approximately 27 million tons of federal coal have been recovered using strip mining. An additional 16 million tons of federal coal have been extracted using underground mining methods.

In recent years there has been a contraction of the coal sector within the Hanna Field. As of 1979, five mining companies were still active in the Hanna Field (Glass and Roberts 1979), but by the year 2000 there were only three active coal mines (two surface mines and one underground mine). Two companies operated these mines. As of mid-2002, only one company, Arch of Wyoming, Inc. (a subsidiary of Arch Western Resources, LLC), was still active. This company operated the Seminoe No. II mine (a combination dragline and shovel/truck operation) and the Medicine Bow Mine. Remaining economic/strippable reserves in both mines have been indicated as sufficient to sustain operations for less than 2 years. As of 2004, all coal mining has ceased, and only reclamation activities currently occur.

Coal is classified by rank in accordance with standard specifications of the American Society for Testing and Materials (ASTM). Most of the Wyoming coals are low sulfur and low to medium rank (bituminous and sub bituminous). ASTM D-388 provides detailed information concerning coal classification specifications and considerations. Within the RMPPA there are six significant coalfields containing coal resources of sub bituminous to bituminous rank (Berryhill et al. 1950): Hanna-Carbon Basin, Great Divide Basin, Rock Creek, Kindt Basin Little Snake River, and Goshen Hole Coalfields.

3.8.4.2 Locatable Minerals

Wyoming is a uranium province. Uranium was discovered in the Powder River and Wind River basins during the 1950s, and continued exploration for uranium resulted in discovery of additional sedimentary uranium deposits in the major basins of central and southern Wyoming. The RMPPA contains its share of sedimentary uranium deposits in the Shirley Basin, the Great Divide Basin, the Red Desert area, and around Baggs in the Poison Buttes area. In addition to uranium, the RMPPA contains deposits of titaniferous magnetite, stratabound gold, copper-gold deposits, and diamonds hosted in kimberlite pipes. Commercial development of the sedimentary uranium and titaniferous magnetite deposits has occurred over the past 50 years. The other locatable mineral deposits have seen only limited production and sporadic exploration. Locatable mineral deposits in the RMPPA are summarized in Table 3-6 and shown on Map 3-6.

Table 3-6. Known Locatable Minerals Deposits in the RMPPA

Commodity	Location	Geologic Description	Deposit Type	Production History	Future Potential
Sedimentary Uranium					
Shirley Basin Deposits	T27-28N, R77-80W Shirley Basin 30 x 60	Sandstone uranium deposits hosted in the Tertiary Wind River Formation.	Epigenetic redox/roll front uranium deposits.	Major mines: Petrotomics, Pathfinder, Jenkins. Est. production about 10 to 20 million pounds of U3O8.	Major district with considerable future potential for uranium. Estimated resource of 50 million pounds.
Red Desert Deposits	T18-21N, R99-101W Red Desert 30 x 60	Lignite coal uranium. Low-grade uranium mineralization in lignite beds of the Wasatch and Green River formations.	Disseminated uranium in lignite beds. Grades range from 0.003 to 0.007 percent U3O8.	No production of uranium. Estimated resources are 24,000 tons of uranium in coal. Coal estimated at 20 percent strippable.	Grades too low for future production except as byproduct of lignite coal production.
Great Divide Basin	T24-26N, R93096W Red Desert 30 x 60	Sandstone and evaporative uranium prospects hosted in Tertiary Battle Spring and Bridger formations.	Epigenetic redox/roll front uranium deposits. Also evaporative uranium deposits near Lost Creek mine.	Lost Creek Schroeckinite Deposit (T26N, R94W). Grades are 0.013 to about 0.28 percent U3O8.	Limited future potential. No major deposits.
Poison Buttes (Baggs)	T12-13N, R92W Baggs area Saratoga 30 x 60	Sandstone uranium deposits hosted in Tertiary Browns Park Formation.	Disseminated and epigenetic redox/roll front uranium deposits.	Urangesellschaft proposed mine at 2,000 tpd production.	Considerable future potential at higher uranium prices. Estimated resource of 8 to 15 million pounds.
Ketchum Buttes	T15N, R89W Northeast of Encampment Saratoga 30 x 60	Sandstone uranium prospects hosted in Tertiary Browns Park Formation.	Disseminated and epigenetic redox/roll front uranium deposits.	Prospects only.	
Desert Rose area (USGS PP 538) (USGS MR-21)	T13N, R76W Southwest of Laramie Laramie 30 x 60	Sandstone uranium prospects hosted in Cretaceous Cloverly Formation.	Disseminated and epigenetic redox/roll front uranium deposits.	Prospects only.	
Miller Hill area	T18N, R88W Rawlins 30 x 60	Sandstone uranium prospects hosted in Tertiary Browns Park Formation.	Disseminated and epigenetic redox/roll front uranium deposits.	Prospects only.	
Encampment/Riverside	T15-16N, R84-85W Saratoga 30 x 60	Sandstone uranium prospects hosted in Tertiary Browns Park Formation.	Disseminated and epigenetic redox/roll front uranium deposits.	Prospects only.	
Magmatic Uranium					
Pedro Hills	T26N, R81W West side of Shirley Basin Shirley Basin 30 x 60	Veins in Precambrian rocks.	Magmatic-hydrothermal uranium veins along fissures.	Little Man Mine—no production history.	Limited future potential. This type of deposit is difficult to develop.

Commodity	Location	Geologic Description	Deposit Type	Production History	Future Potential
Titaniferous Magnetite					
Iron Mountain District	T18-19N, R71W Rock River 30 x 60	Lenses, masses, and beds of titaniferous magnetite and Ilmenite with spinel in Precambrian Laramie Anorthosite.	Magmatic segregations and/or possible replacements within layered mass of feldspar and olivine called Laramie Anorthosite. Deposits follow anticlinal axis of anorthosite.	Main mines are Shanton, Iron Mountain, and Sybille Pit. Past production about 1.1 million tons to 1968. Past operators were Union Pacific Railroad and Anaconda.	Estimated 30 million tons of massive ore at 45% Fe and 20% TiO2. Disseminated ore estimated at 148 million tons at 20% Fe and 9.7% TiO2.
Sheep Mountain	T15N, R77W Medicine Bow 30 x 60	Titaniferous magnetite black sand deposit in the Mesaverde Formation.	Paleo-beach sand deposit 4,300 feet long and about 50 feet x 17 feet. Grades are 15.6 % TiO2. No identified resource.	No production.	Uncertain.
Rare Earths and Yttrium, Including Columbite and Tantalite					
Big Creek District	T13N, R81-82W Saratoga 30 x 60	Veins and pegmatites in Precambrian granite intrusives.	Hydrothermal veins and pegmatites in granites.	Prospects only.	
Tie Siding Area	T12N, R71-72W Laramie 30 x 60	Pegmatites in Sherman Granite.	Radioactive pegmatites.	Prospects only.	
Red Mountain Syenite	T22N, R71W Laramie 30 x 60	Disseminated allanite in Precambrian syenite intrusive mass.	Disseminated rare earth element (REE) deposit.	No Production.	
Fox Creek Pegmatites	T13N, R78W Laramie 30 x 60	Pegmatites with columbite and tantalite.	High-grade pegmatites.	Past production of 85 pounds of columbite and tantalite.	
Stratabound Gold					
Ferris Mountains	T27N, R87-88W Bairoil 30 x 60	Vein-like deposits and beds in Precambrian metasediments and granites.	Exhalative iron-formation gold and copper deposits and associated intrusives with veins. Gold and copper associated with jasperoid beds.	Spanish Trail Mine. No recorded past production.	Deposit type known to host major gold deposits worldwide.
Seminoe Mountains	T25-26N, R84-86W Bairoil 30 x 60	Vein-like deposits and beds in Precambrian metasediments and granites.	Exhalative iron-formation gold and copper deposits and associated intrusives with veins. Gold and copper associated with jasperoid beds in hornblende schist.	Penn Mine at Bradley Peak. Three adits with limited production. Estimated past production of about 530 oz Au.	Estimated 100 million tons of Fe ore at 28% to 68% Fe. Gold values to 2.7 opt Au. Nephrite jade present in Seminoe area.
Copper-Gold Deposits					
Jelm Mountain District	T12-13N, R76-77W Laramie 30 x 60 Saratoga 30 x 60	Copper-gold-silver-arsenic-bismuth "veins" in Precambrian amphibolite schist.	Oxidized quartz veins and mineralized shears in Precambrian metasediments and associated with mineralized pegmatites.	Annie Mine has 3% to 30% Cu and 0.1 opt Au. Wyoming Queen has 3 shafts to depths of 250 feet. No data on past production histories.	Deposits similar to major gold deposits of Canada. Veins may be folded beds, as they are in Canada.

Commodity	Location	Geologic Description	Deposit Type	Production History	Future Potential
Cooper Hill District	T18N, R78W Medicine Bow 30 x 60	Copper and gold veins in Precambrian schist.	Vein and shear-zone sulfide mineralization in folded Precambrian schists.	Charlie, Emma G, and Albion mines. Grades to 0.7 opt Au and 12.2 opt Ag. No recorded production history.	Deposits similar to major gold deposits of Canada. Veins may be folded beds, as they are in Canada.
Silver Crown District	T13-14N, R69-70W Laramie 30 x 60	Precambrian quartz monzonite intrusive related to Nash Fork-Mullen Creek Shear Zone.	Disseminated copper and gold deposit related to Precambrian island-arc volcanism and intrusive igneous rocks.	Copper King Deposit: 35 million tons at 0.2% copper and 0.02 opt gold.	Copper King is only drilled reserve in area. May become economic at higher copper and gold prices.
Kimberlite/Diamonds					
Iron Mountain District	T19-20N, R70W Rock River 30 x 60	Devonian kimberlite intrusives into Precambrian Laramie Anorthosite.	Kimberlite pipes with diamonds.	No production history.	Diamonds small and mainly of industrial quality.
Stateline District	T12N, R72W Laramie 30 x 60	Devonian kimberlite intrusives into Precambrian granites and metamorphics.	Kimberlite pipes with diamonds.	No past production. Diamond grades in range of 0.5 to 1.0 carat/100 tonnes. Industrial grade diamonds.	Diamonds small and mainly of industrial quality. Potential for more discoveries considered high.

Source: BLM 2003

3.8.4.3 Common Variety Minerals

Disposal of common variety minerals is discretionary and is addressed under the *Materials Act* of 1947, as amended by the Acts of 1955 and 1962. These acts authorized that certain mineral materials be disposed of either through a contract of sale or a free-use permit (for state and local governments or eligible nonprofit organizations). The group of mineral materials commonly known as "common variety minerals" includes common varieties of sand, stone, gravel, pumice, cinders, clay, and petrified wood in public lands of the United States (Maley 1977). Common variety minerals that occur within the RMPPA include sand and gravel, limestone, moss rock, cinders (clinker), clay, and petrified wood.

By far the most significant common variety minerals within the RMPPA include sand and gravel, limestone, clinker (scoria), and thin-layered building stone known as moss rock. Sand and gravel resources typically occur in one or more of the following forms: gravel deposits, alluvial sand and gravel deposits, terrace sand and gravel deposits, glacial gravels, older gravel deposits, and windblown deposits. Limestone typically occurs in bedded sedimentary deposits. Within the RMPPA, the aggregates resource base is generally present as windblown, terrace, and alluvial deposits, however coarser, gravel-type materials are present to a somewhat lesser degree. Where gravel is present, it is generally an older gravel (conglomeratic) deposit, often situated beneath surficial deposits. The Wyoming Geologic Survey has identified aggregate deposits in the RMPPA near Fort Steele (T21N, R85W), Elmo (T22-23N, R81W), Creston Junction (T21N, R92W), and in the Red Desert Basin (T21-23N, R95-97W).

3.9 Off-Highway Vehicles (OHV)

Off-highway vehicle (OHV) use is closely related to several environmental resource issues addressed in other sections of this chapter. Aspects of OHV use that are specifically addressed in other sections of this document, such as Recreation (Section 3.11) and Transportation and Access (Section 3.14), will not be addressed in this section. All information in this section was gathered from the Recreation Planner for the RMPPA and from BLM sources, which included the Great Divide Resource Area RMP and BLM's Recreation Management Information System (RMIS) (Clair 2002a, 2003 and 2004; BLM 1990a; BLM 2003a).

3.9.1 Designated Off-Highway Vehicle Use Areas

OHV use is managed according to designations finalized in the Great Divide Resource Area RMP. These designations prescribe the available management environment in which OHV users can travel. Potential OHV designations are open, closed, or limited (Appendix 21). With the exceptions listed below, the RMPPA is open to the use of motorized OHV use. In addition the RMP prescribes that OHV use throughout the RMPPA be limited to existing roads and vehicle routes, except in six specified areas which contain different designations. These six areas and their OHV use classifications are as follows (Map 2-5):

- **Dune Ponds Cooperative Management Area.** The Dune Ponds CMA is an "open" OHV use area, except in vegetated areas, which are restricted to existing roads and vehicle routes.
- **Adobe Town Wilderness Study Area (WSA).** In this area, located in the southwest corner of the RMPPA, motorized vehicle use is limited to designated roads and vehicle routes.
- **Encampment River Canyon.** Located just north of the Medicine Bow National Forest and south of State Highway 70 near the town of Encampment, this area is closed to motorized vehicle use, including over-the-snow vehicles, from December 1 to April 30.

- **Encampment River Trail.** Bisecting the Encampment River Canyon area referred to above, the portions of the Encampment River Trail that cross BLM-administered public land are closed to all types of motorized vehicle use year-round.
- **Ferris Mountains WSA.** Located near the northern boundary of the RMPPA and southeast of the intersection of U.S. Highway 287 and State Highway 220, this area is closed to all types of motorized vehicle use year-round.
- **Pennock Mountains Wildlife Habitat Area.** Located east of Saratoga, WY, this area is closed to all human presence and motorized vehicle use, including over-the-snow vehicles, from November 15 through April 30.

3.9.2 Off-Highway Vehicle Use and Trends

OHVs are used for a variety of purposes. In the RMIS, OHVs are separated into four categories: all-terrain vehicles (ATV), cars/trucks/sport utility vehicles (SUV), motorcycles, and snowmobiles. Snowmobile use, although technically considered OHV use, was not included in the OHV categories in RMIS but will be addressed in this section. Table 3-7 shows the estimated number of participants and visitor days associated with OHV use in the RMPPA.

Table 3-7. Participants and Visitor Days Associated with OHV Use in the RMPPA

OHV Use: Participants and Visitor Days Rawlins Field Office[1]						
	Fiscal Year 2001		Fiscal Year 2002		Fiscal Year 2003	
	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days
OHV—ATV	4,800	1,600	5,000	1,667	5,132	1,711
OHV—Cars/Trucks/SUVs	33,984	16,838	35,134	17,457	36,156	17,908
Snowmobiling	1,200	600	1,250	625	1,283	642

Source: BLM Recreation Management Information System, RMPPA.

The most commonly used of the four potential OHV categories in the RMPPA is the cars/trucks/SUVs category. ATV use is rapidly growing in popularity. Cars/trucks/SUVs are used by over 80 percent of OHV participants, and nearly 85 percent of visitor days include cars/trucks/SUV use.

Within the RMPPA, OHV use provides access to hunting, fishing, and camping. In addition OHV use is increasingly regarded as a method of recreation in itself. OHV use, although recorded by RMIS, extends beyond recreational use. Gathering of noncommercial products includes activities such as the collecting of shed deer and elk antlers, moss rock, and native plant material. OHVs provide access to large areas of land and easy access to antlers on the ground. Recreationists also commonly use OHVs.

Employees of authorized users such as government agencies, ranches, oil and gas companies, and utility providers use OHVs to access and maintain the developments that are integral to the continued operation of their facilities. Oil and gas interests through Onshore Order Number 1 can access their leases without a permit but are strongly encouraged to confer with BLM. BLM staff also use OHVs for tasks such as range inspections, surveying and mapping, inventories, monitoring, vegetation treatments, fire suppression, project maintenance, and construction.

OHV designations in the RMPPA for the majority of public lands are "limited to existing roads and vehicle routes." However the number of unauthorized roads pioneered within the RMPPA is expanding rapidly. Even authorized activities can lead to unauthorized roads and vehicle routes. A concern is that, in all of the above uses, OHV users often leave existing roads and vehicle routes and create new two-tracks, thereby contributing to vegetation loss, soil compaction, soil erosion, and wildlife harassment. In addition, use of existing roads and vehicle routes when they are muddy causes rutting and erosion whether the roads/vehicle routes are two-tracks or improved, and such use creates public safety hazards to drivers that follow. Within the RMPPA, OHV use in the Sand Hills and Dune Ponds areas is of special concern because of the fragile nature of these areas. The Dune Ponds area receives a number of visitors because of its proximity to the Seminoe Reservoir and the population center of Rawlins.

Over the past 25 years, ownership of OHVs has become commonplace. A lack of understanding of land use ethics has increased inappropriate uses of OHVs on federal lands. Shortage of law enforcement personnel and a rapid increase in OHV use throughout the RMPPA make it difficult to enforce OHV designations. This situation generally occurs more often in areas of higher recreational use, but there is evidence of rapid route proliferation throughout the RMPPA.

3.10 PALEONTOLOGY

The Draft Wyoming Paleontology Manual issued by the Wyoming BLM State Office presents guidelines used to ensure that BLM in Wyoming meets its statutory obligations for protection of paleontological resources. The following sections present an overview of the paleontological resources present in the RMPPA, along with the associated paleontological classifications.

3.10.1 Description of Resources

Some of the richest paleontological resources in the United States are in the RMPPA. Vertebrate fossils are especially significant in the area. Paleontological research has been conducted in this part of Wyoming since 1856. More than 30 museums and universities have searched the area for vertebrate fossils, and fossils recovered from the RMPPA can be found in public and private collections around the world (BLM 1987).

The rich paleontological resources present in the RMPPA can be attributed to the area's high elevation and continental climate, which hinder vegetative growth and soil development and support erosion and bedrock exposure. Most fossils are discovered as scattered finds in areas of exposed rocks. Paleontologists often rely on chance for discoveries in which the public has also played a major role in significant fossil discoveries.

Exposures that produce significant fossils, particularly vertebrates, are rare, and consequently the fossils are of considerable scientific value and interest wherever they are found. Some localities in the RMPPA have yielded the only fossil record of several extinct animals (BLM 1987).

The most important paleontological resource in the RMPPA is the Como Bluff National Natural Landmark (NNL) area, which encompasses 7,680 acres located about 5 miles east of Medicine Bow. Como Bluff is a westward-plunging anticline, containing formations from the Cretaceous through the Triassic periods, exposed in the face of the bluff. The dinosaur graveyard fossil bed, an uncommon concentration of well-preserved fossils in the Mesozoic Morrison Formation, is exposed in the Como Bluff area. The fossils found in the Como Bluff area played a significant historic role in the development of paleontology as a scientific discipline (BLM 1987).

Within the Sand Creek NNL, late Pleistocene and more recent vertebrate fossil deposits were recovered within a feature known as the "animal trap." This NNL is located about 20 miles southwest of Laramie and includes 4,800 acres, of which BLM administers a 160-acre parcel of public land. Fossil deposits recovered from the animal trap include a large extinct lion, an eagle-like vulture, a marten, as well as other species no longer found in the area (BLM 1987).

The Washakie Basin, a large physiographic feature with an area of 525 square miles, is located in the southwestern corner of the RMPPA. Characterized as an intermontane desert basin, the Washakie Basin contains important paleontological resources. Fossils are present in abundance, and many institutions have actively studied the paleontology of the area (BLM 1987).

The area in and around the Continental Divide contains one of the most complete records of continental deposition in North America, with exposures of the Fort Union, Battle Springs, Wasatch, Green River, and Washakie formations. The Washakie Formation contains fossils of algae, mollusks, and mammals. Well-preserved fossil fish are contained in the Laney Member of the Green River Formation. Within the Wasatch Formation, vertebrate fossils are found primarily in the non-red facies of the variegated beds, including sandstones. Plant and animal fossils have been found throughout the Fort Union Formation (BLM 1999).

The Medicine Bow Formation, which underlies a portion of the RMPPA, is known to produce vertebrate fossils of scientific significance. Fossils from the Medicine Bow Formation include the remains of marine and freshwater invertebrates, terrestrial plants, and terrestrial vertebrates. Microfossils (pollen) and megafossils (leaf and stem imprints, and petrified and carbonized wood) have been found in the formation. Invertebrate fossils include marine foraminifers and brackish-water gastropods and bivalves. The formation has also produced dinosaur bone fragments from the ceratopsian Triceratops and the remains of a small number of mammals from the late Cretaceous Period (BLM 2001).

The Ferris and Medicine Bow Formations within the RMPPA produce fossils of particular significance, because they preserve strata containing the Cretaceous-Tertiary boundary which dates to the time of the extinction of the dinosaurs and adaptive radiation of mammals. The Ferris Formation has produced the remains of early Paleocene mammals, as well as fossil leaves and shells of freshwater invertebrates, and trace fossils. The Hanna Formation has produced the remains of terrestrial and aquatic vertebrates, invertebrates, and plants of the Paleocene to possibly earliest Eocene age. These fossils are significant,

because the Paleocene-Eocene boundary dates to the transition from Archaic to Modern orders of mammals (BLM 2002a).

3.10.2 Fossil Yield Potential Classification (FYPC)

BLM has classified geologic formations in the RMPPA according to the Probable Fossil Yield Classification (PFYC). This is a planning tool whereby geological units, usually at the formation or member level, are classified according to the probability of yielding paleontological resources that are of concern to land managers. Existing statutes and policies regulate the collection and disposition of vertebrate fossils, but not invertebrate fossils except in special circumstances. This classification is based largely on how likely a geologic unit is to produce vertebrate fossils. The classes are described in Table 3-8, with some examples of corresponding management considerations or actions.

Appendix 30 contains a list of geologic formation classifications, according to the PFYC, for the State of Wyoming. The classifications of paleontological resources determine the procedures to be followed before a paleontological clearance to proceed with a project can be granted. There are over 1,270,000 acres of PFYC Class 4 within the RMPPA. Assigning a formation to Class 5 is determined during site-specific analysis of Class 4 areas. Site-specific conditions may reduce the need for a Class 5 formation to require intense mitigation. In the RMPAA there are around 240,000 acres of PFYC Class 1, over 550,000 acres of PFYC Class 2, and over 1,480,000 acres of PFYC Class 3.

To manage the collection of scientifically significant fossils, BLM requires that a paleontological collecting permit be obtained for collection of vertebrate fossils and scientifically significant invertebrate fossils. These permits are issued only to qualified paleontologists.

Table 3-8. Paleontological Classification Descriptions

Class	Description	Basis	Comments
1	Igneous and metamorphic (tuffs are excluded from this category) geologic units or units representing heavily disturbed preservational environments that are not likely to contain recognizable fossil remains.	Fossils of any kind known not to occur except in the rarest of circumstances. Igneous or metamorphic origin. Landslides and glacial deposits.	The land manager's concern for paleontological resources on Class 1 acres is negligible. Ground disturbing activities will not require mitigation except in rare circumstances.
2	Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant invertebrate fossils.	Vertebrate fossils known to occur very rarely or not at all. Age greater than Devonian. Age younger than 10,000 years before present. Deep marine origin. Aeolian origin. Diagenetic alteration.	The land manager's concern for paleontological resources on Class 2 acres is low. Ground disturbing activities are not likely to require mitigation.

Class	Description	Basis	Comments
3	Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence. Also sedimentary units of unknown fossil potential.	Units with sporadic known occurrences of vertebrate fossils. Vertebrate fossils and significant invertebrate fossils known to occur inconsistently; predictability known to be low. Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.	The land manager's concern for paleontological resources on Class 3 acres may extend across the entire range of management. Ground disturbing activities will require sufficient mitigation to determine whether significant paleontological resources occur in the area of a proposed action. Mitigation beyond initial findings will range from no further mitigation necessary to full and continuous monitoring of significant localities during the action.
4	Class 4 geologic units are Class 5 units (see below) that have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation.	Significant soil/vegetative cover; outcrop is not likely to be impacted. Areas of any exposed outcrop are smaller than 2 contiguous acres. Outcrop forms cliffs of sufficient height and slope that most is out of reach by normal means. Other characteristics that lower the vulnerability of both known and unidentified fossil localities.	The land manager's concern for paleontological resources on Class 4 acres is toward management and away from unregulated access. Proposed ground disturbing activities will require assessment to determine whether significant paleontological resources occur in the area of a proposed action and whether the action will impact the paleontological resources. Mitigation beyond initial findings will range from no further mitigation necessary to full and continuous monitoring of significant localities during the action.
5	Highly fossiliferous geologic units that regularly and predictably produce invertebrate fossils and/or scientifically significant invertebrate fossils, and that are at risk of natural degradation and/or human-caused adverse impacts.	Vertebrate fossils and/or scientifically significant invertebrate fossils are known and documented to occur consistently, predictably, and/or abundantly. Unit is exposed; little or no soil/vegetative cover. Outcrop areas are extensive; discontinuous areas are larger than 2 contiguous acres. Outcrop erodes readily, may form badlands. Easy access to extensive outcrop in remote areas. Other characteristics that increase the sensitivity of both known and unidentified fossil localities.	The land manager's highest concern for paleontological resources should focus on Class 5 acres. Mitigation of ground disturbing activities is required and may be intense. Areas of special interest and concern should be designated and intensely managed.

Source: Originally developed by the Paleontology Center of Excellence and the Region 2 (USFS) Paleo Initiative, 1996. Some modification by Dale Hanson, Regional Paleontologist, Wyoming BLM, 2002.

3.11 RECREATION

Recreation is one of the major resource uses within the RMPPA. The term "recreation" includes a variety of activities that affect and are affected by resources and other resource uses. This section addresses the existing recreational environment within the RMPPA, describing the recreation resources, the levels of use of these resources, and use trends. This section also addresses threats to recreation resources within

the RMPPA. All information in this section was gathered from the Recreation Planner for the RMPPA and from BLM sources, which included the Great Divide Resource Area RMP and BLM's RMIS (Clair 2002a, 2003 and 2004; BLM 1990a BLM 2003a).

3.11.1 Recreation Resources

Recreation resources include recreation sites and dispersed public lands, wildlife resources, visual resources, waterways, lakes, and other resources (physical, historical, etc.), each of which provides different recreational opportunities.

The RMPPA offers a wide variety of recreational opportunities, primarily for dispersed use requiring undeveloped open space. These activities include wildlife viewing, hunting, hiking, backpacking, OHV use, fishing, bicycling, photography, camping, orienteering, and floating. For a physical description of the resources, see the geology, forestry, range, wildlife, and vegetation sections of this chapter.

Based on the classification system identified under the Recreation Opportunity Spectrum (ROS), the WSAs within the planning area are primitive and suited to activities requiring solitude; self-reliance; and unmodified, natural environment. The fringes of Adobe Town and Ferris Mountains WSAs are Semi-Primitive Motorized areas where although experiences are in large part primitive, they can be disrupted because the area often requires vehicular access. The majority of the RMPPA is designated Roaded Natural, with a greater degree of human development and a good network of improved roads and two-tracks traversing largely natural settings. A growing portion of the RMPPA is classified as Rural because of the substantial modification of the natural environment by oil and gas industrialization and the associated road network. A very small portion of the RMPPA within the cities would be classified as urban.

3.11.1.1 Recreation Sites and Areas

In areas where recreation resources receive heavy use, developed recreation sites are often constructed to aid in managing impacts. Consequently, developed recreation sites are primarily located near high-use recreation attractions. There are 11 developed recreation sites and 7 undeveloped recreation sites within the RMPPA. These sites (Map 3-7) are as follows:

- Developed Recreation Sites
  - Rim Lake Recreation Site
  - Teton Reservoir Recreation Site
  - Encampment River Campground (fee site)
  - Bennett Peak Recreation Site (fee site)
  - Corral Creek Campground
  - Dugway Recreation Site
  - Prior Flat Campground
  - Lake Hattie Reservoir
  - Twin Buttes Lake
  - Wheatland Reservoir #3
  - East Allen Lake
- Undeveloped Recreation Sites
  - Nine-Mile Hill
  - Big Creek Proposed Recreation Site
  - Dune Ponds
  - Shirley Basin Reservoir

- Little Sage Reservoir
- Little Robber Reservoir
- Laramie River Access

In addition to these recreation sites, there are larger dispersed areas that receive heavy recreational use. These areas, like recreation sites, are designated as Special Recreation Management Areas (SRMA) to acknowledge the importance of their recreation resources and to help manage these resources in a way that will allow continued and increasing levels of use without damage to the resources. There are three SRMAs in the RMPPA: the Shirley Mountain Caves SRMA, the North Platte River SRMA, and a portion of the Continental Divide National Scenic Trail that passes through the BLM-administered land (Map 2-46). The existing recreational environment of these areas is addressed in the Special Management Area section of this document (Section 3.13).

3.11.1.2 Wildlife Resources

The wildlife resources (non-game, big game, small game, waterfowl, upland birds, fish, etc.) within the RMPPA provide amazing opportunities for recreational uses. There are several world-class fisheries within the RMPPA in addition to a number of areas that offer prime habitat for several big game species. There are also habitats for a variety of upland game birds. The abundance of wildlife in the RMPPA directly affects the amount and type of recreational uses available. When wildlife populations fluctuate, so do the opportunities for recreation that involve those populations.

Recreationists participating in wildlife recreation, such as hunting, fishing, trapping, and wildlife viewing, represent approximately 60 percent of all recreational activities in the RMPPA. In addition, visitor days (1 visitor day represents an aggregate of 12 hours a visitor spends at a site, area, or activity) spent on the above-mentioned activities make up over 55 percent of all visitor days spent recreating. For more information on the existing environment for wildlife, refer to the discussion in Section 3.19 of this document.

3.11.1.3 Other Resources

Several other resources located within the RMPPA provide additional recreation opportunities. Seminoe Reservoir's recreation resources are managed by Wyoming State Parks, yet located in close proximity to the reservoir are several other recreation resources that visitors often use. The Rawlins BLM Field Office has established memorandums of understanding (MOU) with WGFD concerning recreation management on several reservoirs in the Laramie area. MOUs addressing the construction and management of recreation facilities at East Allen Lake, Wheatland Reservoir #3, Twin Buttes Reservoir, and Lake Hattie were entered into between 1973 and 1976 and remain in effect. In addition rivers throughout the RMPPA provide opportunities for fishing as well as other water-based recreational opportunities, such as canoeing, rafting, drift boating, and other floating. In relation to commercial recreational use of river resources, the Rawlins BLM Field Office and the U.S. Forest Service have established an MOU that allows river outfitters who enter the river on land managed by one agency to leave the river on land managed by the other agency without having to obtain permits from both agencies.

The system of roads throughout the RMPPA provides an opportunity for casual driving, viewing of wildlife and wild horses, and other such activities. However, other than highways and those roads associated with towns, few roads are paved in the RMPPA, and most county roads, oil and gas roads, and a few BLM roads are graveled. The remainder of the transportation system is, for the most part, minimally improved or unimproved and thus well-suited to dispersed recreational activities, such as hunting and OHV use.

The Continental Divide National Scenic Trail traverses high desert on BLM-administered land before entering the national forest to the south. The trail provides opportunities for hiking, backpacking, horseback riding, OHV use, mountain biking, and other trail-related recreational activities.

3.11.2 Recreational Use

RMIS estimates participation in 65 types of recreational activities recorded at BLM-managed sites and areas. Estimates are based on registration records, permit records, observations, and professional judgment. Visitation rates are estimated by numbers of participants as well as visitor days. Participants are the actual number of people who take part in a recreational activity. A visitor day is a common unit of measure of recreation, used among Federal agencies. One visitor day represents an aggregate of 12 visitor hours at a site or area. It should be noted that the number of participants and the number of visitors might differ, as one visitor can participate in several recreational activities, thereby being recorded as a participant several times. Table 3-9 shows a summary of the RMIS data for the RMPPA for 2001, 2002, and 2003.

Table 3-9. Recreational Management System Information on Recreation Participants and Visitor Days in the RMPPA

Recreation Participants and Visitor Days, RMPPA[1]						
Activity	Fiscal Year 2001		Fiscal Year 2002		Fiscal Year 2003	
	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days
Backpacking	156	747	156	725	44	589
Bicycling—Mountain	1,334	447	1,376	439	1,290	431
Camping	12,661	31,144	10,465	20,969	7,027	31,862
Canoeing/Kayaking	8	5	175	116	12	8
Driving for Pleasure	24,000	12,000	25,000	12,500	25,660	12,830
Environmental Education	42	56	NA	NA	NA	NA
Fishing—Freshwater	49,279	19,457	47,789	18,313	42,065	16,785
Gather Noncommercial Products	2,400	800	2,500	833	2,566	855
Hiking/Walking/ Running	14,600	5,350	11,347	2,957	4,772	1,424
Horseback Riding	2,770	1,387	4,344	2,133	4,008	1,991
Hunting—Big Game	30,997	59,453	31,404	61,055	31,842	61,742
Hunting—Waterfowl	500	333	500	333	662	441
Nature Study	300	25	279	23	NA	NA
OHV—ATV	4,800	1,600	5,000	1,667	5,132	1,711
OHV—Cars/Trucks/ SUVs	33,984	16,838	35,134	17,457	36,156	17,908
Picnicking	11,878	973	11,966	980	11,541	945
Row/Float/Raft	7,180	2,409	6,102	1,869	3,453	2,124
Snowmobiling	1,200	600	1,250	625	1,283	642
Target Practice	3,600	300	3,750	313	3,849	321
Viewing—Wild Horses	NA	NA	NA	NA	56	37
Viewing—Wildlife	86,601	8,100	84,785	7,949	78,425	7,638

Source: BLM Recreation Management Information System, RMPPA.

From October 2000 through September 2003, there were far more dispersed recreation visits and visitor days than there were visits or visitor days at recreation sites (Table 3-10). This is due largely to the popularity of dispersed activities such as hunting, fishing, and OHV use in the RMPPA, and the vast public lands available for these activities.

Table 3-10. Recreation Visits by Location in the RMPPA

Recreation Visits by Location: October 2000–September 2003 Rawlins RMP Planning Area		
	Visits	Visitor Days
Dispersed Recreation	428,588	369,197
Developed/Undeveloped Recreation Sites	123,224	101,520

Source: BLM Recreation Management Information System, RMPPA.

According to data from fiscal years 2001, 2002, and 2003, dispersed recreation tends to mirror the pattern shown above for the entire RMPPA, with big game hunting, freshwater fishing, wildlife viewing, and OHV cars/trucks/SUVs topping the list of activities. Within these few activities, approximately 250,000 participants viewed wildlife for more than 23,000 visitor days, while approximately 94,000 participants spent more than 182,000 visitor days hunting big game, and approximately 140,00 participants spent more than 54,000 visitor days fishing. Trail activities, such as walking, hiking, and running, were also regularly practiced at recreation sites. Although dispersed recreation patterns tend to mirror the overall RMPPA recreation patterns, recreation near developed and undeveloped sites will tend to be water-related, with more participants recreating for fewer visitor days.

3.11.3 Recreation Trends

The current trends in recreational use in the RMPPA indicate steady to slight increases. Many of the recreational activities in the RMPPA are directly tied to various natural resources, resulting in a correlation between the condition of the resources and the number of users. The recreation trends tied most directly to resource conditions are those that require wildlife populations to be healthy. These include hunting and fishing. In addition, annual precipitation will affect the level of rivers and streams and the recreation that requires these resources, such as fishing and floating. Given favorable conditions for these resources, their recreational use will likely continue to rise slowly.

3.12 SOCIOECONOMICS

The RMPPA encompasses a large area across much of southern Wyoming and is located within four counties: Albany, Carbon, Laramie, and Sweetwater. Because activities in the RMPPA have the potential to affect all of these counties, the socioeconomic study area has been defined as these four counties. Demographic and economic data for the socioeconomic study area have been collected from a variety of sources and cover the past 20 years. A 20-year time horizon was chosen to examine recent trends in demographic and economic parameters for the socioeconomic study area. These trends and parameters are discussed in detail below.

3.12.1 County Characteristics

Like much of Wyoming, the counties within the RMPPA socioeconomic study area are quite rural in nature. Three of the four counties encompass a rather large land area with a dispersed population, as summarized in Table 3-11. Laramie County, the exception, has a higher population density largely as a

result of the location of Cheyenne within its border. The number of persons per square mile ranges from 2.0 in Carbon County to 30.4 in Laramie County.

Table 3-11. Geographic Characteristics of the Study Area

Geographic Characteristic	Albany	Carbon	Laramie	Sweetwater	Wyoming	U.S.
Land Area (Million Acres)	2.7	5.1	1.7	6.7	62.1	2,200
Land Area (Sq. Miles)	4,273	7,896	2,686	10,425	97,100	3.5 Million
Persons Per Square Mile	7.5	2.0	30.4	3.6	5.1	79.6

Source: U.S. Census Bureau, Quick Facts, (USCB, 2003).

The largest population centers in the socioeconomic study area are listed in Table 3-12. These areas have reported changes in population over the past decade that vary by location. Population is increasing in the eastern portions of the Rawlins socioeconomic study area, while declining in western areas.

Table 3-12. Population Centers

County	City	Population		
		1990	2000	% Change
Albany	Laramie	26,687	27,204	1.9
Carbon	Rawlins	9,380	8,538	-9.0
	Saratoga	1,969	1,726	-12.3
Laramie	Cheyenne	50,008	53,011	6.0
	Pine Bluffs	1,054	1,153	9.4
Sweetwater	Green River	12,711	11,808	-7.1
	Rock Springs	19,050	18,708	-1.8

Land ownership in the socioeconomic study area is summarized in Figure 3-29. Public lands account for a significant proportion of the land base, with 49 percent of total land area owned and managed by Federal agencies, including BLM. The RMPPA comprises approximately 3.5 million surface acres, which is 22 percent of the socioeconomic study area. In addition, the RFO staff are responsible for 4.67 million acres of BLM-administered federal mineral estate.

The RMPPA is known for the checkerboard pattern of land ownership, covering a large portion of its area. Figure 3-30 summarizes the land ownership within the RMPPA boundaries and shows that BLM manages 32 percent of the total land area, whereas 52 percent is held in private ownership. This land ownership pattern presents challenges in managing resources.

3.12.2 Demographic Characteristics

3.12.2.1 Population

Annual population estimates for each of the four counties in the socioeconomic study area for 1980 to 2000 are plotted in Figure 3-31. Population increased by 19 percent over the 20 years, equating to an annual average increase of less than 1 percent. Although total population in the socioeconomic study area grew modestly over the past 20 years, examination of the components of population growth yields some additional insights. In Table 3-13, the components of population change show that although there are

increases in population in this area due to natural changes (more births than deaths), net migration continues to draw individuals away from the area. Overall, the socioeconomic study area followed a statewide trend of declining population due to net migration. All four counties experienced decreases in population due to net migration during both decades, with population declining by nearly 14 percent during the 1980s and by over 5 percent during the 1990s.

Distribution of the population by ethnicity for 2000 in the socioeconomic study area and the State of Wyoming is summarized in Figure 3-32. When compared with the state, the socioeconomic study area reported a lower percentage of whites and a slightly higher percentage of individuals indicating they are of Hispanic or Latino descent. The percentage of other ethnic groups is quite small, which is common throughout Wyoming.

Table 3-13. Components of Population Change for the RMPPA

1990–1999										
County	1990 Population	1999 Population	Numeric Change in Population 1990-1999	Percentage Change in Total Population 1990-1999	Cumulative Births	Cumulative Deaths	Natural Change in Population	Natural Percentage Change in Population	Net Migration	Percentage Change in Population Due to Net Migration
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Albany, WY	30,797	29,060	-1,737	-5.64%	3,596	1,487	2,109	6.8%	-3,846	-12.49%
Carbon, WY	16,602	15,437	-1,165	-7.02%	1,715	1,205	510	3.1%	-1,675	-10.09%
Laramie, WY	73,142	78,877	5,735	7.84%	11,110	5,330	5,780	7.9%	-45	-0.06%
Sweetwater, WY	38,823	39,322	499	1.29%	5,245	2,085	3,160	8.1%	-2,661	-6.85%
Study Area	159,364	162,696	3,332	2.09%	21,666	10,107	11,559	7.3%	-8,227	-5.16%
Wyoming	469,557	453,589	-15,968	-3.40%	91,165	32,059	59,106	6.0%	-1,382	-0.30%
1980–1990										
County	1980 Population	1990 Population	Numeric Change in Population 1980-1990	Percentage Change in Total Population 1980-1990	Cumulative Births	Cumulative Deaths	Natural Change in Population	Natural Percentage Change in Population	Net Migration	Percentage Change in Population Due to Net Migration
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Albany, WY	29,062	30,797	1,735	5.97%	4,664	1,526	3,138	10.80%	-1,403	-4.83%
Carbon, WY	21,896	16,659	-5,237	-23.92%	3,589	1,406	2,183	9.97%	-7,420	-33.89%
Laramie, WY	68,649	73,142	4,493	6.54%	13,342	5,064	8,278	12.06%	-3,785	-5.51%
Sweetwater, WY	41,723	38,823	-2,900	-6.95%	8,823	2,022	6,801	16.30%	-9,701	-23.25%
Study Area	161,330	159,421	-1,909	-1.18%	8,253	2,932	5,321	3.30%	-22,309	-13.83%
Wyoming	453,589	479,602	26,013	5.70%	60,099	32,704	27,395	12.60%	-1,382	-16.00%

Source: U.S. Census Bureau

3.12.2.2 Personal Income Trends

Personal income data were obtained for each county in the socioeconomic study area from the U.S. Bureau of Economic Analysis (BEA). Figure 3-33 summarizes components of personal income for 1990 through 2000 for the combined economic study area in inflation-adjusted dollars (2001$). Total personal income increased by over $1 billion during the 1990s, representing a 28 percent increase. Table 3-14 places these data in perspective by summarizing the estimated poverty rates for the four counties in the socioeconomic study area, for Wyoming, for the West, and for the United States.

Table 3-14. Estimated Poverty Rates for Counties Within the RMPPA

Location	1989	1998
Albany Co.	19.8%	14%
Carbon Co.	10.0%	11.8%
Laramie Co.	10.6%	10.7%
Sweetwater Co.	8.0%	8.1%
Wyoming	11.9%	11.4%
West	12.5%	14.6%
U.S.	12.8%	13.3%

Source: U.S. Census Bureau, State Model Estimates of the Percentage of Persons of All Ages in Poverty

Personal income can be broken down into three categories: labor income, investment income, and transfer payments. Labor income is derived from wages, salaries, and self-employment income. Investment income is in the form of rents, dividends, and interest earnings. Transfer payments are largely derived from social security benefits, Medicare and Medicaid benefits, and other income support and assistance.

Labor income consistently accounts for the greatest percentage of personal income for this area (65 percent in 2000). However the importance of income from non-labor sources has increased during the 1990s, accounting for 35 percent of total personal income in 2000, up from 31 percent in 1990. This change in how individuals earn income is not unlike national or state trends.

Investment income in the study area grew by 45 percent during the 1990s and accounted for 24 percent of personal income by 2000. Investment income as a percentage of personal income for this area in 2000 was higher than the national average (18 percent) but below the state average (26 percent). The increasing dependence on investment income is common throughout the country given that an increasing percentage of the population is retired.

Transfer payments for the study area grew by 38 percent during the 1990s and accounted for 11 percent of total personal income in the economic study area in 2000. Although this area has experienced a slight increase in dependence on transfer payments as a source of income, it is very similar to state and national trends, where in 2000 transfer payments accounted for 12 percent of personal income for residents of Wyoming and 13 percent nationally.

The per capita income for the socioeconomic study area has closely followed state and national growth trends associated with per capita income. However, this area has traditionally reported per capita income levels below the national average. For example, in 2000 per capita income for the study area was $27,660, which was lower than both the state average ($28,004) and national average ($30,150).

3.12.3 Economic Characteristics

This section focuses on trends associated with certain economic characteristics in the socioeconomic study area. These trends include changes in the labor force and unemployment, and trends in employment and earnings by industry.

3.12.3.1 Labor Force and Unemployment

Changes in the labor force and unemployment can provide information on the health of the local economy. The average annual unemployment rates for each of the four study counties, for Wyoming, and for the United States, are summarized in Figure 3-34. Unemployment in Carbon and Sweetwater counties has consistently been higher than unemployment for the State of Wyoming during the 1990s, and higher than the national average since 1997. However unemployment in Albany and Laramie counties has been below the state and national averages for almost the entire 10-year period. The significant difference in the unemployment rates between the eastern and western half of the socioeconomic study area likely reflects the availability of jobs in the larger cities of Laramie and Cheyenne in the east in comparison with job scarcity in western portions of the socioeconomic study area.

Changes in the civilian labor force during the 1990s are summarized for each study county and for Wyoming in Table 3-15. The civilian labor force is defined as all persons over 16 years of age in the civilian non-institutional population who either had a job or was looking for a job in the past 12 months. Overall the socioeconomic study area realized slower growth in the civilian labor force than did the state. In addition, the eastern portion of the socioeconomic study area realized growth in the labor force while western counties witnessed a decline.

Table 3-15. Changes in the Civilian Labor Force, 1991–2000

Location	Change in Civilian Labor Force Between 1991–2000	Percentage Change in Civilian Labor Force Between 1991–2000
Albany County, WY	2,516	15.6
Carbon County, WY	-278	-3.2%
Laramie County, WY	5,396	15%
Sweetwater County, WY	-550	-2.7%
Economic Study Area	7,084	8.7%
Wyoming	32,810	14.0%

Source: U.S. Department of Labor, Bureau of Labor Statistics, Local Area Unemployment Statistics

3.12.3.2 Employment and Earnings by Industry

BEA estimates annual employment and earnings for counties throughout the United States. Total annual employment includes both full-time and part-time jobs, so individuals with more than one job will be counted more than once. The employment estimates include persons who are employed by businesses and public entities, as well as individuals who are self-employed. Data were obtained from BEA regarding total annual employment for each of the counties in the economic study area, for Wyoming, and for the United States for 1990 through 2000 to examine trends in employment by industry over the 10-year study period.

Total employment in the economic study area increased by 16 percent during the 1990s, from 94,980 in 1990 to 110,212 in 2000. Compared with employment growth in Wyoming and nationwide, this area showed slower growth in employment. For instance, over the same 10-year period, total employment grew by 21 percent in Wyoming and 20 percent nationwide.

Employment trends in the four-county study area by industry for 1990 through 2000 are summarized in Figure 3-35. The largest employers in the region include government services and trade and comprised 70 percent of total employment in 2000.

The dominance of government employment is due to the large number of state employees located in Cheyenne and Laramie because of state government and the University of Wyoming. Industries showing the greatest percentage increase in employment during this period include construction (43 percent), manufacturing (36 percent), and farm and agricultural services (32 percent). Industries showing the greatest percentage decline in employment between 1990 and 2000 were mining (-36 percent) and transportation and utilities (-6 percent).

Figure 3-36 provides a summary of earnings trends by industry for the study area for 1990 through 2000. Earnings from the government sector dominate this area, providing the largest percentage of earnings of any industry and consistently accounting for nearly a third of total earnings on an annual basis during the 1990s. The service sector now accounts for the second-highest percentage of total earnings in the economic study area (17 percent). This sector is followed by trade (11 percent) and transportation and utilities (10 percent). Industries reporting the greatest growth in earnings include manufacturing, finance, insurance and real estate (F.I.R.E.), and services. Declines in earnings occurred in the mining, farm and agricultural services, and transportation and utilities sectors.

Another method of examining the importance of certain industries is to observe the trends in average earnings. Figure 3-37 shows the trends in average earnings for the study area for 1990–2000. This graph shows that mining jobs remain the highest-paying in the area, followed by transportation and manufacturing.

Industries showing the greatest percentage increase in earnings include manufacturing (37 percent), finance, insurance, and real estate (F.I.R.E.)(31 percent) and services (18 percent). Although the government sector supports the greatest percentage of jobs and earnings in the study area, growth in real earnings for this sector have been relatively modest during the 1990s, increasing by 4 percent between 1990 and 2000.

3.12.3.3 Economic Base

An area's economic base is comprised of industries that are primarily responsible for bringing outside income into the local economy. These industries typically export their goods and services outside the region and in turn support ancillary industries such as retail trade, housing construction, and personal services. The location of important industries in certain areas traditionally has been tied to such factors as the natural resource base, cost factors (transportation and labor), and existing transportation infrastructure. However technology has affected these location factors.

To assess the importance of major industries as a basic industry, location quotients were calculated for nine major industries, as listed in Table 3-16. A location quotient was calculated for both employment and income and compares each industry's share of total local employment or income to the industry's state or national share. This quotient yields a value generally between 0 and 2, where 1.0 indicates an equal share percentage between the local and state or national economies. Location quotients greater than 2 indicate a strong industry concentration, and those less than 0.50 indicate a weak concentration.

Table 3-16 shows that the four-county study area mirrors in many ways the state's economy as a whole. Industries that do show a stronger concentration in this area compared to the state's economy include manufacturing, transportation, utilities, and government. Two industries that are weak in this area compared with the state are mining and farm and agriculture services. When compared to the national

economy, however, mining shows an extremely high concentration. This is also true for the government sector. Alternatively, manufacturing; finance, insurance, and real estate (F.I.R.E.); and services show weak concentration compared to the national economy.

Table 3-16. Location Quotients for the RMPPA, 2000

Industry	Employment		Earnings	
	Location Quotient (WY)	Location Quotient (U.S.)	Location Quotient (WY)	Location Quotient (U.S.)
Farm and Ag Services	0.54	1.01	0.67	0.87
Mining	0.63	8.16	0.63	11.03
Construction	0.75	1.05	0.79	1.12
Manufacturing	1.04	0.40	1.42	0.48
Trans. and Utilities	1.05	1.17	1.12	1.42
Trade	0.94	0.97	0.90	0.77
F.I.R.E.	0.96	0.88	0.96	0.51
Services	0.87	0.73	0.86	0.58
Government	1.28	1.92	1.38	2.08

3.12.3.4 Property Valuation and Taxation

Total property valuation for the four counties in the socioeconomic study area for 2001 is summarized in Table 3-17. This includes property assessed by the State of Wyoming as well as locally assessed property. The State of Wyoming assesses taxes on both mineral and nonmineral property. Nonmineral property assessed by the state includes airlines, utilities, pipelines and gas distribution systems, railroads, and telephone service (Wyoming Department of Revenue 2001). During fiscal year 2001, the valuation of property assessed by the state was $1.66 billion for the socioeconomic study area. Local government also assesses four categories of property, including agricultural land; residential land, improvements, and personal property; commercial land, improvements, and personal property; and industrial property (Figure 3-38). During fiscal year 2001, the value of property assessed by local governments in the socioeconomic study area was almost $947 million, as described in Table 3-17. The total value of assessed property in the four-county socioeconomic study area was $2.6 billion in fiscal year 2001.

Table 3-17. Assessed Property Values by County for 2001

County	Valuation of State-Assessed Property			Valuation of Locally Assessed Property					Total State and Locally Assessed Property
	Non-Minerals	Minerals	Total State Assessed Property	Agricultural Land	Residential Land, Improvements and Personal Property	Commercial Land, Improvements and Personal Property	Industrial Property	Total Locally Assessed Property	
Albany	$23,792,281	$3,324,167	$27,116,448	$5,636,217	$107,891,145	$34,425,664	$6,475,411	$154,428,437	$181,544,885
Carbon	$41,628,203	$426,289,238	$467,917,441	$6,262,236	$37,701,960	$14,333,269	$27,848,535	$86,146,000	$554,063,441
Laramie	$44,719,001	$17,992,517	$62,711,518	$9,790,261	$265,897,775	$98,510,417	$28,210,102	$402,408,555	$465,120,073
Sweetwater	$122,849,306	$980,185,196	$1,103,034,502	$3,105,344	$110,041,844	$32,191,664	$158,602,935	$303,941,787	$1,406,976,289
Total—Study Area	**$232,988,791**	**$1,427,791,118**	**$1,660,779,909**	**$24,794,058**	**$521,532,724**	**$179,461,014**	**$221,136,983**	**$946,924,779**	**$2,607,704,688**

Mineral production in the socioeconomic study area continues to be a major source of tax revenue for local government entities. During fiscal year 2001, minerals accounted for more than 80 percent of the value of property assessed in the area (Figure 3-39). Oil and gas production and operations provided a significant percentage of the assessed value of minerals, especially in Carbon and Sweetwater counties.

Table 3-18 summarizes the assessed value of oil and gas production and property for fiscal year 2001 for each of the counties in the socioeconomic study area. For 2001, oil and gas production accounted for 75 percent of all mineral valuation in the socioeconomic study area as assessed by the state. For Carbon and Sweetwater counties, oil and gas production accounted for 92 percent and 68 percent, respectively, of all assessed mineral production. Physical assets of the oil and gas industry (property) constituted an additional 2.7 percent of all property assessed by local governments. Of all property and production assessed by the state and local governments, oil and gas operations accounted for 42 percent of assessed value in the socioeconomic study area during fiscal year 2001.

Table 3-18. Assessed Value of Oil and Gas Production and Property in the RMPPA, FY 2001

County	Oil and Gas Valuation—Production	Oil and Gas Valuation as Percentage of Total Mineral Valuation	Oil and Gas Extraction and Refining Property Valuation	Oil and Gas Property as a Percentage of Locally Assessed Property Valuation	Oil and Gas Valuation as Percentage of Total State and Local Assessed Property Valuation
Albany	$1,866,033	56.14%	$104,284	0.07%	1%
Carbon	$393,684,237	92.35%	$25,146,585	29.19%	76%
Laramie	$10,676,916	59.34%	$8,756,014	2.18%	4%
Sweetwater	$670,371,775	68.39%	$42,161,137	13.87%	51%
Total Study Area	**$1,076,598,961**	**75.40%**	**$25,250,869**	**2.67%**	**42%**

3.12.3.5 County Ad Valorem Taxes

Estimated ad valorem taxes from mineral production for each study county during calendar year 2001 are summarized in Table 3-19. These counties generated $76 million in tax revenues from mineral production during 2001. Of this, $67 million, or 88 percent, was derived from oil and gas production. Ad valorem taxes derived from mineral production accounted for 53 percent of total county tax levies in 2001.

Table 3-19. Estimated Mineral Ad Valorem Tax Revenues, FY 2001

County	Natural Gas	Crude Oil	Coal	Trona	Granite Ballast	Sand and Gravel	Total	Property Tax Levy[a]	Mineral Tax Levy as Percentage of County Tax Levy
Albany	$0	$117,446	$0	$0	$0	$5,094	$122,541	$12,481,661	1%
Carbon	$22,455,265	$1,927,568	$2,001,986	$0	$0	$17,404	$26,402,224	$34,927,573	76%
Laramie	$21,974	$710,730	$0	$0	$438,322	$58,908	$1,229,933	$34,322,378	4%
Sweetwater	$35,541,587	$6,989,927	$6,544,036	$13,083,494	$0	$28,479	$62,187,523	$89,145,656	70%
Total Study Area	**$58,018,826**	**$9,745,670**	**$8,546,023**	**$13,083,494**	**$438,322**	**$109,886**	**$89,942,220**	**$170,877,268**	**53%**

Table 3-20 provides an estimate of the ad valorem taxes assessed on physical property associated with oil, gas, and coal operations. During 2001, the four counties generated an estimated $3.9 million in property taxes associated with oil, gas, and coal extraction assets.

Table 3-20. Estimated Ad Valorem Tax Revenues on Oil, Gas, and Coal Property, FY 2001

County	Oil and Gas Property Assessment	Coal Property Assessment	Average Tax Levy	Total Estimated Ad Valorem–Property
Albany	$104,284	$0	62.94	$6,564
Carbon	$13,557,345	$1,459,743	61.94	$930,158
Laramie	$813,889	$0	68.63	$55,857
Sweetwater	$42,161,137	$3,944,703	63.44	$2,924,954
Total Study Area	$56,636,655	$5,404,446	124.88	$3,917,534

Table 3-21 estimates the importance of oil and gas operations in terms of local government property tax revenues. The four counties in the socioeconomic study area generated $71 million in tax revenues as a result of oil and gas operations. This accounted for 42 percent of property taxes generated in this area for 2001.

Table 3-21. Oil and Gas Tax Revenues as a Percentage of Total County Property Taxes, FY 2001

County	Total Ad Valorem Tax Revenue—Oil and Gas	Property Tax Levy[a]	Oil and Gas Tax Revenue as Percentage of County Tax Levy
Albany	$124,010	$12,481,661	1%
Carbon	$25,222,507	$34,927,573	72%
Laramie	$788,556	$34,322,378	2%
Sweetwater	$45,206,413	$89,145,656	51%
Total Study Area	$71,341,486	$170,877,268	42%

a Wyoming Taxpayers Association, Wyoming Property Taxation, 2001.

3.12.3.6 State Mineral Severance Taxes

Local government entities as well as the state benefit from severance taxes collected on mineral production throughout the state. Table 3-17 shows that $1.4 billion was assessed by the State of Wyoming for mineral production in the four-county socioeconomic study area during 2001. However severance taxes collected on mineral production are distributed within the state according to a formula published in the state statutes (W.S. 39-14-801). These tax revenues are distributed to a variety of sources, including the state general fund, water development account, state highway fund, counties, cities, and towns. Therefore the government entities within the socioeconomic study area will benefit from only a percentage of the severance taxes collected on production within the area. These entities however will also benefit from the severance taxes collected on mineral production in other parts of the state. Table 3-22 summarizes the total severance tax revenues that were distributed to the local government entities within the socioeconomic study area during fiscal year 2001.

Table 3-22. Total Severance Tax Distributions for Government Entities in the RMPPA, FY 2001

Area	Severance Tax Distributions
Counties in Study Area	$4,801,380
Total Severance Taxes Distributed to All Counties in WY	$13,843,706
Percentage Distributed to Study Area Counties	35%
Cities and Towns in Study Area	$13,638,594
Total Severance Taxes Distributed to All Cities/Towns in WY	$35,370,306
Percentage Distributed to Study Area Cities/Towns	39%

Source: Annual Report of the Treasurer of the State of Wyoming, June 30, 2001.

Table 3-23 estimates the severance taxes generated from mineral production originating within the socioeconomic study area. The estimated severance taxes for each mineral type are based on production and assessed values and the effective tax rates, all of which were obtained from the Wyoming Department of Revenue, Mineral Tax Division. Natural gas production generated the most severance tax revenue in the socioeconomic study area, accounting for nearly 67 percent of all severance taxes generated, with the majority of production occurring in Carbon and Sweetwater counties.

Table 3-23. Severance Taxes Generated in the Study Area by Product, FY 2001

County	Natural Gas	Crude Oil	Stripper Oil	Coal—Surface	Coal—Underground	Granite Ballast	Trona	Sand and Gravel	Total	Percentage of Total Severance Taxes Generated in Each County
Albany	$0	$77,664	$20,140	$0	$0	$0	$0	$1,619	$99,423	0.1%
Carbon	$21,028,585	$1,566,690	$145,466	$623,286	$878,246	$0	$0	$5,620	$24,247,893	30.6%
Laramie	$18,572	$462,391	$89,784	$0	$0	$127,744	$0	$17,168	$715,658	0.9%
Sweetwater	$32,491,495	$6,233,244	$32,737	$7,220,190	$0	$0	$8,248,759	$8,978	$54,235,402	68.4%
Total Study Area	$53,538,652	$8,339,989	$288,127	$7,843,476	$878,246	$127,744	$8,248,759	$33,385	$79,298,376	100.0%
Percentage of Severance Taxes Generated from Each Product	67.5%	10.5%	0.4%	9.9%	1.1%	0.2%	10.4%	0.04%	100.0%	0.0%

3.12.3.7 Federal Royalties

Mineral production occurring on federally owned public lands is also assessed a Federal mineral royalty. Production is assessed at 12.5 percent of value after allowable deductions. The Federal Government returns 50 percent of the total royalties collected to the state where the mineral production occurs. In Wyoming, distribution of the Federal royalties is based on a formula promulgated by the Wyoming State Statutes (W.S. 9-4-601). The state allows a percentage of the Federal royalties to be distributed to cities and towns for planning, construction and maintenance of public facilities, capital construction funds, and transportation projects. Local school districts may also benefit from Federal royalty payments through advanced entitlement grants for capital construction funds.

Total Federal royalties distributed to local government agencies in the socioeconomic study area for the Federal fiscal year 2001 amounted to $6.04 million (Wyoming Department of Revenue 2001).

3.12.3.8 RMPPA Mineral Tax Revenues

Tables 3-24 through 3-26 provide an estimate of the mineral tax revenues associated with oil and gas and common variety minerals production within the RMPPA for production year 2000. Actual production data were obtained from the Wyoming State Geologic Survey and were used in combination with the average taxable valuation per unit and average tax and royalty rates to estimate ad valorem taxes (county), severance taxes (state), and Federal royalties. Oil, gas, and coal production occurring within the RMPPA generated an estimated $62 million in mineral tax revenues to the county, state, and Federal governments (ad valorem, severance, and Federal royalties) during fiscal year 2001.

Table 3-24. Estimated Ad Valorem Tax on Production for the RMPPA (Federal Lands)

Product	Total Annual Production	Taxable Valuation Per Unit[a]	Assessed Valuation	Average Tax Levy[b]	Total Estimated Ad Valorem
(1)	(2)	(3)	(4) = (2)*(3)	(5)	(6) = (4)/1000*(5)
Oil (BBLs)	1,557,123	$24.47	$38,102,800	58.849	$2,242,312
Natural Gas (MCF)	81,540,962	$2.60	$212,006,501	58.849	$12,476,371
Coal (Underground)	1,409,233	$16.62	$23,421,452	61.935	$1,450,608
Coal (Surface)	705,958	$3.91	$2,760,296	61.935	$170,959
Total			$276,291,049		$16,340,250

a Source: Wyoming Department of Revenue Annual Report—Fiscal Year 2001, Cheyenne, WY.

b Source: Wyoming Taxpayers Association, "Wyoming Property Taxation 2001," Cheyenne, WY.

Table 3-25. Estimated Severance Tax on Production for the RMPPA (Federal Lands)

Product	Total Annual Production (BBLs/MCF)	Taxable Valuation Per Unit[a]	Assessed Valuation	Average Sev. Tax Per Unit of Production[a]	Total Estimated Severance Tax
(1)	(2)	(3)	(4) = (2)*(3)	(5)	(6) = (4)*(5)
Oil	1,557,123	$24.47	$38,102,800	0.060	$2,286,168
Natural Gas	81,540,962	$2.60	$212,006,501	0.060	$12,720,390
Coal (Underground)	1,409,233	$16.62	$23,421,452	0.070	$1,639,502
Coal (Surface)	705,958	$3.91	$2,760,296	0.0375	$103,511
Total			$276,291,049		$16,749,571

a Source: Wyoming Department of Revenue Annual Report—Fiscal Year 2001, Cheyenne, WY.

Table 3-26. Estimated Federal Royalties on Production for the RMPPA (Federal Lands)

Product	Total Annual Production (BBLs/MCF)	Taxable Valuation Per Unit[a,b]	Assessed Valuation	Federal Royalty Rate	Total Estimated Federal Royalties
(1)	(2)	(3)	(4) = (2)*(3)	(5)	(6) = (4)*(5)
Oil	1,557,123	$22.92	$35,689,259	0.125	$4,461,157
Natural Gas	81,540,962	$2.10	$171,236,020	0.125	$21,404,503
Coal (Underground)	1,409,233	$16.62	$23,421,452	0.125	$2,927,682
Coal (Surface)	705,958	$3.91	$2,760,296	0.125	$345,037
Total			$233,107,027		$29,138,379

a Source: Wyoming Department of Revenue Annual Report—Fiscal Year 2001, Cheyenne, WY.

b The taxable valuation for oil and gas was decreased to account for allowable cost deductions taken by operators prior to paying Federal royalties. Therefore the taxable valuation per barrel of oil is 93.66% of total valuation and 80.95% of total value.

3.12.3.9 Other Tax Revenue Sources

Other tax revenue sources that may be affected by management actions associated with BLM-managed lands include lodging taxes (Table 3-27), sales and use taxes (Table 3-28), and gas taxes. Lodging taxes have ranged from $0.93 million to $1.2 million per year between 1999 and 2000 for the socioeconomic study area, whereas sales and use taxes generated between $61 million and $74 million during this time.

Table 3-27. Lodging Tax Distribution for the RMPPA

County	FY 1999	FY 2000	FY 2001
Albany	$176,937	$278,992	$296,795
Carbon	$176,051	$202,998	$197,689
Laramie	$333,245	$379,875	$408,164
Sweetwater	$247,099	$270,368	$307,111
Total	$933,332	$1,132,233	$1,209,759

Source: Wyoming Department of Revenue Annual Report—FY 2001.

Table 3-28. Sales and Use Tax Distribution for the RMPPA

Jurisdiction	FY 1999	FY 2000	FY 2001
Albany[a]	$11,184,686	$12,638,203	$12,638,203
Carbon[a]	$8,127,805	$10,151,339	$10,151,399
Laramie[a]	$22,630,054	$29,173,211	$29,173,211
Sweetwater[a]	$19,190,295	$22,413,185	$22,413,185
Total	$61,132,840	$74,375,938	$74,375,998

Source: Wyoming Department of Revenue Annual Report—FY 2001.
a Includes distribution to county and cities and towns within each county.

3.12.3.10 Payment in Lieu of Taxes

Each county in the socioeconomic study area receives Payment in Lieu of Taxes (PILT) to compensate local governments for hardships caused by federal lands being exempt from local property taxes. PILT payments are allowed in addition to other revenue-sharing programs, such as Federal mineral royalties and U.S. Forest reserve payments. The PILT payment made to each county is based on a complex formula that takes into account revenue sharing from the previous year, county population, and acreage of the county in federal ownership. PILT payments received by the counties in the socioeconomic study area for the last 10 years are summarized in Figure 3-40.

3.12.4 Economic Activities Attributable to BLM Lands within the RMPPA

Activities on BLM lands can provide important economic stimulus to local economies. For the RMPPA, activities such as oil, gas, and coal production; grazing; and recreation are important to the region. The following section discusses the link between activities on lands within the RMPPA and the local economy.

3.12.4.1 Oil and Gas Operations

Historical data for oil and gas production between 1974 and 2000 were used to estimate annual production for the RMPPA, summarized in Figures 3-41 and 3-42. As shown in the figures, the RMPPA continues to be a very important area in terms of oil and gas production. For instance, Sweetwater County had the third-highest taxable valuation of crude oil and natural gas of all counties throughout Wyoming during 2001. A significant percentage of this production occurred on BLM-controlled acreage.

Although mining employment and income have declined in the region in recent years, mining still remains a strong industry within the study area. This is especially true for western portions of the study area, which are more dependent on mining than the eastern counties.

Grazing is another important use of BLM-managed lands within the RMPPA. An estimate of the importance of this use in the four-county study area is summarized in Tables 3-29 and 3-30. The value of grazing on BLM-managed public lands was calculated as shown in Table 3-29. Total annual AUMs were obtained from BLM for the period from 1990 to 2000. Using data for the number of AUMs used in 1997 and for the value of cattle and sheep sales from the Wyoming Statistical Service, the value of grazing on BLM-managed public lands for the RMPPA was estimated at more than $10 million. The value of grazing associated with the RMPPA was then compared with livestock sales during 1997 for the four-

county socioeconomic study area. The most recent data on sales were obtained from the 1997 Census of Agriculture published by the National Agricultural Statistical Service. According to Table 3-30, total agricultural sales in the four-county area exceeded $153 million, of which 50 percent was associated with livestock sales. Comparing livestock sales throughout the study area with the value of grazing on BLM-managed lands within the RMPPA indicates that grazing activities accounted for 6.9 percent of all livestock sales and 5.9 percent of all agricultural sales for this area.

Table 3-29. Estimated Value of Grazing Activities on BLM Lands within the RMPPA for 1997

Total Cattle AUMs Attributable to Grazing within RMPPA—1997	Total Sheep AUMs Attributable to Grazing within RMPPA—1997	Value of Cattle Grazing ($1,000)[a]	Value of Sheep Grazing ($1,000)[b]	Total Value of Grazing on BLM Lands ($1,000)
309,725	30,977	$9,851	$850	$10,701

a Cattle Grazing was valued per AUM at $31.80/AUM based on data from the Wyoming Agriculture Statistical Service.

b Sheep Grazing was valued per AUM at $27.44/AUM based on data from the Wyoming Agriculture Statistical Service

Table 3-30. Percentage of Agricultural Sales in the Study Area Attributed to Grazing on BLM Lands in the RMPPA

Total Agricultural Sales—Study Area (1,000$)	Total Cattle and Calf Sales—Study Area (1,000$)	Estimated Value of Grazing on BLM Lands—RMPPA (1,000$)	Grazing Percentage of Total Cattle and Calf Sales	Grazing Percentage of Total Agricultural Sales
$153,329	$76,353	$10,701	14.0%	7.0%

Source: U.S. Department of Agriculture, National Agriculture Statistical Service, Census of Agriculture, 1997.

3.12.4.2 Recreation

Recreational activity has important economic value both in terms of satisfaction provided to local residents and the economic activity generated for the regional economy. In terms of economic activity, recreation generates additional spending in the local economy that supports jobs and income. Estimates of recreational use within the RMPPA indicate that over several hundred thousand Recreational Visitors Days are spent in this area. As visitors come to this area to recreate, they spend money on goods and services to support their activities, including lodging, meals and groceries, gasoline, and other items. These expenditures can be an important economic stimulus to the local area.

3.12.5 Environmental Justice

Executive Order 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, requires the identification and addressing of disproportionately high and adverse human health and environmental impacts of Federal programs, policies, and activities on minority and low-income populations.

Relevant census data were used to determine whether the populations residing within the four-county study area constitute an "environmental justice population" through meeting either of the following criteria:

- At least one-half of the population is of minority or low-income status
- The percentage of population that is of minority or low-income status is at least 10 percent higher than for the entire State of Wyoming.

3.12.5.1 Population by Race

The population distribution by race is summarized in Table 3-31 for all counties in the study area. In addition, Map 3-8 shows the minority population for each county in the State of Wyoming, where minority population is calculated as total population less non-Hispanic white alone. All four counties show minority populations that are greater than the state average. This is mainly attributable to the larger Hispanic population in the four counties compared with the rest of the state. Laramie County also has a slightly higher African-American population than does the rest of the state, probably because of the racial diversity of personnel associated with F.E. Warren Air Force Base in Cheyenne.

Table 3-31. Population Distribution (Percentage) by Race by County, 2000

County	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or More Races	Hispanic or Latino (of any Race)
Albany	91.3	1.1	1.0	1.7	0.1	2.6	2.2	7.5
Carbon	90.1	0.7	1.3	0.7	0.1	5.2	2.1	13.8
Laramie	88.9	2.6	0.8	1.0	0.1	4.0	2.6	10.9
Sweetwater	91.6	0.7	1	0.6	0.0	3.6	2.4	9.4
Wyoming	92.1	0.8	2.3	0.6	0.1	2.5	1.8	6.4

Source: U.S. Bureau of Census
Percentages may not add to 100 because individuals may report ethnicity under more than one category.

However the greater percentage of minority populations living in the four-county study area is not sufficient to constitute an "environmental justice population" because it does not meet either of the criteria above.

3.12.5.2 Population in Poverty

Poverty level is often used as a determinant of low-income status. The U.S. Census Bureau estimates poverty levels using a set of money income thresholds that vary by family size and composition. If a household's income is below the money threshold, then the family and all individuals of that household are considered to be in poverty. Using this criterion, the Census Bureau provides estimates of the percentage of individuals that fall below the poverty level for each county in the United States. Poverty estimates are also provided for different regions of the United States and for the nation as a whole.

Table 3-14 summarizes the estimated poverty rates for the four counties in the socioeconomic study area, for Wyoming, for the West, and for the United States. Carbon, Laramie, and Sweetwater counties have estimated poverty rates over the past decade that are below the state, regional, and national averages. The exception is Albany County, whose estimated poverty rates are higher than all other areas summarized. (Carbon County showed a slightly higher poverty rate than the State of Wyoming for 1998.)

Map 3-9 summarizes the median household income and poverty rates for each county in Wyoming for 2000. The map shows that the median household income in Laramie and Sweetwater counties is above

the state average, and poverty levels (Table 3-14) are lower than poverty levels throughout the state. This indicates the absence within these two counties of low-income populations that could be affected by BLM actions. This is not the case in Carbon and Albany counties, however: these counties reported a lower median household income and higher poverty rates than found throughout Wyoming. For Albany County, the poverty rate is 10 percentage points above the state average, indicating the potential for a low-income "environmental justice population." This issue will require further analysis to determine whether low-income populations may be affected by BLM management actions.

3.12.6 Social Development, Culture, and History of Communities

Understanding the social development, culture, and history of an area provides valuable insight into how events or changes to the area may affect the livelihood and quality of life of the residents. The Rawlins RMPPA historically was developed with sparse populations, rural characteristics, and natural resource-based economies. Although no two communities within the RMPPA are alike, many do share similar historical paths. This section is intended to give a general representation of the communities that are within or in close proximity to the Rawlins RMPPA.

3.12.6.1 Carbon County Communities

Baggs

Located 76 miles from Rawlins and 41 miles from Craig, Colorado, Baggs was named after ranchers George and Maggie Baggs. Initially established mostly as a ranching community, the area continued to develop as settlers came to the area in search of gold and silver. The community of Baggs is also reputed to be the former home of one of the most notorious outlaw bands of the old west, which included Butch Cassidy, the Sundance Kid, and their "Wild Bunch." Today the small community of Baggs consists of a little over 350 residents, who benefit from the oil and gas activity of the area as well as ranching, seasonal recreation, tourists services, and access routes to the national forest that surround the community.

Elk Mountain

The rural community of Elk Mountain grew around the Elk Mountain Stage Station along the Overland Trail. In 1877, a post office was established to service the town and ranches that were being settled in the region. With the growth of the railroad and availability of rangeland for raising stock, the area saw economic growth. Gold was discovered in Douglas Creek, which drew a large number of miners to the Medicine Bow Range. In 1897, copper was found on the west side of Elk Mountain. After the establishment of the Union Pacific Railroad 15 miles to the northeast, ranchers began utilizing the rich rangelands for cattle grazing. Elk Mountain's first mercantile store was constructed in 1902, using lumber from the timber company. In 1915, the Carbon Timber Company sold its assets to the Hanna-based Wyoming Timber Company, which dominated the local logging scene for the next four decades. Mineral explorations in the second half of the 19th century revealed deposits of gold and copper in the region. The boom lasted for only a decade but played an important role in the economic development of Elk Mountain. The energy boom of the 1970s caused an influx of miners and their families to the area. Communities grew and allowed improvements to the lifestyle of their residents. A constant of the area has always been the ranching industry: the raising of quality animals and hay crops has made this a place of agricultural importance.

Encampment and Riverside

Originally known as Grand Encampment (a name subsequently changed in accordance with a Post Office request for a shorter name), Encampment was incorporated in January 1898. Situated between two

noncontiguous sections of the Medicine Bow and Routt national forests in south-central Wyoming, the area was originally settled as a ranching and sheep herding area. In 1897, Ed Haggarty, a sheep rancher and prospector, discovered a prolific copper source in the Sierra Madre Mountains, subsequently starting a copper boom. That same year a prospector from Whitehaven, England, discovered a rich copper prospect that he named the Rudefeha. The property and mine, which soon came to be named the Ferris-Haggarty property, produced much of the more than $2 million dollars of copper from this area of Wyoming.

Seeking capital and development of the region was the foremost advocate or promoter of the Grand Encampment Mining Region, Willis George Emerson. Upon obtaining an interest in the Ferris-Haggarty property and establishing a plethora of companies, promoter Emerson attracted dollars toward the construction of such entities as a 4-mile wood and iron pipeline designed to supply power to the smelter, and an aerial tramway. The tramway extended for 16 miles from the Ferris-Haggarty Mine, over the Continental Divide at an elevation of 10,700 feet above sea level, down through the mountains and across the valley floor to the smelter at Encampment. By 1904 the mining operations were at their apex, employing 200 men and producing over $1,400,000 worth of copper. Foreclosure proceedings began in 1913, and salvage operations followed shortly thereafter.

Although through the first decade of the 1900s Encampment was considered one of the most prosperous towns of the West as a result of the discovery of gold near the Encampment River, the Grand Encampment copper region epitomizes the boom and bust syndrome of many western mining areas.

The town of Riverside, previously known as Dogget, came about as a means of getting to the town of Encampment. Located between Saratoga and Encampment, Riverside's fortunes were directly tied to the copper industry of Encampment. Although never a major mining town, smelter workers stayed at the local Riverside hotel and frequented the saloons, giving Riverside the appearance of a promising mining community. Once the mining and smelter companies of Encampment started to decline, so too did Riverside. Today Riverside's population is approximately 85. The town is considered primarily an agricultural and ranching community, with some timber mill activity and recreational services associated with the national forest.

Today the small towns of Riverside and Encampment are occupied by a number of second homes and retirement homes, situated near a wealth of recreational opportunities.

Hanna

The founding of Hanna was due primarily to its association with the Union Pacific Railroad route and the discovery of coal. The town was formed in 1886 by Mark A. Hanna, a financier and politician who was on the board of directors of the Union Pacific Railroad. Despite Hanna's grand visions and the potential for coal in Hanna, the town began as a small tent town.

As the coal industry grew, so did the town of Hanna. Most of the town's residents were mine workers who emigrated from Finland, England, Sweden, Japan, and Italy. To accommodate the growing population, Union Pacific began building up much of the town, which soon became characterized by orderly streets and alleys concentrated between the town's two mines. In 1903 a mine explosion killed 169 men, the worst mine disaster in Wyoming's history, and in 1908 another explosion killed 59. The mine was subsequently closed and a memorial, which still stands today, was erected just above the mine.

The town of Hanna continued to grow as additional mines were opened. In 1954, when the Union Pacific Railroad began using the diesel locomotive in place of the coal-fueled locomotive, the town of Hanna became a ghost town. However in 1965, Union Pacific gave the town of Hanna water rights and land, and

the town began to survive on its own. Ranching and other occupations aided in the town's survival, as did some renewed interest in coal during the energy boom of 1970. Between 1970 and 1990, the town of Hanna was revived with renewal of the coal industry. (Through its coal, the town came to be referred to as having "black blood running though its veins.")

During its booming coal days, Hanna's population reached about 1,500. More recent population estimates are less than 900. The most probable reason for the town's population decrease is the closing of its mines. Although the Shoshone underground mine was able to compete longer than most because it used longwall mining techniques (which efficiently cut away coal by running back and forth along the coal seam), it too has closed.

Outside of the mining industry, Hanna virtually has no other major (or even medium-sized) employer. Although there are plans for a new mine southeast of town, lagging coal prices have forced delays in those plans. However there is a newly developed wind energy business nearby, and other economic opportunities exist from Hanna's proximity to the Seminoe State Park and Reservoir, and the Medicine Bow National Forest.

Rawlins And Sinclair

During the spring of 1868, members of the grading crew of the Great Iron Horse Railroad established a camp at Rawlins Spring. The camp was named after General John A. Rawlins, Chief of Staff of the U.S. Army, who after taking a drink from the spring stated that if ever something were named for him, he hoped it would be a spring of water. From this camp a tiny town began to grow. A Post Office was established, work on the Union Pacific depot was begun when the tracks finally reached Rawlins, and the town was made a central hub of the railroad.

Rawlins is significant as the original commercial heart of the county seat of Carbon County. From its humble origins as one of hundreds of railroad towns along the Union Pacific mainline, Rawlins grew into a modern city with a diversified economy that today serves a regional ranching, oil and gas, and industrial community. Because of its location on the first transcontinental railroad and a permanent water source in an otherwise semiarid region, Rawlins became a major division point for the Union Pacific Railroad. In the 20th century, the city was located on the first transcontinental auto highway, the Lincoln Highway. As such it has played a key role in state, regional, and national transportation. Today the main industry in Rawlins is the oil business. There are several pipelines in the Rawlins area.

Rawlins is also the home to the Wyoming State Penitentiary, a major employer of the area located just a few miles south of town.

Located just 6 miles to the east is the small Wyoming community of Sinclair, home of the Sinclair Refinery that boasts to be "The West's Most Modern Refinery." First known as Parco, Sinclair was described by the Rocky Mountain News in August of 1925 as "truly an oasis in an otherwise drab desert territory."

Sinclair was financed by oil magnate Frank Kistler to house workers for a large Producers and Refiners Oil Company refinery built in 1922–1923 at the location. Designed by the Denver-based architectural firm of Fisher and Fisher and constructed in 1924–1925, the company-built town of Sinclair consists of numerous public buildings set around three sides of a central east-west plaza, fountain, and park. Residences are located along streets and blocks in a grid pattern running north, west, and east from the plaza area. To foster a sense of community spirit commonly absent in company towns as well as to maintain architectural cohesiveness, Sinclair's architects designed both residential and public buildings

with Spanish Colonial motifs of unpainted stucco, polychrome clay tile roofs, and dominant masonry construction, to accurately simulate the appearance and form of many southwestern adobe missions.

Although Kistler's firm was forced to sell the PARCO holdings in 1934 when crude oil reached an all-time low price of 10 cents a barrel, the oil market improved as a result of increased demand during World War II. The refinery and town, renamed Sinclair in 1942, prospered under the management of the Sinclair Refining Company. From its inception, Sinclair has remained one of the most important refineries in the State of Wyoming.

Saratoga

For more than 95 years, people have been drawn to Saratoga and the Platte Valley by the spectacular mountain scenery, superior trout fishing, trophy class hunting, and abundant wildlife. Long considered the crossroads, as well as a destination, for American Indians and European-American settlers, Saratoga today is a town of approximately 2,000 residents situated on the banks of the North Platte River. Like many of Wyoming's communities, the early history of Saratoga is rooted in the mining, timber, and livestock industries and the railroad. A large number of prominent cattle ranches are strung along the valley. A significant part of the history of Saratoga also revolves around its world famous mineral hot springs and thermal waters, which were initially used by Native Americans who believed the springs served medicinal purposes. Today the State of Wyoming manages the springs and has made modern upgrades to give the springs a bathhouse atmosphere. Also contributing to Saratoga's development was the presence of the timber industry, which included a sawmill operation that lasted for many years.

During the 1940s, a Civilian Conservation Corps camp was established in Saratoga. One of the group's primary tasks was the construction of the Barrett Ridge winter recreation area. Today recreation and the hot springs continue to be the primary attractions of Saratoga. The destination is also home to one of the national fish hatcheries operated by the U.S. Fish and Wildlife Service (USFWS). Dating back to 1915, the hatchery raises a variety of trout species. Eggs from the fish are shipped to Federal and state hatcheries nationwide, where they are raised for stocking.

Carbon

The town of Carbon was founded by the Union Pacific Railroad and was the first mining community on the main Union Pacific line. The first miners to Carbon dug caves into the sides of a nearby ravine and covered the fronts with boards and earth. Later the dwellings were made of sandstone. Flat rocks were piled one on top the other, chinking was of rock, sticks, or wood, and interior walls were of plaster about an inch thick, made of sandstone. At its peak, Carbon had seven coal mines worked by "Lankies" (because several of them came from Lancashire, England). Three thousand residents lived in Carbon, and there was a general store, Scranton House, two or three saloons, Carbon State Bank, Slack Diamond Newspaper, a school, Miners Hall, two churches, and the large Finn Hall.

However the town of Carbon was doomed by Simpson Hill, a steep grade west of town that required helper engines for about 6 miles to the top of the hill. In 1899, railroad surveyors found an easier grade through present-day Hanna, which happened at about the same time the Carbon mines were playing out. By 1902, the town of Carbon was abandoned because of the loss of its economy. Today all that is left of Carbon is the Carbon Cemetery north of the town site, along with a few partial foundations and sandstone walls. The first grave in Carbon was that of the stable boss who fell victim to a flock of Indian arrows shortly after the camp started to take shape. The local outlaws "Dutch Charlie," who was hung in Carbon, and "Big Nose-George," who was hung in Rawlins, are also buried in the Carbon Cemetery.

Medicine Bow

The name "Medicine Bow" is legendary and derives its origin from the Indian tribes that frequented the area, mainly the Arapaho and Cheyenne. Along the banks of the river, Native Americans found excellent material for making their bows. Anything that was found good for a purpose was called "good medicine." Thus these Native Americans named the river flowing through the area the Medicine Bow River. Because the headwaters of the river originated in the mountains to the south, these mountains were called the Medicine Bow Mountains.

Trappers and mountain men and women first used the Medicine Bow area during the 1830s. In 1868, the Union Pacific Railroad was built through the area, and a pumping station was established on the river. A store and saloon marked the beginnings of the small village, which naturally was given the name Medicine Bow. By the following year, Medicine Bow had become a major supply point, and in the 1870s, the Federal Government operated a military post in Medicine Bow to protect the railroad and freight wagons from Indian attack. A Post Office was built and, in 1876, the first elementary school was established.

By the late 1870s and early 1880s, Medicine Bow had become the largest shipping point for range livestock on the Union Pacific line. Cattle were brought in for shipping from as far as Idaho and Montana, and an average of 2,000 head a day were being shipped. By the turn-of-the-century, Medicine Bow was also a major shipping point for wool, averaging 1,000 tons a year.

In 1901, the Union Pacific Railroad was relocated from the Rock Creek route to its present location, and a depot was built in Medicine Bow. The original depot burned down July 24, 1913, and the present depot was erected in November 1913. In late 1913, the transcontinental Lincoln Highway passed directly through Medicine Bow. In the 1930s the highway was paved, bringing tourism to the area. In later years, lumber, uranium, coal, oil, and natural gas were found in the Medicine Bow area, adding to the prosperity of the region.

Arlington

In the 1860s, the Rock Creek Crossing and Stage Station was one of many stopping points, or waystations, along the Overland Trail, a central trail among many western transcontinental transportation routes. As a stage station (known as a "home station"), Rock Creek (now known as Arlington) became a commercial and entertainment center for immigrants. Joe Bush, owner of the stage station, constructed a bridge at the crossing and lived in a log cabin at the site. To serve the many needs of travelers, Bush operated a dancehall-saloon, general store, and blacksmith shop from one building. Although travel along the Overland Trail declined after the transcontinental railroad was completed, Rock Creek continued to thrive as a supply and social center for growing agricultural and timber interests in the surrounding area. In 1882, a Post Office known as Rock Dale was constructed at the site. The Post Office was used as a bunkhouse in later years. In the 1890s, the dancehall-store-blacksmith shop also served as a school.

Although Rock Creek still served as a commercial and social center during the later part of the 19th century, the economic base of the small settlement began to change. For economic purposes, the owners of Rock Creek station turned to stock raising during this period. Corrals, a barn, a milkhouse, and an icehouse were built during the 1880s and 1890s. During the early 20th century, Rock Creek was renamed Arlington, and continued in its dual commercial-agricultural role.

The original Wyoming Wind Project, located on Foote Creek Rim above Arlington, had an original output of more than 85 megawatts of electricity, enough for about 27,000 average homes. Electronic control systems point each turbine into the wind and adjust the pitch of the blades to make the best use of

wind at any speed. The turbines can generate power at wind speeds of 8–65 mph. At higher speeds, the turbines automatically shut down—a feature which allows them to withstand Wyoming's 125-mph gusts. The turbines are also adapted to operate reliably in extremely cold conditions.

Since development of the original 69-turbine project, several subsequent phases have been constructed, and the project now totals 183 turbines, with a generating capacity of 134.7 megawatts.

Rock Creek's historical significance relates to its evolution as a home station along the Overland Trail to a permanent ranching community. As one of the earliest settlements in Carbon County, Rock Creek contributed in a commercial and social sense to the development of south-central Wyoming.

The Stone Wall Ranch was the first permanent ranch homestead within the Little Snake River Valley. Founded in 1871 by one of the valley's first permanent cattle-raising residents, Noah Reader, the ranch retains material cultural elements that embody the relationship between stockmen and the local environment, elements that express an articulation between a mode of livelihood and local environmental constraints. The ranch's name derived from the natural sandstone escarpment that still forms the back (north) wall of the ranch's main corral. The Stone Wall Ranch is significant as the first permanent settlement in the Little Snake River Valley and because of its unique environmental setting. Cultural elements of the property are integrated with the environmental features, eliciting a feeling of confinement rather than the open spaciousness so common among Wyoming ranches.

3.12.6.2 Albany County Communities

Albany

With the construction of the Laramie, Hahn's Peak and Pacific Railways (LHP&P), the railhead location in Albany provided a convenient central location where local miners and logging companies could take advantage of the more efficient transportation system to get their products to markets in Laramie and beyond. The LHP&P also provided a faster and less expensive means of transporting mineral ores and wood products than local wagon freighters offered. During the 1920s and 1930s, summer-home tracts were established outside of Albany on Forest Service-administered land, and soon the community of Albany began to witness an influx of eastern visitors taking advantage of the recreational opportunities of the area.

Centennial

The Centennial Valley received its first major influx of people as a result of two pivotal government acts: the *Homestead Act* of 1862 and, more directly, the *Pacific Railway Act* that supported the construction of the transcontinental railroad in 1868. The first settlement of Centennial was actually located 1 mile southwest of the present town. The area around Centennial has always been used for its extensive grazing lands, and there is also ore and timber business. Although Centennial largely can be characterized by it long history of logging, mining, and grazing ventures, tourism and recreation have contributed to the growth of the area both historically and presently. The wild lands, undeveloped forest, and surrounding rangelands of Centennial have been enjoyed recreationally as early as 1914. Considered the gateway to the Snowy Range ski area, the proximity of Centennial to the Medicine Bow Mountains makes it a year-round destination for a variety of recreational opportunities.

Laramie

The county seat of Albany County, Laramie is located in southeast Wyoming along Interstate 80, on the banks of the Laramie River near Ames Monument. Various adventurers, including French trapper

Jacques La Ramie after which the city is named, historically traversed the area around Laramie. Spurred by the railroad's arrival in 1868, the town of Laramie was incorporated in 1874. Laramie is home to the historic Territorial Prison. The 42-cell prison opened in 1872 and housed more than 1,000 men and 12 women, including Butch Cassidy, who was imprisoned there for stealing horses in 1894. Today the prison includes state-of-the-art displays and interactive exhibits on frontier law and justice, as well as other facets of western history. Laramie is home to the University of Wyoming, which was established in 1886 and is today one of the major employers in the town. With a student population of roughly 10,000 (in comparison with a total city population of a little over 27,000), there exist a number of service industry opportunities in and around the University of Wyoming.

Laramie has become a transportation and commercial hub for timber-producing and ranching interests. Tourism and recreation also contributing significantly to the economy.

Rock River

Rock River came into existence as a result of the rerouting of the Union Pacific Railroad in 1898. With this change, the neighboring cow town of Rock Creek was abandoned when a railroad stop was established in Rock River. Along with the residents, many of the businesses of Rock Creek also moved to Rock River. Rock River was established in 1910. In 1919, oil was discovered 14 miles west of town, in what is now called McFadden. The economy flourished, and hopes ran high that a refinery would be established, but the oil was instead piped to a refinery in Laramie.

Today the population of Rock River is approximately 235, with the majority of those persons involved in agriculture and grazing.

Jelm

Three-and-a-half miles south of Woods Landing, in the bottomland of the Big Laramie River, is the site of Cummins City, later named Jelm. Placer gold is reported to have been discovered in the Medicine Bow Range as early as 1858, and Cummins City developed as a mining camp. In 1879, new prospects were discovered in gold-bearing quartz along the Upper Big Laramie River at Jelm Mountain. John Cummins promoted his mining interests in the region, and by 1880 a plot for the new town called Cummins City was drawn up. Numerous buildings were erected, including individual cabins, a boarding house, a meat and vegetable market, a paint store, restaurants, blacksmith shops, a livery stable, and at least one bar. However by the end of 1881, Cummins City began to decline, and by 1886 it was reported that, with two exceptions (at a copper mine and a bismuth mine), no mining had been done in the Cummins City district.

Later, near the turn-of-the-century, interest in the mining district was revived by the discovery of copper in the Medicine Bow and Sierra Madre ranges. In 1898, the Jelm Mining District was created. A new town plan was drawn up, and in 1900 Cummins City was resurrected as Jelm.

Mining carried on intermittently at Jelm, although it was not a large or permanent settlement.

3.12.6.3 Laramie County Communities

Cheyenne

The City of Cheyenne began in 1867, when the Union Pacific Railroad came through on its way to the west coast. The town site was first surveyed by General Greenville Dodge and was named for an Indian tribe that roamed the area. Settlement came so fast to the area that the nickname "Magic City of the

Plains" was adopted for Cheyenne. On August 8, 1867, the first charter for the government of the City of Cheyenne was established, and H. M. Cook was elected the city's first mayor. At that time, Cheyenne was situated in the Dakota Territory and had a population of approximately 600 people. The following December, a permanent city charter was granted by the Dakota Territory legislature. On January 5, 1914, the commissioner form of government was formally adopted by the City of Cheyenne.

With a recent population of over 53,000 persons, Cheyenne is strategically situated at a major transportation hub (the intersection of Interstates 25 and 80 and two major railroads), and is a developing center of commerce. Only 90 minutes north of Denver, Colorado, Cheyenne sits as the northern anchor city of the Front Range of the Rocky Mountains. Cheyenne is the capital of Wyoming, the seat of Laramie County, and the site of F.E. Warren Air Force Base. Its economic base is extremely diverse, ranging from state and national government to the high-technology of satellite communications.

3.12.6.4 Sweetwater County Communities

Bairoil

The town of Bairoil is located about 40 miles north of Rawlins and 90 miles south of Casper. Bairoil acquired its name from Charles Bair, who was involved in drilling the first well there in 1916. The town began as the Bair Camp, built by the Bair Oil Company in the midst of the oil wells. In 1924, the name Bairoil became official when residents requested that a Post Office be established and that it be called Bair Oil. Over the years, the name evolved into its present spelling.

Rock Springs

Rock Springs is in southwestern Wyoming on Bitter Creek, 12 miles east of Green River. Named from a nearby saline spring, Rock Springs has been home to as many as 57 different nationalities in its long history and is a "melting pot" of cultural diversity. The first occupants were Paleo-Indian hunters and gatherers who arrived from Siberia through Alaska more than 20,000 years ago. The Shoshone were the largest tribal group, at around 1,800 in number, but there were also smaller numbers of Arapaho, Crow, Cheyenne, and Oglala and Brulé Dakota (Sioux). Rock Springs began as a stage stop in 1862 and developed as a coal-mining and ranching center after the arrival of the Union Pacific Railroad in 1868. The region around Rock Springs has rich underground stores of coal, oil, natural gas, trona, and phosphates. The railroad had been given the rights to the coal along its route, and it immediately opened coal mines near Evanston and Rock Springs, bringing in Chinese miners for less expensive labor and to aid in mining strikes. Racial tensions ensued, and on September 2, 1885, rioting led to the deaths of 29 Chinese workers. During the boom years of the 1980s, Rock Springs was the richest city in the nation on a per capita basis, yet its crime rate was also one of the highest in the nation. Then came the bust, with jobs disappearing as the town's underground coal mines began subsiding.

Today Rock Springs is slowly stabilizing in both its economy and its appearance. Its main economic contributors continue to be mining and coal-supporting companies, such as the Trona mining and processing company, Bridger power plant and coal company, and PacifiCorp, as well as Union Pacific Rail Road, services for I-80, and other services including schools and hospitals.

Wamsutter

Wamsutter is located in Sweetwater County in southwestern Wyoming, 65 miles east of Rock Springs. With a population of 261 as of 2002, this small town is referred to as the Gateway to the Red Desert. The Wamsutter train station was created when the Union Pacific Railroad built its tracks through the area in 1868. The name of the town was originally Washakie, after the great Shoshoni Indian Chief. Because

freight intended for Fort Washakie was mistakenly sent to the town of Washakie, the Federal Postal Service requested a name change in 1884 or 1885. Wamsutter was named either after a German bridge builder on the Union Pacific Railroad or after the Wamsutta Woolen Mills of Massachusetts. At one time, Wamsutter was considered the second-largest wool shipping point in the United States, and Wamsutta Mills was the largest buyer. ("Wamsutta" is a name applied to the cotton cloth manufactured at Wamsutta Mills in New Bedford, Massachusetts. The name is after a Massachusetts sachem, or chief, who was the eldest son of Massasoit, a Wampanoag. "Wamsutter" is apparently a contraction of "Womosutta," meaning "Loving Heart.")

The transportation facilities offered by the Union Pacific Railroad and the fine grazing land of the Red Desert, where half-a-million sheep winter annually, are the main factors in the growth and development of this small town. Wamsutter was incorporated on April 21, 1914. The area around the town is rich in underground stores of coal, oil, and gas. The main contributor to Wamsutter's economy continues to be mining, supplemented by sheep and cattle farming.

3.13 SPECIAL MANAGEMENT AREAS

Special management areas are designated to protect or preserve certain qualities or uses in areas that best provide them. The environment in these areas is unique in some respects, and it is therefore desirable to apply different management prescriptions to these areas than those of the surrounding public lands.

This section identifies the various special management areas within the RMPPA and addresses the qualities or uses that have resulted in their designation. The types of special management designation addressed in this section are WSAs, Areas of Critical Environmental Concern (ACEC), SRMAs, NNLs, and WSRs.

3.13.1 Wilderness Study Areas

There are no designated wilderness areas in the RMPPA, but there are five WSAs located within the RMPPA (Map 2-6). These are as follows:

- Adobe Town WSA
- Ferris Mountains WSA
- Encampment River Canyon WSA
- Prospect Mountain WSA
- Bennett Mountains WSA

WSAs are managed to minimize disturbance to and retain or improve their wilderness character. Unless otherwise noted, all information in this section was obtained from the Wyoming Statewide Wilderness Study Report (BLM 1991).

3.13.1.1 Adobe Town WSA

The Adobe Town WSA consists of a single study area within the Rawlins and Rock Springs Field Office administrative boundaries. This WSA includes 34,230 acres of BLM-managed lands within the RMPPA. The WSA is located in southeastern Sweetwater County, 25 miles south of Wamsutter. It is bounded on the north by the checkerboard land pattern and the Manual Gap Road, on the west by the Adobe Town Rim Road, on the south by a fading two-track, and on the east by the Willow Creek Road.

Adobe Town WSA was studied under Section 603 of FLPMA and was included in the Final Adobe Town-Ferris Mountains Wilderness EIS filed in January 1988. Based on information from that document, the BLM Wyoming State Office recommended that 10,920 acres of the original 82,350 be recommended for wilderness designation. The recommended portions include most of the heart of the Washakie Basin, an ancient inland sea. This portion of the WSA is a very colorful and rugged desert badland area, virtually untouched by human activity. Skull Creek Rim, in the heart of the area recommended for wilderness designation, contains some of the most unique and extensive badlands formations in Wyoming.

3.13.1.2 Ferris Mountains WSA

The Ferris Mountains WSA includes 21,880 acres of BLM-managed public lands and one privately owned inholding of 160 acres. The WSA is located in northwestern Carbon County, about 40 miles north of Rawlins. The Ferris Mountains are a small mountain range, rising abruptly from the gently rolling plains that surround the WSA. The WSA is bounded on the north by the rolling plains of the Sweetwater Valley, on the south by the level expanses of Separation Flat, on the west by Muddy Gap, and on the east by Miners Canyon.

The Ferris Mountains WSA is extremely steep and rugged, providing unusual and spectacular scenery. Along the southern flank, a formation of limestone outcrops forms a prominent white band 12 miles long, which is visible for up to 50 miles under proper lighting conditions. At 10,037 feet, Ferris Peak is the highest point in the Great Divide Basin, rising nearly 3,500 feet from the valley floor. Vegetation consists of coniferous trees, aspen, shrubby plants, grasses, and forbs. The WSA also contains grassy meadows and riparian areas.

Ferris Mountains WSA was studied under Section 603 of FLPMA and was included in the Adobe Town-Ferris Mountains Wilderness EIS filed in January 1988. The BLM Wyoming State Office recommended that all 22,245 acres be designated wilderness.

3.13.1.3 Encampment River Canyon WSA

The Encampment River Canyon WSA includes 4,510 acres of BLM-managed lands, with no inholdings or split-estate lands. The WSA is located in southern Carbon County, approximately 2 miles south of Encampment and 1 mile north of the USFS Encampment River Wilderness. It lies in the foothills of the Sierra Madre. The Encampment River bisects the WSA.

The topography of the entire unit is mountainous. Steep canyons and rocky slopes dominate the vistas. The Encampment River and a major tributary, Miner Creek, add scenic features to the WSA. Elevations range from 7,260 feet along the Encampment River to 8,545 feet on the high ridges.

Approximately 10 percent of the Encampment River Canyon WSA is forested. Tree species include limber pine, lodgepole pine, Douglas fir, subalpine fir, cottonwood, and aspen. These species occur in pure and mixed stands scattered throughout the WSA. Narrow belts of deciduous trees, coniferous trees, grasses, and forbs bordering the Encampment River characterize lower elevations and drainages.

Vegetation in the middle and upper elevations and on rocky slopes is influenced by differing aspects of the canyon, with a mosaic of bunchgrass and small shrubs on steep canyon slopes, and small fingers of trees in draws and gullies. Wildland fires have influenced the vegetation mosaic.

The Encampment River Canyon WSA was studied under Section 202 of FLPMA and was included in the Final Great Divide Resource Area Wilderness EIS filed in August 1990. The BLM Wyoming State Office recommended that all 4,467 acres be designated as wilderness.

3.13.1.4 Prospect Mountain WSA

The Prospect Mountain WSA includes 1,150 acres of BLM-managed public lands, with no inholdings or split-estate lands. The WSA is located in southern Carbon County, approximately 16 miles southeast of Encampment and 8 miles north of the Colorado-Wyoming border. It is situated along the southwestern flank of the Snowy Range in the Medicine Bow Mountains.

The topography of the area is mountainous, with open sagebrush transitional zones. The WSA contains the western half of Prospect Mountain. Elevations range from 7,400 feet along the North Platte River to 8,500 feet at its southern tip. The WSA is 70 percent forested, with lodgepole pine and aspen as the major species, and contains riparian areas and beaver ponds.

The Prospect Mountain WSA was studied under Section 202 of FLPMA and included in the Final Great Divide Resource Area Wilderness EIS filed in August 1990. The BLM Wyoming State Office recommended that all 1,145 acres be designated as wilderness because the WSA is located adjacent to the USFS Platte River Wilderness.

3.13.1.5 Bennett Mountains WSA

The Bennett Mountains WSA includes 5,960 acres of BLM-managed public lands, with no inholdings or split-estate lands. The WSA is located in north-central Carbon County, east of Seminoe Dam, and lies about 35 miles northeast of Rawlins. It is part of the Seminoe Mountain range, a small, rugged range that rises abruptly from the surrounding lowlands. The WSA is bounded on the north and east by private and state lands, on the south by a power line road, and on the west by the Bennett Mountain Road.

The Bennett Mountains WSA contains three basic types of topography: mountain plateau/ridges, steep rock ledges, and many tributary draws. Elevations range from 6,600 feet to 7,951 feet. The mountain, which is approximately 4 miles long within the WSA, has distinct ledges and walls along the entire southern exposure. In many places these walls are vertical outcrops that create the appearance of a fortress. The northern portion is traversed by numerous tree-filled drainages. Most portions of the WSA are vegetated with interspersed grasses, sagebrush, and other shrubs, as well as pockets of pine, aspen, and willows. The higher elevations have considerably less vegetation and more rugged features.

The Bennett Mountains WSA was studied under Section 603 of FLPMA and was included in the Final Great Divide Resource Area Wilderness EIS filed in August 1990. BLM's Wyoming State Office recommended that none of the WSA be designated as wilderness. This decision was based on the relative quality of the area's wilderness values. Although the wilderness inventory notes that outstanding opportunities for solitude and primitive recreation exist in the WSA, these values are not found throughout the study area.

3.13.2 Areas of Critical Environmental Concern (ACEC)

ACECs are managed to protect and prevent irreparable damage to specific resources. This section addresses the specific resources found within each of the existing and potential ACECs identified within the RMPPA.

3.13.2.1 Existing Areas of Critical Environmental Concern

Currently there are four ACECs in the RMPPA: Como Bluff ACEC, Sand Hills ACEC, Jep Canyon ACEC, and Shamrock Hills ACEC (Map 2-7). The Jep Canyon, Shamrock Hills, and Como Bluff ACECs are within the checkerboard portion of the RMPPA, which is characterized by public and private ownership of alternating sections of land. This mixed land ownership pattern makes these ACECs difficult to manage, because the owners of private sections may have goals for their lands that are quite different than BLM's goals. The mixed land ownership pattern also makes public access to these resources difficult.

Como Bluff ACEC

Como Bluff ACEC protects 1,550 acres of public land, located in the Morrison Geologic Formation (a fossil-bearing formation), for its paleontological resources and historical values. Over the years excavations have removed a wide array of fossilized material, including fossilized bones of dinosaurs such as Apatosaurus and Diplodocus (Town of Morrison 2002). In addition to the rich collection of paleontological resources, Como Bluff ACEC preserves a portion of the period in American history known as the Bone Wars. Beginning at Como Bluff in the late 1870s, this period was marked by extremely competitive fossil hunting by paleontologists, including stories of espionage and sabotage (BLM 2002b). Como Bluff ACEC is part of the Como Bluff Historic District, also known as the Como Bluff Historic-Paleontologic Site, which is listed on the NRHP (National Register 2002). In addition, the Como Bluff area is an NNL.

Sand Hills ACEC and Proposed JO Ranch Expansion

The Sand Hills ACEC protects about 8,000 acres of public land for its unique vegetation complex, wildlife habitat values, and recreational opportunities. The bitterbrush/big sagebrush plant community, which is interspersed with patches of serviceberry, chokecherry, and aspen and occurs on a deep sand soil, is the only representation of this vegetative mix within the State of Wyoming. This area provides crucial winter range for mule deer and elk, and nesting and foraging habitat for raptors, Greater sage-grouse, and Columbian sharp-tailed grouse populations (Section 3.19).

Recreation in this area is primarily associated with hunting activities. The high amount of vehicle use on these vegetation communities and fragile soils have resulted in a high road density (in some areas reaching 9 miles of road per square mile).

The proposed JO Ranch expansion, which will occur partly in response to the Pittsburg and Midway Coal Mining Company Exchange, will increase the size of the current Sand Hills ACEC to 12,700 acres. BLM will acquire about 1,200 acres along Cow Creek, which includes the historic JO Ranch and the Rawlins-to-Baggs Freight Road. The JO Ranch is a unique example of continuous ranching activities of over 100 years in the Washakie Basin. This property includes a flood irrigation system along the valley bottom, which has resulted in a very high-quality habitat for wildlife. This system will require maintenance and planning to sustain it for the future. The JO Ranch also served as a stage stop along the Rawlins-to-Baggs Freight Road, a historic route that connected northern Colorado with the Union Pacific Railroad line in Rawlins.

The acquisition of the JO Ranch area will include only the surface rights. The mineral rights will be retained by the current owner, which may limit the potential management actions that can be considered for the property.

Jep Canyon ACEC/Jep Canyon Wildlife Habitat Management Area

The Jep Canyon ACEC protects about 13,320 acres of public land for their crucial elk winter range as well as for raptor nesting habitat. There is a Raptor Concentration Area within the boundaries of Jep Canyon ACEC, with a high concentration of raptors including but not limited to red-tailed hawks, Cooper's hawks, golden eagles, and prairie falcons. The high relief topography and wind deposition of snow provide a diversity of vegetation communities, including aspen. Windswept south- and west-facing slopes provide open foraging areas for elk at critical times.

Shamrock Hills ACEC

Shamrock Hills ACEC protects about 17,280 acres of public land for its habitat and productivity of nesting raptor pairs. Shamrock Hills ACEC is recognized as a Raptor Concentration Area, with one of the highest known nesting populations of ferruginous hawks in the United States. These populations are discussed in greater detail in Section 3.19, Wildlife and Fish.

3.13.2.2 Potential Areas of Critical Environmental Concern

Other areas within the RMPPA that were identified as potential ACECs are described below. These include the Red Rim-Daley Area, Upper Muddy Creek Watershed/Grizzly Area, High Savery Dam, Stratton Sagebrush Steppe Research Area, Chain Lakes Area, Laramie Peak Area, Pennock Mountain Wildlife Habitat Management Area, Wick-Beumee Wildlife Habitat Management Area, Laramie Plains Lakes Area, Blowout Penstemon Area, White-Tailed Prairie Dog Area, and Historic Trails. Each area met at least one of the ACEC relevance and importance criteria necessary to be considered a potential ACEC (BLM 2004a).

Red Rim-Daley Area

The Red Rim-Daley Potential ACEC (15,524 acres) is a WGFD Cooperative Wildlife Habitat Management Area and is located approximately 15 miles southwest of Rawlins. The Red Rim area contains both the Daley Ranch allotment and the Daley Ranch Pasture. The area contains scenic values throughout the red sandstone uplift. There are historic carvings in the rocks, with names and dates of people that traveled through the area. The area provides crucial winter range for pronghorn, giving this winter habitat national importance. The area may require additional management to maintain unique scenic and wildlife values.

Upper Muddy Creek Watershed/Grizzly Area

The Upper Muddy Creek Watershed/Grizzly area includes 127,430 acres. The area contains those portions of the Muddy Creek watershed above the Weber headcut stabilization structure, as well as those portions of the Savery Creek watershed within the Grizzly allotment. The Grizzly allotment is currently managed as a wildlife habitat management area in cooperation with WGFD. The area contains unique fish habitats that support a rare community of native Colorado River Basin fish, including Colorado River cutthroat trout, bluehead sucker, flannelmouth sucker, roundtail chub, mountain sucker, and speckled dace. Elk crucial winter range is located within this area. The high relief topography and wind deposition of snow provide a diversity of vegetation communities, including aspen (Section 3.15, Vegetation).

High Savery Dam Area

The High Savery Dam and Reservoir area on the Savery Creek drainage south of Rawlins contains 530 acres of public lands, primarily downstream of the dam site. There is an MOU with the Wyoming Water Development Commission (WWDC) to manage the area to protect the dam, reservoir site, and

wetland/riparian habitat. Mitigation for wetland/riparian areas impacted by dam construction would result in created wetlands on BLM lands. Public access is closed to vehicular traffic; it is restricted to foot access.

Stratton Sagebrush Steppe Research Area

The Stratton Sagebrush Steppe Research Area is 5,500 acres that includes five small watersheds that have been used for research in the past. Currently a portion of the Stratton area is withdrawn from locatable mineral entry. There is existing infrastructure that was put in place for past research objectives. Examples of this infrastructure include weirs for measuring stream flows, snow fences, vegetation plot markers, and precipitation gauge sites. The current management allows for grazing on three pastures within the research area, which is part of the Middlewood Hill allotment.

Chain Lakes Area

The Chain Lakes area contains 30,562 acres of public land and occurs in a checkerboard ownership pattern where approximately 54 percent of the lands are either owned or leased by WGFD, and the remaining 46 percent are federal lands administered by the BLM RMPPA. The area contains migration corridors and seasonal ranges for pronghorn. It also contains a majority of the Chain Lakes, a unique desert alkaline wetland community.

Laramie Peak Area

The Laramie Peak area contains 18,662 acres of public land. The area has crucial winter range habitat for bighorn sheep, elk, and mule deer. There is an existing Habitat Management Plan (HMP) that directs management of the BLM lands in cooperation and coordination with USFS, WGFD, BLM (both the Rawlins and Casper Field Offices), and public interest groups (such as Foundation for North American Wild Sheep [FNAWS]). Granitic rock outcrops, deep drainages, and open meadows characterize the area. Ponderosa pine, Douglas fir, and lodgepole pine, with numerous stands of aspen and mountain shrubs, dominate the vegetative communities. One of the last remaining populations of the hornyhead chub in Wyoming occurs in this area. The area also contains habitat for the threatened Preble's meadow jumping mouse and potential habitat for Laramie columbine, a BLM sensitive species.

Pennock Mountain Wildlife Habitat Management Area

WGFD first established the 9,806-acre Pennock Mountain Elk Winter Range, located east of Saratoga, in 1962. The area contains crucial winter habitat for both elk and mule deer. BLM reserves all grazing preference for wildlife on 6,284 acres of BLM-administered public land, including 1,530 AUMs of forage for wintering elk. This area is closed to human presence and motorized vehicle use, including over-the-snow vehicles, from November 15 through April 30. The area contains mountain big sage, mountain shrub, aspen, cottonwood, and willow habitats.

Wick-Beumee Wildlife Habitat Management Area

WGFD established the Wick Elk Winter Area, located on both sides of I-80 and between the towns of Elk Mountain and Arlington, in 1965. The area contains elk winter/crucial winter range and year-round habitat for wildlife. In conjunction with WGFD's purchase of the Wick Brothers Ranch, an MOU between BLM and WGFD was developed that reserves grazing use on the 286 acres of BLM-administered public land for the use of elk and other wildlife. The terrain ranges from rugged foothills on the south to gently rolling plains on the north. Vegetative communities consist of sagebrush, mountain shrub, and aspen. The area is closed to human presence and motorized vehicle use, including over-the-snow vehicles, from November 16 through May 31.

Laramie Plains Lakes Area

The Laramie Plains Lakes area is located southwest of Laramie and contains Lake Hattie and Twin Buttes Reservoir as well as 1,291 acres of public land. The area has potential habitat for the endangered Wyoming toad, which is currently found in Mortenson Lake and Moeboer Lake, both located within close proximity. Although this area contains only potential habitat, it is highly possible that the toads can travel through the wetland corridors to Lake Hattie and Twin Buttes Reservoir. Recreationists heavily use this area. Shortgrass species dominate upland areas, whereas wetland areas consist of a combination of emergent aquatic vegetation and bare bank areas.

Blowout Penstemon Area

The Blowout Penstemon area contains 4,120 acres of potential habitat for the endangered blowout penstemon. This area encompasses unique sand dunes that contain steep sandy slopes deposited at the base of granite or sedimentary mountains. The Blowout Penstemon plant is restricted to sparsely vegetated, early successional shifting sand dunes created by wind erosion. Although some believe the plant is native to Nebraska, historical records show the plant may have been collected during the Hayden expedition in 1877 as it traveled from Casper to Rawlins through Sandy Creek pass and the Seminole Hills (now called the Ferris Mountains) (Fertig 2001).

White-Tailed Prairie Dog Area

The white-tailed prairie dog complexes that have been identified within the RMPPA contain eight different colonies and their associated habitat. These complexes, indicated on Map 2-8, include the following areas: Sweetwater, Dad, Shamrock Hills, Pathfinder, Bolton Ranch, Seminoe, Saratoga, and the Shirley Basin-Medicine Bow area.

The white-tailed prairie dog and their complexes are an important element in the sagebrush-steppe ecosystem. The white-tailed prairie dog primarily inhabits open, rolling grassy plains but can also be found in slightly brushy country and in areas with scattered juniper and pinyon pine. The species has been identified as being a "keystone" species, which is defined as a species on which numerous other species rely as an important component in their life history. At least nine species depend directly on prairie dogs or their activities to some extent, and another 137 species are associated opportunistically. Some of these species and the critical components provided to them by prairie dogs include Black-footed ferrets (a federally listed species), who rely on prairie dogs as their primary food source and use their burrows for denning; swift fox (another listed species), who rely on prairie dogs as a component of their food sources; burrowing owls, who rely on abandoned prairie dog burrows for nesting (CNE et al., 2003).

Prairie dogs create habitat for themselves and other species by modifying vegetative communities. They create preferential grazing opportunities for herbivores, including livestock, who in turn create opportunities via grazing for the expansion of prairie dog colonies at their perimeters.

Prairie dogs were once numerous on the prairies but have been reduced to a few complexes through poisoning operations (Burt et al., 1980).

Historic Trails (Overland, Cherokee, Rawlins-to-Baggs, and Rawlins-to-Fort Washakie)

Historic transportation routes (i.e., trails, roads, and railroads) command a great amount of management attention because of their overall historic importance in western settlement and expansion and their presence over long distances within the RMPPA. Some of these properties are encountered on a frequent basis during cultural resource inventories. The general locations of selected NRHP-eligible linear properties across the RMPPA are shown on Map 2-46.

The Overland Trail

The Overland Trail crosses the southern portion of the RMPPA from east to west. The trail was the principal mail and stage route west from 1862 to 1868, and its use continued thereafter as an emigrant road. Only three of the stage stations built along the trail exist on currently administered public lands: the Midway, Sage Creek, and Washakie stations. The Washakie station is listed on the NRHP and still retains some of its original structure. Today, evidence of the Overland Trail remains in the form of ruts and swales, as well as associated artifacts.

The Cherokee Trail

The Cherokee trail crosses the southern portion of the RMPPA from east to west. Groups en route from Oklahoma to the California gold fields pioneered the Cherokee Trail in 1849. Two main routes of the trail occur in the RMPPA, as subsequent groups in 1849 and 1850 forged different paths. Portions of the northernmost route were used later as part of the Overland Trail. Some of the Cherokee Trail routes eventually were used to some degree as freight and stage roads. Today evidence of the Cherokee Trail is scarce, but it can be found in the form of ruts and swales.

The Rawlins-to-Baggs Freight Road

The Rawlins-to-Baggs freight road was a 19th century road connecting Rawlins and the town of Baggs to the southwest and continuing on to the White River Ute Indian Agency at Meeker, Colorado. Originally the route was used for freight, but mail and passenger services were added as the region became more populated. The military used the road to transport troops and supplies from Fort Steele to Meeker during a massacre in 1879. The Rawlins-to-Baggs freight road parallels the 20-mile road out of Rawlins. Portions of the road are in excellent condition, with deep swales and ruts present.

The Rawlins-to-Fort Washakie Freight Road

The Rawlins-to-Fort Washakie Freight Road was created by the military after the establishment of Camp Auger at present-day Lander. The military used the route from Rawlins north, as Rawlins was the closest rail and supply point for Camp Auger. Later the route was extended north to Fort Washakie, after the Indian Agency was established there. In 1885, a tri-weekly stage was established between Rawlins and Lander, which used the Rawlins-to-Fort Washakie Trail until 1906, when the Chicago and Northwestern Railroad reached Lander and the Wind River Valley.

3.13.3 Special Recreation Management Areas

SRMAs are managed for significant or unique recreational resources. Currently there are three such areas within the RMPPA: the Continental Divide National Scenic Trail SRMA, the North Platte River SRMA, and the Shirley Mountain Caves SRMA (Map 2-14). Table 3-32 summarizes RMIS data for these areas over the past 3 fiscal years (FY01, FY02, FY03). In addition to these data, each area is summarized briefly below.

Table 3-32. Recreational Management System Information for Special Management Areas Within the RMPPA

Activity	Number of Recorded Participants and Visitor Days[1] October 1, 2000–September 30, 2003					
	Continental Divide National Scenic Trail SRMA		North Platte River SRMA		Shirley Mountain Caves SRMA	
	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days	Number of Participants	# Visitor Days
Backpacking	106	1,421	NA	NA	NA	NA
Bicycling—Mountain	17	8	NA	NA	NA	NA
Camping	80	105	6,472	14,102	603	2,411
Canoeing/Kayaking	NA	NA	195	129	NA	NA
Fishing	NA	NA	50,828	18,295	NA	NA
Hiking/Walking/Running	NA	NA	5,149	1,687	NA	NA
Hunting—Big Game	16	11	4,025	6,089	6,028	12,054
Hunting—Waterfowl	NA	NA	1,662	1,107	NA	NA
Nature Study	NA	NA	889	74	NA	NA
OHV—Cars/Trucks/SUVs	41	27	1,059	89	10,849	5,454
Picnicking	80	6	14,391	1,200	1,205	51
Row/Float/Raft	NA	NA	19,509	6,544	NA	NA
Viewing—Wildlife	NA	NA	38,259	5,266	10,849	1,808

Source: BLM Recreation Management Information System, BLM RMPPA.
1 Some activities listed occur within the SRMAs but are not recorded.

3.13.3.1 Continental Divide National Scenic Trail SRMA

The currently designated portions of the Continental Divide National Scenic Trail (CDNST) SRMA cover about 82 miles of trail, primarily on BLM-managed land (in addition to some state land) in the RMPPA. Its key uses include camping, hiking, and driving. Within the RMPPA, the CDNST experience is typical high desert, with frequent high winds and scarce water, sagebrush, and two-tracks through open country. The exact trail route has not yet been fully identified.

3.13.3.2 North Platte River SRMA

By far, the North Platte River SRMA receives the heaviest use of the three SRMAs in the RMPPA. It is a 5,200-acre SRMA that follows the North Platte River from Seminoe Reservoir to the Prospect Creek access at the southernmost BLM riverfront lands. Water-related recreational activities draw large numbers of participants to the area. During the past 3 fiscal years, the largest number of SRMA participants (over 50,000) fished the river, and over 38,000 participants viewed wildlife. Other important activities within this SRMA include row/float/raft activities and camping. Picnicking and day-use activities were also enjoyed frequently.

3.13.3.3 Shirley Mountain Caves SRMA

The Shirley Mountain Caves SRMA contains 24,800 acres of public land. Cave Creek Cave is located within the SRMA area and contains a hibernaculum for several bat species, including those on the BLM sensitive species list. Cave Creek flows through the cave and provides unique humidity and temperature conditions that support hibernating and breeding bats.

The SRMA receives its heaviest visitation during deer and elk hunting season. Prior Flat Campground is used heavily during hunting season; much less frequently during the rest of the year. Dispersed camping on Shirley Mountain is popular with those campers who prefer solitude and a greater sense of self-sufficiency. Undeveloped areas, such as First Ranch Creek, the old fire camp, and Airplane Park are popular for dispersed hunting camps.

3.13.3.4 Rawlins OHV Area

The Rawlins OHV area contains 480 acres and is located at Hogback Lake (a playa) south of Rawlins. It is not near any residential areas. The area is located in a closed basin, with public access from Twenty Mile Road, an existing county road. The area provides BLM with a forum for education about safe and ethical OHV use, while providing the public with a safe area to develop riding skills and recreate.

3.13.4 National Natural Landmarks (NNL) Management

NNLs include Big Hollow, which contains 640 acres of public land; Sand Creek, which contains 160 acres of public land; and Como Bluff, which contains 1,760 acres of public land.

Big Hollow, which was designated an NNL in 1980, is characterized by a large depression or deflation basin formed by wind erosion. This NNL on the high plains west of Laramie contains 640 acres of public land, to which legal access does not exist.

The significance of the Big Hollow NNL lies in the great size of the deflation basin and the Aeolian processes through which it was formed. The deflation basin is considered the largest topographic feature of its kind in the continental United States. The integrity of the surface of those portions of the deflation basin that have not been disturbed enhances the naturalness of the landmark.

The Sand Creek NNL was designated in 1984, primarily for its scenic values and for the scientific values of its geologic features. It is about 20 miles southwest of Laramie and contains 160 acres of public land to which legal access does not exist. Land use within this area is predominately livestock grazing.

The geologic features at Sand Creek include pillars and monuments of cross-bedded sandstone. Chimney (Camel) Rock is more than 200 feet high. To the west of these features, a sandstone escarpment rises as much as 300 feet above the surrounding terrain. The red and white coloring of the wind- and water-sculpted features adds to the scenic beauty of this natural landmark.

A description of the Como Bluff NNL is provided above within the ACEC section.

3.13.5 Wild and Scenic Rivers

3.13.5.1 Encampment River Potential Wild and Scenic River

There are currently no designated Wild and Scenic Rivers (WSR) in the RMPPA. The portion of the Encampment River within the WSA is the only segment within the RMPPA that has been identified as eligible and suitable for Wild and Scenic River designation, which requires congressional approval. Designation of the WSR would ensure continued protection of the outstandingly remarkable character of the river corridor for future generations.

3.13.6 Other Management Areas

3.13.6.1 Rawlins-to-Baggs Geographical Area

The Rawlins-to-Baggs area is bounded on the north by Interstate 80, on the east by State Highway 71 and Carbon County Road 401, on the south by State Highway 70, and on the west by State Highway 789. This area contains unique and valuable vegetation and wildlife resources that require special management emphasis. The natural resources within the area draw a high number of dispersed recreationists. Mineral development in this area has high potential, and if this development were to take place, it is likely that the values of this area would be compromised.

The Rawlins-to-Baggs area has a combination of diverse upland habitat conditions intertwined with perennial and ephemeral stream systems and riparian habitat, which combine to support a higher-than-normal wildlife species richness. The most important factor of the area is the mosaic mix of these wildlife communities in close proximity to one another based upon the diversity of topography, soils, and climate. Vegetation communities within this area include aspen, six types of sagebrush, juniper, mountain shrub, saline desert shrub, and riparian/wetland communities.

South-central Wyoming is a unique area within the contiguous United States and contains vast tracts of undisturbed wildlife habitat. There is an abundance and richness of wildlife that includes big game, raptors, Greater sage-grouse and Columbian sharp-tailed grouse, Neotropical birds, Colorado River cutthroat trout, and BLM sensitive warm water fish species. This diversity is also observed in the proximity of seasonal ranges to crucial winter ranges; the overlapping winter ranges of several big game species; and important birthing areas for antelope, mule deer, and elk. Raptor species include a wide variety of hawks, eagles, and owls, as well as healthy populations of two BLM state sensitive species—ferruginous hawks and burrowing owls. This area is the only place in Wyoming where Columbian sharp-tailed grouse occur, and their range is expanding northward. There are few locations elsewhere in Wyoming that support a higher density of Greater sage-grouse.

The upper Muddy Creek drainage bisects the middle of this region, and it once supported Colorado River cutthroat trout in the days when Jim Bridger first explored routes for the settlers that followed. The Colorado River cutthroat trout were recently reintroduced into the upper watershed and will soon expand to much of their former habitat. This species, as well as three nongame warm water fish species, may benefit sufficiently to preclude the need to list these species for additional protection under the *Endangered Species Act* (ESA).

The plant and wildlife values of this area are reflected in several smaller portions being proposed as special management areas, including the proposed Upper Muddy Creek Watershed/Grizzly Potential ACEC, Red Rim-Daley Potential ACEC, Jep Canyon ACEC (elk and raptors), and the Sand Hills ACEC (mule deer). However, piecemeal protection of the higher value areas will not adequately protect all the wildlife species that use and depend on this area.

The Rawlins-to-Baggs area is a popular dispersed recreation destination, particularly for hunters because here they can hunt multiple big game species. There is a sufficient road network for recreational access, and the scenic quality of the area is not impaired by an abundance of permanent facilities.

The Continental Divide National Scenic Trail passes through this area. Visitation to the trail is gradually increasing.

Cultural values in this area include the Overland and Cherokee historic trails, the Rawlins-to- Baggs freight road, the historic JO Ranch, and numerous other significant cultural properties. The historic trails and roads are important reminders of settlement in this area.

The Rawlins-to-Baggs area also includes the Historic Trails Potential ACEC, High Savery Dam Potential ACEC, and the Continental Divide National Scenic Trail SRMA.

3.14 Transportation and Access

Transportation activity within the RMPPA is associated with a variety of resource uses, including mineral extraction, livestock grazing, and recreation. The level of access to these resources can affect their potential levels of use. This section addresses the current roadway network, access issues, and trends associated with the RMPPA transportation system.

3.14.1 Roadway Network

The RMPPA roadway network includes a spectrum of roads for varying purposes. Map 1-4 shows the interstate transportation network, U.S. and state highways, and county roads. There are two interstate highways through the RMPPA: I-25, which runs north-south through Cheyenne and Wheatland in the far eastern part of the area; and I-80, running westward from Nebraska to generally bisect the RMPPA. For the most part, U.S. highways are co-located on interstate highways, with U.S. 87 following I-25 and U.S. 30 following I-80. An important exception is the divergence of U.S. 30 from I-80 between Laramie and Walcott, where it is co-located with U.S. 287. This route is less subject to the blizzard conditions that sometime occur in this segment of I-80. As would be expected on the basis of population, state highways are much more numerous in the portion of the RMPPA east of Rawlins. West of Rawlins, State Highway 789 is the only state highway, and other routes are typically unpaved.

Not shown on Map 1-4 are numerous smaller roads laced through the RMPPA, which connect more remote locations within the RMPPA to the larger collector roads. These roads are used for recreational purposes as well as for access for developing and maintaining oil and gas wells, and for range management improvements. Most of these roads are not paved; they are of dirt, gravel, or sand. These

roads include those that are maintained by BLM, by counties, and by private corporations. The larger collector roads shown on Map 1-4 are not maintained by BLM.

3.14.1.1 Access

The checkerboard land ownership pattern and other non-BLM-managed inholdings create problems for accessing land and resources administered by BLM. Some easements exist to allow access across private lands to public lands, but there are several locations where public access to public land is not available due to the lack of such easements or contiguous BLM-managed public land. For example, access to the Overland Trail is hampered because of noncontiguous BLM-managed land. In addition, public access to streams and reservoirs is often restricted by the absence of lands with legal public access adjacent to the water.

3.14.1.2 Transportation Trends

Energy- and recreational-related vehicular traffic on the public lands is increasing. This is due to further energy development and recreational use by the general public. With the greater use and demand on the existing transportation network, additional legal access would be required to provide for and enhance travel to and from the public lands.

3.15 VEGETATION

Vegetation resources within the RMPPA are diverse and in some areas unique. The precipitation, elevation, and temperature extremes, combined with soil and geology variability, create a variety of vegetation habitat types. The eastern areas of the RMPPA, located in Wyoming's southeast corner, are within the vast North American prairies, where mixed-grass communities dominate. The desert areas provide habitat for a variety of hearty plants tolerant of low precipitation, temperature extremes, and saline soils. Alpine areas on Elk Mountain and the Seminoe and Ferris mountains support plants adapted to very low temperatures, an extremely short growing season, and high snow accumulation. The RMPPA supports a variety of vegetation types, each of which is susceptible to fire occurrence as a result of fuel loading or as a natural condition of the environment.

Vegetation treatments in the RMPPA operate under the protocols set forth in the Vegetation Treatment on BLM Lands in Thirteen Western States Final Environmental Impact Statement and Record of Decision (BLM 1991b). Vegetation treatments include fuels reduction, vegetation health, and weed control projects, with separate annual treatment acreages for each.

This discussion focuses on vegetation distribution and vegetation types at three levels. The top level divides the RMPPA into three vegetation provinces. These were taken from Bailey (1995), who describes the ecoregions of the United States. The middle level uses vegetation map zones aggregated from Geographical Analysis Program (GAP) satellite imagery interpretation. The map zones allow quantitative measurements of broad vegetation types. The lowest level describes the individual plant communities, defined by the soil, climate, and vegetation characteristics. Each level may be used as a management tool depending on the specific issues and level of detail required. Wetland, riparian, and upland plant species commonly found in the RMPPA are presented in Appendix 28.

3.15.1 Ecological Provinces

Bailey's (1995) description of North American ecoregions places the RMPPA in three different vegetation provinces. These include the Intermountain Semi-Desert Province (342), Great Plains Dry

Steppe Province (331), and Southern Rocky Mountain Steppe-Open Woodland—Coniferous Forest Province (M331). The following subsections provide an overview of each of these vegetation provinces.

3.15.1.1 Intermountain Semi-Desert Province (342)

The Intermountain Semi-Desert Province is contained within the intermountain basins of Wyoming and northern Colorado. The chief vegetation type, sagebrush steppe, is made up of sagebrush, saltbush, and a mixture of grasses and forbs. Willows, rushes, and sedges dominate the wetter valley bottoms, while greasewood and inland saltgrass dominate drier streams and ephemeral washes (Bailey 1995; Knight 1994). The higher elevations may contain pockets of aspen in the wetter areas and juniper/limber pine stands in the drier areas.

This area is sometimes considered a cold desert, as the summers are hot and the winters can be extremely cold. The growing season is short (Rawlins has a frost-free period of 106 days), and the annual precipitation varies between 5 and 14 inches. Annual snowfall averages between 20 and 60 inches (Martner 1986). Winter snow accumulation and runoff provide available moisture for spring plant growth. Snow distribution patterns caused by wind, topography, and existing vegetation, develop pockets of highly productive sites within the drier, less productive surrounding areas.

This area lays predominantly in the western and central regions of the RMPPA, at elevations below 8,000 feet. Forest and alpine areas dissect this vegetation province, therefore these areas provide winter habitat for many wildlife species. Livestock and wildlife grazing are the primary uses of the area.

3.15.1.2 Great Plains Dry Steppe Province (331)

Mixed- and shortgrass prairies east of the central Rocky Mountains dominate the Great Plains Dry Steppe Province. Typical grasses in these areas include buffalo grass, grama grasses, wheatgrasses, and needle grasses. Deeper soils in wetter areas may grow taller grasses, such as Indian grass and little bluestem. Scattered shrub colonies may dot the landscape with big sagebrush, sand sagebrush, and rabbitbrush. Wet riparian areas provide habitat for cottonwood, sumac, willow, and alder (Bailey 1995; Knight 1994).

This area lies in the rain shadow of the Rocky Mountains. Winters are cold and dry, and summers are warm, with frequent thunderstorms (Martner 1986; Bailey 1995). Cheyenne has a moderate growing season of 138 days, but Laramie, 40 miles west, has a much shorter growing season of only 93 days. The annual precipitation of the area is between 10 inches in the far west and 16 inches east of Cheyenne. The average annual snowfall is between 60 and 80 inches (Martner 1986).

Within the RMPPA, the Great Plains Dry Steppe Province dominates the ecology of the Laramie Basin and the prairie east of the Laramie Range to Nebraska. The Laramie Basin varies in elevation between 7,000 and 7,500 feet, whereas the elevation of the far southeast portion of the RMPPA ranges between 5,500 and 7,000 feet. Most of this area is privately owned and is used for grazing of livestock, irrigated cropland, or dryland farming.

3.15.1.3 Southern Rocky Mountain Steppe—Open Woodland—Coniferous Forest Province (M331)

The Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest Province is a transition from grass- and shrub-dominated areas to shrub- and tree-dominated areas. Brome and fescue grasses, mountain mahogany, sagebrush, aspen, and juniper dominate the 8,000-to-9,000-foot elevations. The middle elevations of pine and spruce forest lie between 8,500 and 12,000 feet. Alpine tundra occurs only in the RMPPA area above 10,000 feet and is dominated by short grasses and cushion-type forbs, as well

as by krummholz patches of spruce and fir. Riparian vegetation also varies according to elevation, however willows and water-tolerant grasses, sedges, and rushes often dominate from the foothills to the alpine (Bailey 1995; Knight 1994).

The climate of these areas is very variable and dynamic as a result of factors such as elevation, aspect, slope, and topographical change. Eastern and southern slopes are generally drier and warmer than are western and northern slopes. As the elevation rises, the mean temperature lowers and the growing season shortens. (Fox Park, at 9,065 feet, has a frost-free period of only 21 days.) Annual precipitation generally increases from 14 inches in the foothills to over 60 inches in the alpine area. Winter mountain snowpack may reach over 200 inches per year and provides a reservoir for lower-elevation water users (Martner 1986; Knight 1994).

Mountain ranges dominated by the Southern Rocky Mountain Steppe—Open Woodland—Coniferous Forest Province are well distributed throughout the RMPPA. They include the Snowy Range, the Sierra Madre, the Laramie Range, the Shirley Mountains, the Freeze Out Mountains, the Seminoe Mountains, and the Ferris Mountains. These areas provide summer forage for wildlife and livestock as well as important habitat for many nongame mammals, birds, and fish. Higher elevation provides areas of increased diversity and productivity within large areas of lower precipitation and often harsher environments.

3.15.2 General Vegetation Map Zones

The general vegetation zones illustrated in Map 3-10 represent combinations of plant community classes taken directly from the GAP satellite imagery analysis (Table 3-33). The classes combined for each zone, the zone's total area, dominant vegetation, and a description of the area where the vegetation occurs are also provided in Table 3-33. Note that the acreages indicated represent total area within the RMPPA, some of which is owned by private, state, or other Federal entities.

Table 3-33. RMPPA Vegetation Zones Mapped from Plant Community Classes Developed from GAP Satellite Imagery, Including Zone Total Area and Description

Vegetation Types and Map Zones	GAP Plant Community Classes	Description
Agriculture/Town (1,055,429 acres) Areas modified for crop-growing, intensive agriculture, municipal and industrial uses	Human settlement type	
	Irrigated crop type	
	Dryland crop type	
	Forest-dominated riparian	
	Mining operation type	Primarily hayfields with linear cottonwood stands
Barren Communities (255,251 acres) Unproductive lands—either exposed rock, badlands, or playas	Open water	Large, deep lakes and reservoirs
	Alpine exposed type	
	Basin exposed rock/soil type	Including badland shale interspersed with sand dunes
	Unvegetated playa type	
Forest and Woodland Communities		
Broadleaf Communities (220,355 acres)	Aspen forest type	Aspen-dominated foothills and desert ridges

Vegetation Types and Map Zones	GAP Plant Community Classes	Description
Conifer Communities		
Juniper Woodland (78,999 acres)	Juniper woodland type	Juniper-dominated foothills and desert mesas, especially on rocky escarpments
Other Conifer (1,198,762 acres) Forests dominated by pine, fir, and spruce; mid-to-upper-mountain elevations	Limber pine woodland and scrub type	Shrub understory
	Lodgepole pine intact type	
	Ponderosa pine intact type	
	Spruce-fir intact type*	
	Subalpine meadow type*	
	Douglas fir type*	
	Logged conifer type*	
Grassland Communities (2,656,896 acres) Grass dominated prairie	Shortgrass prairie type	Including desert grassland
	Mixed-grass prairie type	
Shrub Communities		
Greasewood (478,440 acres)	Greasewood fans and flats type	Greasewood-dominated desert
Mountain Shrub (733,199 acres) Mountain mahogany or other shrub-dominated foothills region	Bitterbrush shrub steppe	
	Mesic upland shrub steppe	Serviceberry, chokecherry
	Xeric upland shrub steppe	Mountain mahogany
Sagebrush (4,194,383 acres)** Communities frequently dominated by big sage in the desert to mountain foothills	Black sagebrush	Wyoming big sagebrush type
	Mountain sagebrush	Basin big sagebrush
	Wyoming sagebrush	Mountain big sagebrush/grassland
		Silver-sagebrush/grasslands
		Alkali sagebrush
		Birdsfoot sagebrush
		Wyoming three tip sagebrush
Saltbush (634,776 acres) Saltbush-dominated plant communities of the saline desert	Desert shrub	Hopsage and shadscale
	Saltbush fans and flats type	
Sand (63,307 acres) Sand dune areas with plant communities of grasses and small shrubs	Active sand dune type	
	Sand dune complex type	
Wetland and Riparian Areas (87,445 acres)	Graminoid/forb-dominated wetland type	
	Graminoid/forb-dominated riparian type	

Vegetation Types and Map Zones	GAP Plant Community Classes	Description
	Riparian shrub	

* *These coniferous types occur within the RMPPA, but primarily on USDA Forest Service ground.*

** *The GAP plant community classes and the descriptions associated with the sagebrush zone are not associated. The species of sagebrush actually found cannot readily be partitioned among the GAP classes.*

Distinct plant communities within the RMPPA are influenced by characteristics such as soil depth, texture, and salt content; climate variables, particularly temperature, total and seasonal distribution of precipitation, and wind; and topographic features, most importantly elevation, aspect, and slope. Plant communities respond to other environmental influences, such as wildlife foraging, rodent burrowing, and ant hills.

Plants themselves also influence soil chemistry and soil resistance to wind and water erosion. The following plant community overviews explain the diverse and complex nature of vegetation communities in the RMPPA.

3.15.2.1 Agriculture/Town

This highly modified vegetation zone is mapped within the RMPPA. It includes areas that are settled, farmed with or without irrigation, or mined. It also includes areas mapped by GAP as forest-dominated riparian that in reality are primarily hayfields with only linear cottonwood stands remaining. With the exception of mined areas, little or none of this vegetation zone occurs on land managed by BLM.

3.15.2.2 Barren

The barren vegetation zone occurs in diverse locations, all of which are inhospitable to vegetation. These locations range from exposed areas on mountaintops, to rocky areas in basins, to basin soils that do not support plants for various reasons, often because they are highly saline. This zone also includes areas mapped as open water that are primarily large deep reservoirs not supporting plant life.

3.15.2.3 Forest and Woodland Communities

Broadleaf Communities—Aspen

Quaking aspen communities in the RMPPA occupy the transitional zones between the sagebrush-dominated communities and the coniferous forests. Aspen are also present along streams, in draws, or on the leeward areas of hills and ridges where snow collects. Aspen colonies typically reproduce asexually, producing clones in which separate trees are connected by root suckers. Therefore several acres of aspen may be interconnected through their roots (Barns 1966). The soils of these areas are usually well-developed deep loam and sandy loam soils with good drainage and high organic matter.

Acting as snow traps, aspen stands are able to support higher productivity and more diverse herbaceous plants than are the adjacent coniferous or sagebrush communities. Aspen stands also provide protective cover essential to mountain watersheds. Understory plants commonly include mountain brome, lupine, columbine, Indian paintbrush, elk sedge, Columbia needlegrass, Kentucky bluegrass, wildrye, licorice-root, elkweed, bedstraw, yarrow, bluebells, yampah, fairy bells, arnica, snowberry, serviceberry, Oregon grape, wood rose, Scouler's willow, and common juniper.

Aspen respond well to fire, and fires typically stimulate repressed colonies to increase root sucker regeneration. This may diversify the age structure of the stand and increase herbaceous production. The occurrence of spring and fall fires has produced the best results.

Wildlife depend on aspen in the fall, winter, and spring for both cover and forage. The open cover of aspen stands provides mule deer fawning areas and elk calving areas. High forb and grass production as well as shade draw wildlife and cattle into these areas during summer grazing seasons. Birds use these areas for important nesting sites, and other nongame species also rely on this habitat. Lower-elevation aspen stands at edges of sagebrush are important areas of wildlife biodiversity for many small birds, raptors, and owls. A diversity of age classes and stand densities are important in maintaining diverse wildlife communities supported by aspen.

River bottom cottonwood forests occur along the North Platte River bottom and are dominated by plains cottonwood and narrowleaf cottonwood. The vegetation type is very similar to riparian woodlands, however these areas are drier and usually have a natural understory dominated by upland grasses and forbs in areas where agriculture is absent.

3.15.2.4 Conifer Communities

Juniper

Juniper woodlands in the Colorado River watershed area often have Utah juniper as the single tree species. These sites occur on rocky, fractured bedrock areas at elevations between 5,700 and 7,500 feet, with annual precipitation between 10 and 15 inches. In other areas, on foot-slopes adjacent to conifer forests, Rocky Mountain juniper occurs in association with limber pine. These sites may occur in association with basin and mountain big sagebrush steppe in shallow, poorly developed soils at elevations between 7,500 and 8,500 feet. Annual precipitation in these areas is between 16 and 20 inches. Both types of juniper woodlands have understory vegetation which may include bluebunch wheatgrass, needle-and-thread, slender wheatgrass, Idaho fescue, Wyoming big sagebrush, mountain big sagebrush, snowberry, mountain mahogany, bitterbrush, and common juniper.

Juniper-dominated communities often become decadent because the dominant species pumps most of the soil water into the atmosphere, resulting in a monoculture of juniper. At this point prescribed fire in these areas does not result in an effective burn, because the fine fuels on the ground do not carry the fire into the trees. However, when these communities do eventually burn, they may sustain dangerous high-intensity wildland fire during high winds in the hot season. After juniper woodlands burn, production of herbaceous vegetation responds very well.

Limber Pine Woodland

Limber pine is the dominant tree on rocky escarpments surrounded by more productive grasslands (Knight 1994). It may also occur as a subdominant tree in juniper woodland, as mentioned above. Limber pine-dominated areas are normally associated with Idaho fescue, bluebunch wheatgrass, globemallow, phlox, sand sage, fringed sage, snowberry, and mountain big sagebrush.

Lodgepole Pine Forest

The most common tree in the mountains of northern Colorado, Wyoming, and much of the Northern Rockies is lodgepole pine. These forests occur in the middle elevations of the area mountain ranges, between 8,000 and 10,000 feet (Knight 1994). Lodgepole pine is considered a pioneer species, as it returns rather quickly following fire and does not regenerate well in a continuously shaded environment.

These trees also produce serotinous cones, which are more likely to release their seeds and germinate following intense heat.

The lodgepole pine forest canopy does not allow for a very diverse understory plant community. Plants that occur here are pine reedgrass, Wheeler bluegrass, heartleaf arnica, bedstraw, wortleberry, common juniper, wood rose, wax currant, and russet buffalo berry. Lodgepole pine will grow in mixed stands of aspen, Engleman spruce, subalpine fir, Douglas fir, and Ponderosa pine (Knight 1994).

Lodgepole pine forests are present in many mountain areas of the RMPPA and are managed for wildlife habitat, watershed maintenance, and timber production. A detailed discussion of the management of these areas is included in Section 3.5, Forest Resources.

Ponderosa Pine Forest

Ponderosa pine occurs at lower elevations on the eastern slopes of mountains, where summer precipitation levels may be higher and the growing season is longer and warmer. The most notable stands of ponderosa pine in the RMPPA are on the eastern slopes of the Laramie Range, Shirley Mountains, and Seminoe Mountains. Ponderosa pine forests are often open woodlands and support a mixed-grass or shortgrass understory.

Scattered Upper-Elevation Species

Scattered in the upper elevations of the RMPPA on north-facing slopes and in cold air drainages are individuals of species often found at elevations higher than typically characterize the RMPPA. These include spruces, firs, and Douglas fir. Logged conifers and subalpine meadows are also mapped in this vegetation zone. Most stands of these species occur on U.S. Department of Agriculture (USDA) Forest Service lands.

3.15.2.5 Grassland

Three grassland types occur in the RMPPA: mixed-grass prairie, shortgrass prairie, and a shortgrass prairie variant sometimes called desert grassland. These grasslands are characterized below.

Mixed-Grass Prairie

Because of the altitude and prevalence of sandy soils, the Laramie Basin is an isolated pocket of mixed-grass prairie. Summers in this area are cool, which reduces evapotranspiration. Frequent thunderstorms in July and August maintain this grassland, a situation also found in higher precipitation zones to the north and east. Mixed-grass prairie is characterized by needle-and-thread, western wheatgrass, blue grama, Sandberg bluegrass, threadleaf sedge, needleleaf sedge, prairie junegrass, Indian ricegrass, prickly pear cactus, globemallow, fringed sagebrush, and various species of milkvetch and locoweed. This area is predominantly used for livestock and wildlife grazing.

Shortgrass Prairie

The shortgrass prairie occurs in the southeastern corner of the RMPPA and is characterized by buffalo grass and blue grama. Other associated species include hairy grama, western wheatgrass, side-oats grama, yucca, and prickly pear cactus (Barker and Whitman 1994). This area lies in the 12- to 20-inch annual precipitation zone in the rain shadow of the Rocky Mountains. Soils are sandy loams, loams, and clay loams. Most of the area is used for livestock grazing, and very little is managed by BLM. To the west, this vegetation type is replaced by the ponderosa pine and lodgepole pine forests of the Laramie Range.

Desert Grassland

On sandier soils and dunes, where water is more available and the shifting dunes are restricted by shrub establishment, desert grasslands commonly occur as a variant of shortgrass prairie. Common grass species include thickspike wheatgrass, slender wheatgrass, bluebunch wheatgrass, Indian ricegrass, needle-and-thread, Sandberg bluegrass, threadleaf sedge, and sand dropseed. Other shrubs and forbs growing among the grasses are sand sagewort, phlox, Hooker sandwort, bud sagebrush, fringed sagebrush, Wyoming big sagebrush, rubber rabbitbrush, horsebrush, and prickly pear cactus (Knight 1994).

Saltgrass meadows occur in shallow depressions or adjacent to playa lakes where groundwater is near the desert surface. These areas are characterized by inland saltgrass, alkaligrass, alkali sacaton, and, in wetter areas, alkali cordgrass (Knight 1994). Desert grasslands provide palatable forage and often provide islands of diversity within the desert shrublands.

3.15.2.6 Shrub Communities

Shrublands dominate the majority of lands administered by BLM in the RMPPA. These areas are very diverse; therefore several shrub community types are discussed in this section.

Greasewood

Greasewood-dominated shrublands occur on the fringes of playas, desert lakes, ponds, and desert streams. Greasewood is a halophyte that does well in very saline soils, however it needs more soil moisture to survive than does saltbush.

Where greasewood is the dominant shrub, subdominant shrubs include shadscale, Gardner saltbush, alkali sagebrush, and basin big sagebrush. The understory is limited to salt-tolerant herbaceous vegetation such as inland saltgrass, western wheatgrass, alkali sacaton, bottlebrush squirreltail, Sandberg bluegrass, biscuit root, pepperweed, and sea blight.

Large expanses of this vegetation type occur in the Great Divide Basin. Greasewood shrublands often occur on the terraces above wetter areas, where silver sagebrush or basin big sagebrush dominate (Knight 1994). Greasewood communities are often found adjacent to saltbush-dominated communities, growing in deeper, sandier soils and alluvial fans. Although greasewood is not considered a very palatable forage, pronghorn and sheep will eat the spiny twigs and leaves in the spring and early summer, and cattle use this species in summer and fall as a source of salt.

Mountain Shrub

Bitterbrush Shrub Steppe

Bitterbrush-dominated plant communities exist on sand, sandy and sandy loam soils in the 10- to 14-inch annual precipitation zones. Bitterbrush varies in height depending on soil depth, precipitation, and browsing. It may appear as a low spreading shrub about 6 inches tall, or as a tall shrub reaching 6 feet in height.

Bitterbrush is often a co-dominant with mountain or basin big sagebrush, and in the sand hills south of Rawlins it is intermixed with silver sagebrush, basin big sagebrush, and rabbitbrush in deep sand soils. At higher elevations and precipitation levels, bitterbrush occurs in mixtures with sagebrush, snowberry, serviceberry, mountain mahogany, and occasionally chokecherry. Herbaceous plants associated with bitterbrush include grasses such as needle-and-thread, bluebunch wheatgrass, Indian ricegrass, sand

dropseed, and thick spike wheatgrass, and include forbs such as lupine, penstemon, sego lily, wild onion, larkspur, and prickly pear cactus.

Bitterbrush is probably the most important winter browse species for mule deer in the region. Elk and cattle use it as well in the fall and spring. It responds best to low-intensity (cooler-season) prescribed burns, brush beating, and chemical treatment directed at killing sagebrush. Resprouting response to fire is considered fair to moderate when fires occur in low-intensity fires. High-intensity fires (fires with extreme energy release components and residual heat) will kill bitterbrush.

Mesic Upland Shrub Steppe

Serviceberry or chokecherry or a combination of both dominates the mesic upland shrub steppe community, often in conjunction with snowberry, currant, and wood rose. Good examples of this plant community occur on the middle elevations of Battle Mountain near Savery. These shrubs may reach 10 to 15 feet in height. They occur in dense stands or scattered patches, often adjacent to aspen or willow. Understory grasses include basin wildrye, green needlegrass, Columbia needlegrass, and Kentucky bluegrass, and forbs include bluebell, columbine, aster, violet, elkweed, chickweed, and stinging nettle.

This community provides hiding and thermal cover for deer, elk, and other wildlife species. The dominant shrubs provide excellent forage for browsing animals when their softer leaves and shoots stay within reach. These shrubs will reestablish following fire, often in less dense patches, making them more accessible to wildlife and livestock.

Xeric Upland Shrub Steppe

True mountain mahogany dominates the xeric upland shrub steppe plant community on dry rocky slopes or in very shallow, undeveloped soils in the 10- to 14-inch precipitation zone. It occurs as both the dominant shrub or as an understory of Utah juniper, occurs at higher elevations, and mixes with bitterbrush, snowberry, serviceberry, green rabbitbrush, broom snakeweed, and mountain big sagebrush. Common herbaceous plants include bluebunch wheatgrass, Indian ricegrass, Sandberg bluegrass, and mat-forming forbs such as phlox, buckwheat, false locoweed, Hooker sandwort, goldenweed, and milkvetch.

True mountain mahogany may reach 5 to 7 feet in height depending on the amount of browsing and soil depth. Typical mountain mahogany communities occur in Telephone Canyon along I-80 east of Laramie, on the west end of Ferris Mountains, and on Chalk Mountain near the Shirley Mountains. Fire generally lessens the density of the shrub stands, allowing grasses and other herbaceous plants to increase while still providing wildlife browse. Mountain mahogany is an important wildlife fall and winter forage. A notable characteristic is the hedging growth pattern exhibited by mountain mahogany plants after they have been browsed by mule deer and elk.

Sagebrush

The GAP data represent sagebrush as black sagebrush, mountain sagebrush, and Wyoming sagebrush plant cover types, which are mapped collectively as sagebrush on Map 3-10. These three categories cannot readily be partitioned into the species of sagebrush actually found in the RMPPA, which species are discussed below.

Wyoming Big Sagebrush/Grassland

The Wyoming big sagebrush/grassland is the most common vegetative cover type in south-central Wyoming. It occurs in shallow-to-moderately deep soil at lower elevations, giving way to basin big sagebrush in deeper soils and to mountain big sagebrush above 6,500 feet in elevation and within the 9- to

16-inch annual precipitation zones (Knight 1994). Shrub height varies from as little as 6 inches on shallow sites to around 30 inches in deeper soils. Canopy cover is generally lower than observed in either basin or mountain big sagebrush—usually under 30 percent.

Wyoming big sagebrush often appears as the dominant plant in mosaic communities intermixed with Gardner saltbush and open grasslands. In shallow, rocky-to-gravelly soils, Wyoming big sagebrush may co-dominate with black sagebrush, green rabbitbrush, and sometimes winter fat. Grass and forb species vary depending on soil texture, aspect, and slope. Common grass and grass-like species include bluebunch and thickspike wheatgrass, Sandberg and mutton bluegrass, Indian ricegrass, needle-and-thread, threadleaf sedge, and bottlebrush squirrel tail. Common forbs include phlox, Hooker sandwort, onion, goldenweed, sego lily buckwheat, penstemon, Indian paintbrush, globemallow, and prickly pear cactus.

Wyoming big sagebrush is the most frequently eaten sagebrush and is a staple for pronghorn antelope and Greater sage-grouse. It is also one of the dominant species found on antelope and mule deer crucial winter ranges. Fire is an important component of all sagebrush-dominated plant communities. Depending on the nature of the site, the fire return interval can be between 25 and 100 years (Knight 1994).

Basin Big Sagebrush Shrubland

Basin big sagebrush shrubland is found in moderately deep-to-deep soils of all soil textures, in zones of 10 to 16 inches of annual precipitation (Beetle 1960). It occurs as pockets within Wyoming big sagebrush and Gardner saltbush communities, as the dominant plant type along valley bottoms and canyons, and along ephemeral washes. This subspecies of big sagebrush may reach 12 feet in height, with canopy cover reaching 70 percent.

Basin big sagebrush mixes with serviceberry, green and rubber rabbitbrush, snowberry, bitterbrush, silver sagebrush, and mountain mahogany, depending on the soil depth, annual precipitation, and elevation. Grasses occurring in these communities include basin wildrye, green needlegrass, Idaho fescue, thickspike wheatgrass, Kentucky and mutton bluegrass, and bottlebrush squirrel tail. Common forbs include bluebells, groundsel, onion, violet, buttercup, false dandelion, buckwheat, penstemon, Indian paintbrush, lupin, locoweed, and prickly pear cactus.

Basin big sagebrush is not a palatable forage. It usually shows little or no use, even in extreme winters when use levels of other plants are severe. It is important, however, as hiding cover for mule deer and elk and as habitat for other wildlife species. In some areas it also provides critical winter habitat for Greater sage-grouse when snow covers most other shrubs. Basin big sagebrush often increases in density and cover with poor livestock management and interruptions in the fire cycle. To increase diversity in basin big sagebrush shrublands, prescribed fires and chemical and mechanical treatments are employed, resulting in increases of grasses and other understory plants. The natural fire reoccurrence interval in the sagebrush type is approximately 30 to 75 years.

Mountain Big Sagebrush/Grassland

Mountain big sagebrush is located in shallow-to-moderately deep soils at elevations above 6,500 feet, in 12- to 20-inch annual precipitation zones. It is the dominant plant community on the Brown's Hill-to-Miller Hill plateau south of Rawlins. This is one of the largest homogeneous communities of this sagebrush type in the United States. Mountain big sagebrush also occurs as smaller plant communities at the lower mountain elevations, intermixed with aspen and conifer woodlands. Shrub height will vary from 10 to 30 inches, with canopy cover reaching 50 to 60 percent.

Mountain big sagebrush is usually the dominant shrub in foothill and mountain sage communities, with bitterbrush, serviceberry, snowberry, and mountain mahogany providing subdominant brush diversity. Grasses include Idaho fescue; king spike fescue; green and Colombia needle grass; Kentucky, mutton, and big bluegrass; elk sedge; and Ross' sedge. Common forbs found in these areas include Indian paintbrush, phlox, balsamroot, locoweed, lupine, larkspur, penstemon, and Oregon grape.

Mountain big sagebrush is palatable to wildlife, although browsing is limited during the winter when these habitats become unavailable because of snow. Following fire, mountain big sagebrush reestablishes as the dominant species more quickly than do other sagebrush types, often resuming dense canopy cover after approximately 40 years. The natural fire recurrence interval in this sagebrush type is approximately 25 to 75 years.

Silver Sagebrush/Grasslands

Silver sagebrush/grasslands have two subtypes with very different habitats. The most common is found in deep sandy soils and consists of silver sage as the dominant species. It is associated with basin big sage, green rabbitbrush, serviceberry, chokecherry, and wood rose. Herbaceous species include needle-and-thread, Indian ricegrass, prairie sandreed, sand dropseed, scurfpea, and prickly pear cactus.

The second type of silver sagebrush is located in riparian habitat along streams above the wet sedge and willow riparian zone. This second riparian terrace is also habitat for basin wildrye, Kentucky bluegrass, streambank wheatgrass, redtop, Baltic rush, clover, checkermallow, aster, and occasionally cottonwood and willow.

Silver sagebrush is desirable forage for both livestock and wildlife, and it provides important habitat for big game and nongame species. Silver sagebrush responds well to prescribed fire as a management tool when it is dry enough to burn. Any disturbance in the silver sagebrush community may result in less desirable species increasing in prevalence as a result of the transition of soil types or low-moisture regime.

Low Sages—Alkali, Birdsfoot, Black, and Wyoming Three-Tip Sagebrush/Grassland

Alkali sagebrush is found growing in clay soils and, as its name implies, can withstand soils of higher alkalinity than can other sagebrushes (Beetle and Johnson 1982; Knight 1994). It occurs in relatively pure communities because of the high clay content and high cation exchange capacity in the soils in areas below 7,500 feet in elevation. Understory grasses include bluebunch wheatgrass, western wheatgrass, mutton bluegrass, bottlebrush squirreltail, and Indian ricegrass. Forbs noted at this site include wild buckwheat, biscuit root, and wild onion. Browsing on this sage is light.

Birdsfoot sagebrush is found in alkaline soils, where pH ranges from 8.5 to 11, and below 7,500 feet. At lower pH levels, birdsfoot sage mixes with Gardner saltbush, and it appears with a mixture of grasses and forbs on windswept ridges and hills. At higher pH levels, birdsfoot sagebrush occurs as a monoculture.

Black sagebrush occurs on gravelly-to-rocky soils that have a "shallow effective" rooting depth (less than 15 inches), and various textures from sandy loams to clay loams. On the plains north of the Ferris and Seminoe Mountains, it is the principal shrub present, but it will often intermix with Wyoming big sagebrush and, above 7,400 feet, it gives way to Wyoming three-tip sagebrush. It also has been observed as an understory shrub in true mountain mahogany stands. On sandy sites, it is commonly found with needle-and-thread, threadleaf sedge, Junegrass, sandwort, and buckwheat, whereas on loamy soils it will occur with wheatgrasses, bluegrasses, Indian ricegrass, phlox, onion, paintbrush, and penstemon. Black sagebrush sites probably rarely burn because of the low production and shrub cover these sites support. In some locations, black sagebrush is considered an important browse species for mule deer.

Wyoming three-tip sagebrush occurs above 7,000 feet in the foothills and at the higher elevations of the mountain ranges. It normally grows between 4 inches and 15 inches tall in moderately deep, well-drained soils (Beetle and Johnson 1982). It is often found intermixed with mountain big sagebrush and black sagebrush. Understory grasses and forbs include Idaho fescue, king spike fescue, Colombian needlegrass, elk sedge, Ross' sedge, Indian paintbrush, mountain pea, larkspur, balsamroot, phlox, and buckwheat. Wyoming three-tip sagebrush-dominated areas are often used as forage for wildlife. This species does burn, but because of a lack of fuel continuity, large, resource-damaging fires are rare.

Saltbush

Salt desert shrubland is perhaps the most arid vegetation type in the intermountain West (Knight 1994). Gardner saltbush dominates the salt desert shrub community type and in some instances occurs as up to 90 percent of the vegetation cover. These areas are characterized by accumulations of salt in poorly developed soils. Soils of these areas usually have a pH of 7.8 to 9, which restricts the uptake of water by all but the most salt-tolerant plants (halophytes). Soil textures can be sandy loam, sandy clay loam, or loam and clay. Salts accumulate around these plants each year with leaf fall. Halophytes function essentially to redistribute salts from the soil depths to the surface, thereby concentrating salts around the perimeter of the plant. This enables the plant to eliminate competition for scarce water and nutrients from other less salt-tolerant plants (Goodin and Mozafar 1972).

Gardner saltbush normally grows no higher than 12 inches. It may grow along the ground, forming a mat. Subdominant shrubs include birdfoot sage, bud sage, spiny hopsage, greasewood, broom snakeweed, shadscale, spiny horsebrush, and winterfat. Grasses associated with these sites are Indian ricegrass, bottlebrush squirreltail, Sandberg bluegrass, and western wheatgrass. Forbs found in these areas include wild onion, biscuit root, woody aster, globemallow, princess plume, and prickly pear cactus.

Salt desert shrublands occur at elevations between 6,000 and 7,600 feet within the lowest precipitation areas in the RMPPA. These areas are typically flat or rolling hills. Excellent examples of this type exist in the Separation Flats area west of Rawlins. Gardner saltbush is a valuable forage species on winter and spring ranges. In the spring when green, it has higher protein concentrations than does late-season alfalfa, and it is a preferred livestock forage.

3.15.2.7 Sand

The sand vegetation zone is mapped as a combination of active sand dune type and sand dune complex type. A band of sand dunes stretches across the northern portion of the RMPPA. In addition dunes are found near the western boundary of the RMPPA and in the Sand Hills, which are southwest of Rawlins and near the Dad homestead.

Blowout grass is a common early colonizer species on sands. Species that survive in the frequently shifting sands include Indian ricegrass, needle-and-thread, alkali wildrye, and slimflower scurfpea. Alkali cordgrass commonly occurs in areas where water accumulates (Knight 1994). Dune areas typically have earlier successional plant species unless the continued growth of vegetation leads to increased soil organic matter, increased soil structure, and lower wind velocities across the dunes, thereby stabilizing them. Stabilized dunes may provide habitat for later successional species, such as thickspike wheatgrass, Sandberg bluegrass, sand dropseed, Hooker sandwort and bud sagebrush, fringed sagebrush, Wyoming big sagebrush, rubber rabbitbrush, horsebrush, spiny hopsage, and prickly pear cactus (Knight 1994).

Some dunes may become vegetated for a while only to suffer a blowout from atypical wind speeds or directions. Once such a blowout starts to enlarge, the destabilized dune becomes active again. These dunes provide habitat for unique plant species, such as blowout penstemon, which is Wyoming's only

endangered plant species. Some places in these dunes may have more water than other places. Ice that forms in interstices between the sand grains provides supplemental water when it melts in the spring. In addition, snowdrifts that become insulated by a blanket of overblown sand may serve as a source of water for more permanent dunal ponds, particularly if there is an impermeable layer beneath the sand. High water levels in Seminoe Reservoir that indirectly raise the ground water table may also support the dunal ponds. Such ponds are an important source of water for wildlife in the midst of the sandy dunes.

3.15.2.8 Wetland/Riparian Communities

The GAP data use three plant cover types to depict wetland/riparian communities: graminoid/forb-dominated wetlands, graminoid/forb-dominated riparian areas, and shrub-dominated riparian areas. These types provide the best reflection of wetland/riparian communities in smaller drainages, where agriculture has not extensively modified the vegetation. As noted previously, forest-dominated riparian communities have been mapped as part of the agriculture/town zone because of their extensive modification. These communities are no longer available as a substantive habitat, particularly in the eastern portion of the RMPPA.

Wetland/riparian vegetation communities in arid and semiarid environments often are key sites for the local ecosystem. Most terrestrial animal and insect life depends on riparian or wetland areas as sources of water, forage, and cover. Wetland/riparian areas in good health maintain water quality and aquifers, control erosion, diminish the impact of floods, and act as a stabilizing force in western landscapes subject to frequent drought and dynamic precipitation cycles.

Wetland/Riparian Areas

Wetland vegetation depends on the hydrologic network of the watershed, the duration of water availability, geologic conditions, soil types and depth, climate, and management history. Sedges, rushes, cattails, willows, and other wetland obligates dominate the environment. As water availability decreases, herbaceous vegetation shifts from sedges (wetland obligates) to grasses and wetland facultative plants (plants that usually occur in wetlands but are occasionally found in other habitats).

Wetlands are a valuable natural resource, and impacts to these areas should be avoided wherever possible. Wetlands in the RMPPA are represented by—

- Shoreline vegetation around open water bodies.
- Riparian vegetation along streams.
- Open meadows that accumulate moisture in the winter and spring.
- Dunal ponds associated with the Great Basin Divide Basin.

Based on GAP data, there are 87,445 acres in the RMPPA that can be classified as wetlands. Many of these areas are seasonally dry and infrequently inundated with water. Vegetation in these areas varies according to the frequency, depth, and duration of inundation. From an ecosystem perspective, an area that is unique to the wetland areas in the RMPPA is the dunal ponds, which are seasonally supported by precipitation that is trapped in the Great Divide Basin sand deposits. The variety of shrubs, grasses, and forbs present depends on the degree and duration of wetness and exposure at each location.

In most cases salt accumulation is not excessive in the wetland areas. Where drainage is limited, alkaline conditions can occur, and these can affect the types of plants that can be sustained. Wetland/riparian vegetation moderates stream water temperatures; adds structure to the river network; provides habitat for fish, birds, and wildlife; and provides organic material for insect production. Vegetated wetlands and

flood plains dissipate stream energy, store water for later release, provide areas of infiltration for ground water, support the hyporheic zone of the river, and provide rearing areas for fish and animal species.

Public lands within the RMPPA boundaries provide potential habitat for obligate and facultative wetland/riparian plants (Appendix 28). Wetland vegetation can form nearly monotypic stands of vegetation (e.g., sedges or cattails) to diversified assemblages of plants. The determining factors appear to be availability of water, soils, and management actions on the surrounding lands. Meadows typically have a wider variety of plants, probably because of their more gradual transition from dry to wet conditions. Wetlands that are isolated by location and distance from other vegetation types typically are more likely to have a monotypic plant assemblage.

Three primary drainages occur within the RMPPA: the Colorado River watershed in the western portion, the North Platte River watershed in the eastern portion, and the Great Divide Basin in the northwest. Each of these basins has unique soil, geologic, and hydrologic characteristics that affect the potential for wetland development.

Desert Riparian

Many different types of desert riparian occur in the RMPPA, depending on the timing and duration of soil wetting, soil type and depth, and topography of the area. These types usually occur on alluvial material, either of sand, sandy loam, loam, or an unconsolidated mixture of soil and cobble material. Soils are usually well-drained and are higher in organic matter content than the surrounding uplands. Streams are often ephemeral or intermittent, therefore vegetation depends on spring runoff or spring and summer rain.

The wettest areas in the desert commonly support Baltic rush, Nebraska sedge, water sedge, and tufted hairgrass, with mountain iris, sandbar willow, and narrowleaf cottonwood occasionally occurring along the fringes. Seasonally wet areas in the desert and steppe communities commonly contain Kentucky bluegrass, tufted hairgrass, foxtail barley, redtop, northern reedgrass, slender wheatgrass, basin wildrye, field horsetail, wood rose, shrubby cinquefoil, silver sage, basin big sagebrush, greasewood, and a variety of willow species.

Desert ephemeral washes may lie on saltier soils and therefore support salt-tolerant species. Inland saltgrass and western wheatgrass dominate this herbaceous community, whereas greasewood and basin big sagebrush are the dominant shrubs.

Irrigated nonfederal lands along the major streams and rivers in the desert have limited the extent of native vegetation in some riparian areas. Where topography and soils restrict irrigation of nonfederal lands, native vegetation persists. These areas sustain riparian woodlands that support trees and shrubs such as plains cottonwood, narrowleaf cottonwood, Fremont cottonwood, Geyer willow, sandbar willow, and yellow willow. Often the trees and shrubs give way to herbaceous communities where soils are shallow. Herbaceous plants and lower shrubs dominating these areas would be part of the understory in the riparian tree communities. Vegetation includes slender wheatgrass, thickspike wheatgrass, smooth brome, tufted hairgrass, meadow foxtail, timothy, mountain iris, horsetail, gooseberry, currant, buffaloberry, and basin big sagebrush. Such communities are located along the fringes of the riparian areas or in rocky areas.

Riparian areas are associated with the highest production of grasses and other very palatable herbaceous species in the desert, as well as the greatest plant diversity. Often open water is also present. These characteristics draw both livestock and wildlife and also provide critical habitat to many species who depend on water for survival. Desert riparian communities normally represent less than 1 percent of the total area in the desert. This places additional pressure on the management of riparian sites for ecological

and hydrological sustainability. Management of BLM livestock allotments is often focused on limiting grazing on the desert riparian areas to preserve their valuable diversity and productivity.

Foothills and Mountain Riparian

Riparian areas in the foothills and mountains are generally moister for longer periods of time and support plants that need to be in wet or saturated soils throughout the growing season. The stream gradients are also steeper, and the streambed material much larger. Riparian areas in the foothills and mountains receive snowmelt and spring discharges that provide perennial flow and cooler water. The soils are usually coarser, with higher organic matter content and increased soil development compared with lower elevations. These areas range in elevation from 7,500 to 10,000 feet and may include alpine tundra characteristics in the upper reaches of the watersheds.

Willow is often the dominant species in these environments. They are frequently observed are sandbar willow, Geyer willow, yellow willow, whiplash willow, Wolf willow, Booth willow, Bebb's willow, and plain leaf willow. Species prominent in the composition of the willow understory include beaked sedge, Nebraska sedge, water sedge, field sedge, Baltic rush, bull rush, spike rush, tufted hairgrass, Kentucky bluegrass, meadow foxtail, and reedgrass. These understory plants dominate in the open meadows and marshes. Other shrubs and trees that occur are water birch, shrubby cinquefoil, redosier dogwood, snowberry, skunkbrush sumac, narrow leaf cottonwood, aspen, Englemann spruce, and lodgepole pine (Knight 1994).

As in the desert riparian area, mountain riparian vegetation is more diverse and higher in productivity than the surrounding uplands, causing livestock and game to concentrate there. The forage also stays lush and more palatable into the late summer (when upland grasses have cured), adding to the attractiveness of these areas. Livestock management strategies often include controlled season and duration of use of these areas.

3.15.3 Riparian Proper Functioning Condition

Proper Functioning Condition (PFC) is the assessment tool the RFO staff uses to determine the relative health of stream hydrology, riparian vegetation, and the aquatic fauna and flora of creeks in the RMPPA. Wetlands are also evaluated. Emphasis is placed on these communities because of the importance of aquatic systems in the semiarid climate of the RMPPA and because the deterioration of vegetative health can result in excessive erosion, alteration of narrow sinuous creek beds into fan-shaped drainages that no longer feed the water table, and the consequent conversion of perennial streams to ephemeral drainages. A wetland system is considered rated as PFC when adequate vegetation or land form is present to dissipate energy associated with high water flows or other environmental disturbance; is able to function as a wetland appropriate to the setting to filter sediment, develop root masses that stabilize banks, and improve water retention; and provide diverse ponding or channel characteristics, and the biodiversity and habitat needed to support aquatic organisms and waterfowl.

PFC surveys are used to evaluate Standard No. 2, Wetland/Riparian Health, of the Rangeland Standards Assessment Process. PFC surveys determine whether the stream and riparian areas are meeting minimum requirements for proper ecological and physical processes. The PFC assessment takes into consideration—

- Frequency at which the streamflow exceeds bankfull and inundates the floodplain.
- Past and present beaver activity.
- Channel morphology in relation to landscape setting.
- Changing riparian and watershed relationships that may impact stream integrity.

- Upland watershed condition and its potential effect on riparian and stream channel condition.
- Age structure of the riparian plant community.
- Presence and absence of indicator riparian species.
- Riparian stream soil moisture.
- Ability of the stream bank vegetation root system to resist high flows and subsequent erosion.
- Vigor and condition of indicator wetland/riparian species.
- Adequacy of water energy dissipation and stream armoring by vegetative cover.
- Maintenance of organic woody material in wetland/riparian areas.
- Stream channel roughness and ability to resist erosion caused by increased flows.
- Evaluation of in-channel vegetation as an indicator of seasonal flow regimes.
- Channel stability in regard to lateral and vertical movement.
- Sediment and water discharge relationships in relation to watershed dynamics.

PFC surveys can be combined with macroinvertebrate and vertebrate sampling, stream/riparian cross-section surveys, upland vegetation cover analysis, and assessment of the watershed and riparian area management. Photographs are also taken from specified points associated with the surveys. Additional surveys that address specific water quality and aquatic habitat parameters may be initiated if species or habitat needs indicate that more detailed information is required.

The RFO staff has been conducting PFC assessments for many years. Data from these surveys are used together with data collected in overall watershed assessments under BLM Standards and Guidelines. Assessments are being conducted on seven watershed management areas that represent the fourth-order watersheds in the RMPPA (Section 3.17). PFC data are used to supplement the Standards and Guidelines assessments

3.15.4 Vegetation Health

The condition of vegetation communities in the past was based on range site descriptions and ratings that placed different sites into classes of excellent, good, fair, or poor. Two principal problems with this system were a lack of successional states for each community and a single evaluation score that may be misleading. For instance, a site with a high proportion of shrubs might rate fair for cattle grazing and be excellent habitat for mule deer. The desired plant community (DPC) of vegetative communities is determined on a site-specific basis.

The health of vegetation communities is dependent on the current location along the path of succession and the other factors that may affect a particular site, such as grazing or browsing, insects, disease, fire, chemical and mechanical treatments, and climate. Typical elements used in describing health include species and cover composition, vertical structure, and age class. Examples of vegetation health issues observed in the RMPPA are described in the following paragraphs.

Livestock use is the most direct and manageable action affecting vegetation. The effect of grazing on vegetation is influenced by the duration, season, and amount of use. For instance, long duration use by cattle from spring through fall has been a common practice during the 1900s. On uplands, this led to increases in less desirable species like rhizamotous wheatgrass, cactus, and annual forbs, whereas sought-after species of bunchgrasses became less common (and sometimes are only found under shrubs where they were partially protected). In riparian habitat, grazing-tolerant species like Kentucky bluegrass and mat muhly, or undesirable species like Baltic rush and thistles, flourished while other grasses, sedges, and willows were reduced in abundance. In most areas this trend has been reversed through the use of grazing BMPs. Section 3.7 presents a further discussion of the results of BMP application.

The loss of beaver to trapping and habitat degradation has also influenced riparian plant communities. Recovery in some instances is very slow, however planting of some shrub and tree species can increase the rate of reestablishment. Season of use is particularly important in reference to when plants are actively growing. Providing rest from use during part of this time period has been shown to help maintain or improve the vigor and production of desirable species. This is often a key element in management plans.

Use of vegetation by wild horses is also important within HMAs and adjacent allotments. Wild horses are more likely to have year-round use in some areas (compared to livestock or wildlife), and therefore the levels or amount of use may be the principle issue that is dependent on the current population. The recent high numbers of wild horses in the Adobe Town Wild Horse HMA, along with drought conditions, led to high levels of wild horse use of both desired and normally undesirable species. Upland trend in species composition, cover, and plant spacing appears to be in a negative direction as a result. Riparian habitat is being protected with exclosures, with development of off-site water to meet PFC. High numbers of wild horses also leads to more movement into adjacent allotments outside the HMAs, which may affect vegetation condition until wild horses are removed.

Wildlife generally moves seasonally between summer and winter habitats, and in most cases their effect upon vegetation is minimal. However crucial winter range of mule deer in some locations is in poor health because of loss of habitat and restricted movement as a result of highways and fences. This has led to decadent shrub stands, encroaching woodlands, and high browse use of Wyoming big sagebrush and mountain shrubs by deer. Portions of antelope crucial winter range are also areas of concern because of high browse use of Wyoming big sagebrush by antelope. In areas where antelope and mule deer winter range overlap, these impacts are compounded. Transition range habitat is located between summer and winter ranges and receives more use by wildlife during mild winters, which reduces browsing impacts on crucial winter range and helps to maintain these plant communities. Within the RMPPA, only 35 percent of identified crucial winter range is on BLM-administered land.

Changes in vegetation health due to aging and succession are more subtle. The suppression of wildland fires and lower fire occurrence because of grazing of fine fuels has compounded this issue. Aspen are the most visible and affected plant community, with remnant sites littered with stumps and downed trees now dominated by conifers and sagebrush. It is believed that about half the acreage of aspen communities has been lost over the last 100 years, and many remaining stands are decadent, diseased, and being taken over by other plant species. Decadence and aging is also common in sagebrush and mountain shrub communities where annual precipitation is 10 to 12 inches or higher. There are increasing amounts of dead and decadent shrubs, lower vigor and production of remaining shrubs, and lower diversity and cover in the understory species. For instance on sites supporting basin and mountain big sagebrush treated with prescribed fire, canopy cover prior to treatment averaged about 50 percent, with some sites with shrub cover as high as 75%.

The occurrence and condition of microbiotic crusts within the RMPPA is another factor in vegetation and watershed health. These species are primarily found in the western portion of the RMPPA, where sagebrush is the principal cover type. Additional monitoring will be necessary to assess trends and prescribe management for these species.

3.15.5 Noxious and Invasive Weed Management

Noxious and invasive weeds are established in the RMPPA and have been identified as a major threat to native ecosystems. Noxious and invasive weeds contribute to the loss of rangeland productivity, increased soil erosion, reduced species and structural diversity, and loss of wildlife habitat. In some instances, they are hazardous to human and animal health and welfare (*Federal Noxious Weed Act*, Public

Law 93-629). Waterways, roads, and movement by animals appear to be the principle vectors for expansion of noxious and invasive weed species. Noxious and invasive weeds are a component for evaluation during Standards for Healthy Rangelands assessments (Appendix 8).

Some weed species pose a significant threat to multiple-use public land management. Noxious and invasive weeds cannot be adequately controlled unless Federal, state, county, and private interests work together. The *Carlson-Foley Act* (Public Law 90-583), as well as state and county laws, make the Federal Government responsible for control of noxious and invasive weeds on federal land and provide direction for their control. The Noxious Weed Prevention Plan (Appendix 31) outlines measures to reduce the occurrence and dispersion of noxious weeds in the RMPPA. It takes into consideration different activities, such as livestock grazing, surface disturbance, and recreation.

The following list of plants (and their current known general locations in the RMPPA) are currently designated as noxious plants (Wyoming Weed and Pest Control Act):

- Leafy spurge: Saratoga Valley—North Platte River; Muddy Gap; and Baggs
- Spotted knapweed: Saratoga Valley, Seminoe, Arlington, and Elk Mountain
- Diffuse knapweed: Seminoe, Saratoga, and Roger's Canyon
- Russian knapweed: Muddy Gap, Sage/Little Sage Creek, Seminoe, Wamsutter, Hay Reservoir, and Bell springs
- Musk thistle: Saratoga/Encampment and Baggs
- Scotch thistle: Seminoe road
- Plumeless thistle: Seminoe, Loco Creek, and Baggs Highway
- Canada thistle: Along drainages throughout the RMPPA
- Field bindweed: Scattered throughout the RMPPA
- Dyers woad: Railroad track siding toward Cheyenne
- Hoary cress: Wamsutter, Sage/Little Sage Creek, and Hanna
- Perennial pepperweed: Little Sage Creek, Rawlins, Sugar Creek, Dixon, North of Tipton, and Herrick Lane
- Dalmatian toadflax: Rawlins, Laramie, Snowy Range-Centennial, Hanna, Seminoe, and Vedavoo
- Yellow toadflax: Upper North Platte River, Encampment, and Muddy Creek
- Skeletonleaf bursage
- Houndstongue: Baggs, Arlington, Ryan Park, Battle Mountain-Horse Creek, Lindsey Creek/Spring, and Sybille canyon
- Common burdock: Arlington, Baggs-Battle Mountain, and Sybille canyon
- Quack grass
- Perennial sowthistle
- Oxeye daisy: Upper North Platte River
- Purple loosestrife
- Saltcedar: Hay Reservoir, Sand Creek/Willow Creek/Wamsutter/Saratoga, and North Platte River Fort Steele to Seminoe Reservoir
- Common tansy
- Common St. Johnswort.

The RMPPA weed management staff and the County Weed and Pest Control Districts focus their efforts on noxious weeds, however they are actively involved in controlling all invasive and non-native species (halogeton, henbane, gumweed, and cheatgrass) that cause management problems related to livestock, wildlife, and human activities. Surface-disturbing activities such as roads and pipelines contribute to a proliferation of invasive species. Historic livestock management practices have also led to the introduction and expansion of noxious and invasive weeds. For example, biennial weed species, such as houndstongue, usually require bare ground to germinate. Improved livestock management practices

increase ground cover, which reduces the frequency of these species. However weed treatments are still required for complete control. Perennial weed species, such as knapweeds, spurge, and saltcedar, usually spread regardless of management practices. Cheatgrass is of concern because it out competes native grasses and increases the potential for wildland fire. Cheatgrass occurs in the Laramie Peaks region, Upper North Platte regions, Sweetwater Rocks, and other localized areas of disturbance (e.g., roadsides, livestock and wildlife concentration areas, recreation sites). Prickly poppy and mullien are two newly discovered invasive species that are increasing in localized areas.

The current untreated, weed-infested acreage in the RMPPA is estimated at about 20,000 acres (not including areas infested with cheatgrass). However most of the RMPPA has not been mapped for noxious and invasive species, thus the number of acres needing treatment has not been established.

3.15.6 Poisonous Plants

Poisonous plants are a normal component of the range ecosystem. Most poisonous plant species will kill animals only if they are eaten in large amounts, such as on almost a straight diet (Stoddart et al. 1975). Several factors play an important role in livestock poisoning: time of year and climate conditions, the animals' seasonal susceptibility to the poisonous plant, the formation of the poisonous portion of the plant, the susceptibility of certain kinds of animals to poisoning from a particular plant, or deficiency of minerals in the diet.

A shortage of salt in the diet may cause animals to eat plants they would not normally eat. Shortages of other minerals, such as phosphorus, induce abnormal appetites, causing the animal to consume low-value vegetation including poisonous plants. Although poisonous plants can be found throughout the RMPPA, there are few large concentrations, and there is sufficient quality forage available for livestock. Poisonous plants do affect turnout dates.

Some plants are toxic because of the high occurrence of the trace element selenium in soils of south-central Wyoming. Specific plants (e.g., woody aster) absorb selenium and can be very toxic when consumed by livestock. Selenium acts as a cumulative poison and can cause chronic poisoning effects over a long period, or quick death if consumed in quantity. Local names for this poisoning effect include "alkali disease" and "blind staggers." Extremely large concentrations of woody aster and other selenium-accumulating plants occur in Poison Basin west of Baggs, Sage Creek Basin south of Rawlins. Alkali Basin north of Sinclair, and Hanna and Shirley basins.

More than 20 species of poisonous plants are known to exist in the RMPPA. Table 3-34 lists some of the poisonous species, dangerous seasons, and grazing animals endangered. Poisonous noxious species are not included in the table.

Table 3-34. Poisonous Plants in the RMPPA

Species	Dangerous Season(s)	Kind of Livestock Endangered
Arrowgrass	All	All
Chokecherry	All	All, especially sheep
Death camas	Early spring	All, especially sheep
Greasewood	Spring	All, especially sheep
Halogeton	Fall and winter	All, especially sheep
Horsebrush	Spring	Sheep
Horsetail	Haying season	All, especially cattle and horses
Low larkspur	Early spring	Cattle
Tall larkspur	Early summer	Cattle
Loco	All, especially spring	All

Species	Dangerous Season(s)	Kind of Livestock Endangered
Lupine	Summer	Sheep
Prince's plume	Spring and summer	All
Senecio	Spring and summer	All
Woody Aster	Spring and summer	All

Source: Stoddart, Smith, and Box, 1975.

3.15.7 Threatened, Endangered, Candidate, and Proposed Plant Species

Special Status Plant Species includes candidate, proposed, threatened, and endangered species, as well as Wyoming BLM State Sensitive Species. The list of Wyoming BLM State Sensitive Plant Species includes species that are of concern as well as Federal threatened and endangered (T&E) species. Appendix 10 lists current T&E plant species in the RMPPA, and other current species on the BLM Wyoming State Director's Sensitive Species List.

Special Status Plant Species occur in a variety of plant associations and a variety of physical habitats, many of which have distinctive soil types. Often several Special Status Plant Species occur together in plant communities that may exhibit fidelity to specific locations and substrates and ultimately result in the development of unique subspecies. Section 6840 of the BLM Manual sets guidelines for Special Status Plant Species (Wyoming BLM State Sensitive Plant Species). These selected species receive priority attention for inventories, research, monitoring, and management decisions concerning surface-disturbing activities. There is one endangered plant species—the blowout penstemon—and two threatened species—the Ute ladies' tresses and the Colorado butterfly plant that are located within the RMPPA. Blowout penstemon is of particular interest in the Rawlins RMPPA. Blowout penstemon is a federally listed endangered plant that was previously thought to occur only in the Nebraska Sand Hills. It is the rarest plant species native to the Great Plains, is the only endangered plant in the state, and occurs in the band of moving sand dunes across the northern portion of the RMPPA. Ute ladies' tresses and Colorado butterfly plant have the potential to occur in riparian habitat on public lands within the Rawlins RMPPA. In addition, plant species that have been identified on the BLM Wyoming State Director's Sensitive Species List will be discussed in further detail in Section 3.15.8.

3.15.7.1 Blowout Penstemon Plant

The blowout penstemon plant is of particular interest in the RMPPA. This plant is a federally listed endangered plant that was previously thought to occur only in the Nebraska Sand Hills. It is the rarest plant species native to the Great Plains, is the only endangered plant in the state, and occurs in the band of moving sand dunes across the northern portion of the RMPPA (BLM 2004b).

3.15.7.2 Ute Ladies' Tresses Plant

The Ute ladies' tresses plant has the potential to occur in riparian habitat on public lands within the RMPPA. It is a perennial terrestrial orchid known to occur in western Nebraska, southwestern Wyoming, north-central Colorado, northeastern and southern Utah, east-central Idaho, southwestern Montana, and north-central Washington. The total population is approximately 20,500 individuals with 4 known populations in Wyoming totaling 800-1,200 individuals in an area of less than ten acres (BLM 2004b).

3.15.7.3 Colorado Butterfly Plant

The Colorado butterfly plant has the potential to occur in riparian habitat on public lands within the RMPPA. The plant is a short-lived perennial herb. Prior to 1984, no extensive documentation of the

plant's range had been documented. The plant is a regional endemic of southwestern Nebraska, southeastern Wyoming, and northeastern Colorado. In Wyoming, this plant is known only from the southeastern plains in Laramie and Platte counties, between the boundary of the Medicine Bow National Forest and the Wyoming-Nebraska border. Recent surveys in Wyoming suggest that the extant populations are probably stable, although population sizes may vary from year to year.

Two populations of this plant have been documented to occur at the F.E. Warren Air Force Base in Cheyenne. Other populations within the RMPPA are located on private lands between the Medicine Bow National Forest Boundary (Pole Mountain) and the Wyoming-Nebraska border on Middle Crow Creek, North Fork Crow Creek, South Branch Crow Creek, Lodgepole Creek, and Horse Creek. There are three small populations that are found partly or fully on state school trust lands, which are managed mostly for agricultural uses. Most of the plant population locations that are known to occur for the Colorado butterfly plant exist on private lands. No know populations are known to occur on BLM-administered federal lands in the RMPPA (BLM 2004b).

3.15.8 BLM Wyoming State Director's Sensitive Species List for Plants

BLM and WGFD are responsible for managing a wide array of wildlife and associated habitat types, including sensitive plant species located within the RMPPA. Plant species listed on the BLM Wyoming State Director's Sensitive Species List and their associated habitat types are discussed in detail below. These plants are recognized as being of particular interest to the public and are a focus of management.

- Laramie Columbine: crevices of granite boulders and cliffs at 6,400–8,000 feet in elevation
- Nelson' Milkvetch: alkaline clay flats, shale bluffs and gullies, pebbly slopes, and volcanic cinders in sparsely vegetated sagebrush, juniper, and cushion plant communities at 5,200–7,600 feet in elevation
- Cedar Rim Thistle: barren, chalky hills, gravelly slopes, and fine-textured, sandy-shaley draws at 6,700–7,200 feet in elevation
- Weber's Scarlet Gilia: openings in coniferous forests and scrub oak woodlands at 8,500–9,600 feet in elevation
- Gibbens' Beardtongue: sparsely vegetated shale or sandy-clay slopes at 5,500–7,700 feet in elevation
- Persistent Sepal Yellowcress: riverbanks and shorelines, usually on sandy soils near the high water line
- Pale Blue-eyed Grass: wet meadows, stream banks, roadside ditches, and irrigated meadows at 7,000–7,900 feet in elevation
- Laramie False Sagebrush: cushion plant communities on rocky limestone ridges and gentle slopes at 7,500–8,600 feet in elevation.

3.15.9 Unique Plant Communities

In addition to Special Status Plant Species, the RMPPA also contains rare or unique plant communities that may or may not contain Special Status plants, such as the Muddy Gap cushion plant community. Two other examples of these communities include the Sandhills "sand dune" plant community and the alkaline desert wetland communities found in the Chain Lakes area.

3.16 VISUAL RESOURCES

Visual resources within the RMPPA are influenced by a wide variety of topographic, geologic, hydrological, vegetative, and other characteristics of the region. Landforms range from relatively flat land to low mountains, low rolling or flat-topped hills, and isolated hills; to higher elevations near the Medicine Bow National Forest containing mountain shrub vegetation, and alpine forest atop the highest areas. Elevation and precipitation vary widely within the RMPPA and determine the dominant vegetation. With the widely diverse vegetation patterns that result from varying topographic soils and precipitation characteristics come changes in color, form, line, and contrast. These four elements form the basis for the analysis of the visual resources of the area.

Visual resources are often associated with recreational opportunities, as discussed in Section 3.11. Many recreational activities, such as backpacking, geologic and nature study, photography, and hiking depend on the natural settings and scenic views that visual resource management (VRM) is intended to protect.

3.16.1 Natural Settings and Scenic Views

Much of the RMPPA contains natural settings with limited development, open spaces with panoramic vistas, and scenic views. In the non-mountainous, lower elevations of the area, summer views are characterized by scrubby low-growing gray-green vegetation, distant mountains, and an intense blue sky. In contrast, winter views are monochromatic gray, with clear skies and an apparently lifeless gray to brown foreground backed by distant snow-capped mountain peaks. Different combinations of plant communities create subtle changes in mosaics of textures and colors. More extensive views that encompass several viewsheds are available from high points. The horizon is a significant aspect of all distant views.

Several areas within the RMPPA that exhibit high scenic quality are easily accessible for tourists and other recreationists. The highest-quality scenic views in the RMPPA are the WSAs, particularly the Ferris Mountains and Adobe Town WSAs because of their unique geological formations. Both these areas are quite rugged and untrammeled by humans (Clair 2002b).

3.16.1.1 Visibility

Visibility can be defined as the distance one can see and the accompanying ability to perceive color, contrast, and detail. The RMPPA is essentially rural in character, and the Wyoming Air Quality Division has designated the area in attainment of all U.S. Environmental Protection Agency (EPA) national pollution and ambient air quality standards. As discussed in Section 3.2, the Savage Run Wilderness and Rocky Mountain National Park have been designated as prevention of significant deterioration (PSD) Class I areas. PSD Class I areas receive the highest degree of protection from air pollution; only small amounts of particulate, SO^2, and NO^2 air pollutants are allowed in these areas.

Visibility trend analysis for Rocky Mountain National Park (to the south and southeast of the RMPPA) reveals no significant worsening of visibility from 1989 through 1998. The information from this nearby monitored area and from local observations indicate that the air quality of the RMPPA is generally excellent, and that pollutants very seldom obscure visibility.

3.16.1.2 Visual Resource Management System

The RMPPA has been inventoried using BLM Visual Resource Management (VRM) classification system. Under this system, the RMPPA was classified into four visual management categories (Classes I

through IV) based on scenic quality, visual sensitivity levels, and viewer distance zones. Each VRM classification has a management objective, as described below:

- **Class I.** The objective of Class I is to preserve the existing character of the landscape. This class provides for natural ecological changes, however it does not preclude very limited management activities. The level of change to the characteristic landscape should be very low and should not attract attention.

- **Class II.** The objective of Class II is to retain the existing character of the landscape. 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. Any changes to the landscape must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

- **Class III.** The objective of Class III is to partially retain the existing character of the landscape. The level of change to the landscape should be moderate. Management activities may attract the attention of the casual observer but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

- **Class IV.** The objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the landscape can be high. The management activities may dominate the view and may be the major focus of viewer attention. Every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic visual elements of form, line, color, and texture.

The established VRM classes for the RMPPA are depicted in Map 2-51. The acreage for each VRM class within the RMPPA is shown in Table 3-35. About 75 percent of the lands within the RMPPA are categorized as Visual Class III. Class II lands are primarily associated with areas around the Pathfinder and Seminoe Reservoirs and with the close-range viewsheds of the Medicine Bow National Forest. Only the WSAs are rated as VRM Class I.

Table 3-35. Visual Resource Management Classifications and Acreages in the RMPPA.[1]

Classification	Acres	Percentage
I	67,630	2
II	359,610	10
III	2,677,480	75
IV	446,760	13
TOTAL	3,551,480	100

1 All lands in the planning area were rated, however only the BLM-administered lands are managed within the VRM system, and only BLM lands are included in the above-referenced acreages.

The current objective of VRM within the RMPPA is to minimize adverse effects on visual resources while maintaining the effectiveness of other land use allocations. Visual resources in the RMPPA are managed according to the VRM classes they are assigned.

3.16.1.3 Visual Resource Trends and Issues

There are several visual resource trends in the RMPPA (Clair 2002b), including—

- The existing Rawlins RMP describes those areas that have been designated for OHV use. OHV use is not yet highly popular in the RMPPA, however an increase in unmanaged, unmonitored OHV use within the area for both recreation and access to the surrounding USFS-managed lands in the Medicine Bow National Forest and to the dunes area, is creating direct, negative visual impacts in certain parts of the area. OHV use has affected some vegetative communities more than others.

- The widespread development of petroleum, natural gas, and coal in the RMPPA is creating direct, negative visual impacts within the RMPPA. Currently visual mitigation of this activity is preventing mineral development activities from exceeding the established VRM objectives within these areas. The trend toward continued expansion of natural resource development is creating areas of potential conflict between this activity and the established VRM class objectives.

- Utilities are also having an increasing visual impact in the RMPPA. Even buried fiber-optic lines leave obvious visual effects.

- Although visual sensitivity is clearly not the highest priority for many residents and visitors, as increasing numbers of sightseers and persons seeking various types of recreational opportunities pass through the RMPPA, a heightened awareness of scenic values and of the existing scenic quality for some residents and visitors has occurred.

Emerging visual resource issues include (Clair 2002b)—

- Degradation of visual resources within the coalbed natural gas project on Seminoe Road. The road is a backcountry byway, and portions of the project area are in the Class II VRM area. Efforts are needed to hide the roads, use the topsoil as berms to hide the well pads, and paint the fixtures to match natural conditions. However there is no control over what effects occur within the private portion of the land ownership checkerboard.

- The need for more effective mitigation on seismic projects.

- The need for more effective mitigation within the transportation corridors (such as I-80), even if they are Class IV lands. Because the transportation corridors are also the utility corridors, the existing impacts are difficult to change.

- The need for more effective mitigation on all wells. It has been proven difficult to change existing mitigation precedents.

3.17 Water Quality, Watershed, and Soils

3.17.1 Water Quality and Watershed

Water resources include surface water and ground water. Surface water includes lakes, rivers, reservoirs, streams, creeks, and springs and are important for a variety of reasons, including economic, ecological, recreational, and human health. Ground water comprises the subsurface hydrologic resources of the physical environment and is a valuable resource in this arid environment.

The headwaters of several rivers, which supply water to millions of people in the western and midwestern United States, originate in the RMPPA. Water in the intermountain West is less abundant than in most of the United States, therefore proper and cautious management of water is essential to the economy of this region.

Conservation of water is evident throughout the RMPPA. Stock reservoirs attenuate natural stream flows in the upper portions of watersheds and provide drinking water sources for livestock and wildlife. Reservoirs on the North Platte and Laramie Rivers hold spring and early summer runoff for use by farmers and municipalities later in the year. This attenuation of natural stream flows has caused depletion of water resources required to maintain habitats of fish and wildlife species downstream in the Platte and Colorado River basins (Appendix 11). Therefore BLM management actions that result in depletions to these river systems must be evaluated for impacts to these species. The RFO staff administers public lands in accordance with the *Clean Water Act* by maintaining the quality of upland range and wetland/riparian areas to ensure that the water running off these lands is of good quality (Appendix 11). Water quality and watershed health are standards that are evaluated during Standards for Healthy Rangelands assessments (Appendix 8).

3.17.1.1 Surface Water Characteristics

There are 22 fourth-order watershed sub-basins in the RMPPA, along with the major rivers, lakes, and reservoirs. Acreage for each of these watersheds is indicated in Table 3-36. Map 3-11 shows major surface water basins in the RMPPA. The RMPPA is topographically divided by the Continental Divide, which means that streams in the southwestern portion of the RMPPA are drained by Muddy Creek and the Little Snake River, which flows into the Colorado River system and eventually into the Gulf of California. Within the RMPPA, the North Platte, Medicine Bow, and Laramie rivers drain watersheds east of the Continental Divide. These rivers flow into the Mississippi River system via the Platte River and eventually into the Gulf of Mexico. Streams to the north and west of Rawlins lie in the Great Divide Basin, which is a large, internally drained basin with no outflow. The rivers that convey the most water within the RMPPA are the Encampment River, Medicine Bow River, Laramie River, North Platte River, and Little Snake River, which consequently have long-term stream gauges operated by the USGS. Table 3-37 shows the monthly mean discharge data for these rivers at USGS gaging stations. Figures 3-43 to 3-48 present hydrographs of the daily statistics for these rivers. All the rivers have peak flows in May or June in response to snowmelt and display peaks in the maximum values in the late summer in response to thunderstorms. The flatter peaks in the mean values for the Laramie, Little Snake, and Medicine Bow Rivers indicate modifications to the system due to diversions for irrigation. Irrigation can also shift the peak to later in the year, as can be observed by comparing the maximum and mean and the 2003 values for the Medicine Bow River. In addition to using USGS data, BLM and /or local conservation districts collect additional flow data from other locations, such as Muddy and Sage creeks, where water quality data are collected.

Table 3-36. Watersheds and Their Acreage Within the RMPPA

Watersheds				
Water Resources Region	Sub-Region	Accounting Unit	Cataloging Unit	ACRES
Missouri	North Platte	North Platte	Glendo Reservoir	1,354,118
Missouri	North Platte	North Platte	Horse	1,070,448
Missouri	North Platte	North Platte	Little Medicine Bow	654,576
Missouri	North Platte	North Platte	Lower Laramie	1,528,285
Missouri	North Platte	North Platte	Medicine Bow	920,518
Missouri	North Platte	North Platte	Middle North Platte-Casper	2,210,280
Missouri	North Platte	North Platte	Pathfinder-Seminoe Reservoirs	637,713
Missouri	North Platte	North Platte	Pumpkin	641,775
Missouri	North Platte	North Platte	Sweetwater	1,845,320
Missouri	North Platte	North Platte	Upper Laramie	1,384,875
Missouri	North Platte	North Platte	Upper North Platte	1,849,524
Missouri	South Platte	South Platte	Cache La Poudre	1,207,681
Missouri	South Platte	South Platte	Crow	890,192
Missouri	South Platte	South Platte	Lone Tree-Owl	361,861
Missouri	South Platte	South Platte	Lower Lodgepole	853,707
Missouri	South Platte	South Platte	Sidney Draw	474,460
Missouri	South Platte	South Platte	Upper Lodgepole	726,583
Upper Colorado	Great Divide—Upper Green	Great Divide Closed Basin	Great Divide Closed Basin	2,473,410
Upper Colorado	Great Divide—Upper Green	Upper Green	Bitter	1,413,961
Upper Colorado	Great Divide—Upper Green	Upper Green	Vermilion	609,582
Upper Colorado	White-Yampa	White-Yampa	Little Snake	1,940,746
Upper Colorado	White-Yampa	White-Yampa	Muddy	649,962

Table 3-37. Discharge from Selected USGS Gaging Stations in the RMPPA

Mean yearly and monthly discharge from selected USGS gaging stations throughout the Rawlins Field Office planning area.
(stream discharge in cubic feet per second)

Stream and Location	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Peak Flow	Drainage Area (sq. mi.)
North Platte River Above Seminoe Reservoir	1,145	318	350	555	1,417	3,163	4,378	1,412	502	314	415	429	352	14,500	4,175
North Platte River Above Northgate Canyon	436	84	89.4	177	753	1,139	1,472	637	265	149	162	153	104	6,740	1,431
Encampment River at the Platte River Confluence	247	62.3	63.1	70.9	149	771	1,184	283	67.9	55.9	79	78.9	69.7	4,510	265
Little Snake River at the Wyoming-Colorado Line	231	31.9	32.8	51.4	263	1,089	946	161	39.8	29.6	39.1	36.5	32.5	4,200	285
Laramie River at the Platte River Confluence	125	77.7	83.9	100	170	357	349	135	73.1	64.5	72.9	81.8	79.1	6,260	4,564
Medicine Bow River at the Platte River Confluence	184	32.5	49.4	143	328	570	670	179	54.2	29.2	43.4	51.3	38.7	6,010	1,942

Most watersheds in the RMPPA are shrub-dominated rangelands below 8,500 feet. Watersheds in the desert and range areas of the RMPPA are in a water balance deficit, meaning the annual potential evapotranspiration exceeds the annual precipitation. Therefore there is limited runoff from watersheds in these desert areas, and most streams originating in these areas are ephemeral.

Areas above 8,500 to 9,000 feet are in a water balance surplus, meaning that annual precipitation exceeds annual potential evapotranspiration. Most of the streamflows in these areas are perennial, and most of the large rivers originate in these high elevation areas, which are mostly located in national forests.

Watersheds originating in the mountains receive flow from melting snow and summer rainstorms. Discharge in these streams typically peaks in May or June. There is an additional peak in the daily records of most systems in August or September before discharge tapers off to a base flow. Streams originating in the desert areas respond to snowmelt as well, however the peak flow from these streams occurs in April and May, and desert streams may go dry by early June. Following spring runoff, these streams only flow as a response to rainfall events. Perennial and intermittent streams that flow into sandy substrates may disappear or become intermittent along certain reaches.

The many dams and diversions along streams and rivers dampen the peak flows and enable higher flows through the late summer when irrigation water is needed. Dams and diversions have altered the normal seasonal flow patterns of many streams and rivers in the RMPPA and resulted in changes to the natural hydrograph. Dams have also altered the movement of sediment down rivers and, in general, discharge cold, clean water during the hot months. This has enabled a prime trout fishery in the Miracle Mile below Seminoe Reservoir.

The Great Divide Basin lies in the northwestern portion of the RMPPA. This is a large, closed basin which splits the Continental Divide. None of the precipitation falling within the basin leaves through surface flow. This is a unique geological and hydrologic feature, because the Continental Divide does not split anywhere else in the United States.

Surface Water Quality

Baseline water quality of water bodies within the RMPPA is influenced by the type of rock and soils with which the water has been in contact, and water quality also varies depending on flow conditions. Human-induced impacts, such as changes in thermal and turbidity conditions in water bodies and impacts from increased salinity, heavy metals, and nutrients from irrigation or other discharges, impact natural water quality in this region. Water quality impacts within the RMPPA may be associated with agricultural runoff, road maintenance, removal of riparian vegetation, channel modification, stream bank destabilization, atmospheric deposition, resource extraction, oil and gas activities, urban runoff, and grazing activities. Heavy metal, nutrients, sediment, and salinity impacts can be associated with mining, oil and gas extraction, agricultural runoff, and other surface-disturbing activities. Water quality typically varies as a function of flow conditions.

As water quality decreases, the ability of aquatic benthos, food base, and fisheries to maintain themselves is diminished. Stressors associated with increasing temperatures, lower dissolved oxygen levels, changing pH, and smothering from sediments negatively impact the aquatic ecosystem and diminish the ability of a stream system to sustain natural conditions.

The primary surface water quality concerns in the RMPPA are salinity in the Little Snake River basin and turbidity in the North Platte River Basin (Appendix 11). The Little Snake River is part of the Upper Colorado River Basin and is therefore covered by the *Colorado River Basin Salinity Control Act*. Many of the watersheds discharging water within the RMPPA are on highly erodible soils, notably Muddy

Creek flowing into the Little Snake River and Sage Creek flowing into the North Platte River (Appendix 11). Elevated dissolved salt loading has been documented in Muddy Creek, and elevated suspended sedimentation loading has been documented in both Muddy and Sage creeks. Reaches on both these streams have been or are listed as threatened on the State 303(d) list for sediment and/or habitat degradation.

Stream bank degradation and erosion due to poor vegetation cover within the watersheds are the predominant sources of sediment and salinity found in the streams. Management of livestock grazing, road design, and recreation planning and regulation of oil and gas activities within the RMPPA often mitigate the impacts of these activities to the maximum extent possible.

3.17.1.2 Ground Water Characteristics

Ground water recharge primarily originates as precipitation in the mountain areas surrounding the RMPPA, where geologic formations outcrop or water resources were deposited during past geologic periods. Aquifers providing usable water in the RMPPA can be found along streams and rivers in the unconsolidated alluvium. These aquifers are termed unconfined, or water table, aquifers. Wells emanating from these aquifers can supply water to ranches and farms, as well as to municipalities. Deeper confined aquifers supply water to artesian wells. Artesian wells may be flowing or not, depending on the potentiometric surface of the aquifer. Wells used for domestic; municipal; irrigation; drilling operations for oil and gas; stock-watering; and other uses are typically found in limestone, gravel, or sandstone formations and can be 200 to 2,000 feet beneath the surface.

Ground Water Quality

Extensive water quality surveys have been performed by the USGS, which recently collected data in Carbon and Sweetwater counties. Ground water quality conditions vary in the RMPPA and are defined by the geologic conditions in which the water is found.

Water from most aquifers in the RMPPA is of good quality. However ground water quality depends on the geology of the area where the aquifer is located. Some aquifers produce water with concentrations of salts and heavy metals. Oil and gas wells may produce water from these aquifers, which may be in sandstone, limestone, or coalbeds, depending on the formation. The drilling companies handle the produced water in various ways, such as containing it in evaporation ponds or in tanks and treating it or reinjecting it into a formation already containing water of lower quality, or through surface discharge once they have obtained a National Pollutant Discharge Elimination System (NPDES) permit from WDEQ and have completed the required Water Management Plan as part of the National Environmental Protection Act (NEPA) process. The NPDES permits issued by WDEQ are listed on its Web page at http://deq.state.wy.us/wqd (WDEQ-WQD 2002).

3.17.2 Water Management and Monitoring

3.17.2.1 Water Management

Water management within the boundaries of the RMPPA is primarily the responsibility of the Wyoming State Engineers Office, which administers state-held water rights, and the U.S. Bureau of Reclamation (USBOR), which administers dam and reservoir systems. BLM manages watersheds that supply irrigation water and water for other uses. Therefore it is the RFO staff's responsibility to manage these lands in a manner that maintains water quality and quantity (BLM 1997). Other agencies involved in managing and regulating the water resources of the area are the local conservation districts, Army Corps of Engineers, EPA, WDEQ, and WGFD.

The Wyoming State Engineers Office administers water rights within the State of Wyoming. Administration includes domestic, municipal, industrial, agricultural, recreational, and in-stream flow. The Wyoming Board of Control issues all water permits and decides all state water rights issues. All of the RMPPA is in Division One or Division Four as defined by the Wyoming Board of Control. Water rights in Wyoming are managed under the Prior Appropriation Doctrine, meaning "first in time, first in right."

USBOR manages the system of dams on the North Platte River, beginning with Seminoe Reservoir, to meet the downstream requirements of irrigators, municipalities, industrial uses, and the states of Wyoming and Nebraska. BOR distributes water according to Wyoming water law and the Final Settlement Stipulation and Modified North Platte Decree. The final settlement, approved by the U.S. Supreme Court on November 13, 2001, modified the 1945 North Platte Decree and ended the Nebraska v. Wyoming lawsuit. This settlement established the North Platte Decree Committee (NPDC) and set in place new procedures for the administration and use of North Platte River water by Nebraska, Wyoming, Colorado, and BOR. The Supreme Court decision freed Wyoming to adjudicate water rights in the North Platte River drainage and to continue to collect data and accomplish tasks associated with the settlement. The North Platte River is still considered to be fully allocated, which limits new water development in the RMPPA from sources connected to surface waters. Typical water development associated with the RFO management actions involve troughs or pits for stock watering that must be permitted with the Wyoming State Engineers Office.

Interstate agreements, decrees, and treaties concerning water within the RMPPA include but are limited to the following:

- Colorado River Compact, 1922: divides the basin at Lee Ferry, Arizona, and provides that upper basin states may use 7.5 million acre feet annually
- Upper Colorado River, 1948: apportions 14 percent of the water allocated in the Colorado River Compact to Wyoming
- Colorado River Basin Salinity Control Act, 1974 (P.L. 93-320): limits the amount of total dissolved salts flowing into Mexico. This was a result of Minute No. 242 (1973), an amendment to the 1944 treaty between Mexico and the United States
- Laramie River Decree, 1922: allows the State of Colorado to divert 49,375 acre-feet of water from the Laramie River and its tributaries per calendar year for use in Colorado, of which 19,875 acre-feet may be diverted out of basin
- Recovery programs and interagency agreements regarding water depletions in the Colorado and Platte River systems (Appendix 11)

WDEQ identifies water bodies that are water quality impaired. This list of streams, rivers, ponds, and lakes is updated every 2 years by the state. The streams that WDEQ considers impaired, either because of watershed degradation or because the water bodies exceed water quality limits for beneficial uses, are then listed on the State 303(d) list (Appendix 11). BLM participates in efforts to manage and monitor water bodies listed on the 303(d) list, which flow through land or are located on land it administers. Streams on the 303(d) list are listed on the WDEQ Web page at http://deq.state.wy.us/wqd/watershed/01452-doc.pdf.

3.17.2.2 Water Monitoring

Water resource monitoring in the RMPPA is designed and managed to provide BLM with baseline information on water quantity and quality as well as to answer project-specific questions. Monitoring activities include the collection of streamflow data, water samples for analysis, evaluation of stream health conditions, evaluation of springs and other water sources, and evaluation of streamflow conditions. In addition to the PFC assessments discussed in Section 3.15.3, which are indirect indicators of water quality and watershed health, direct methods are also used to monitor water resources. Direct methods include gaging stations (Table 3-37), water quality samples, and bioassessment protocols. Within the RMPPA, water quality samples historically have been collected at springs, wells, stream locations, ponds, and ephemeral washes. A watershed approach to water quality assessment in the RMPPA is used. Ground water monitoring occurs at several wells in the project area, with grab samples being collected periodically (Appendix 17).

Bioassessment protocols developed by WDEQ provide quantitative assessments on watershed health and ecosystem integrity. The RMPPA is implementing the WDEQ protocols and developing an integrated approach to the monitoring and assessment of watershed, aquatic, and riparian ecosystem conditions within areas that are reviewed for Rangeland Standards and Guidelines.

These collective monitoring efforts are helpful in providing information that is used to adjust management within the watersheds and along riparian areas. Information is also shared with WDEQ for listing or delisting water bodies on the 303(d) list. Assessments under the BLM Standards and Guidelines using a watershed approach are conducted on a 10-year cycle. The RFO staff began this watershed approach in 2001, and it plans to complete the first round of these assessments in 2008. Initial efforts have concentrated on watershed management areas in the western portion of the RMPPA, where BLM-managed lands are most extensive.

3.17.3 Soils

Soil data have been used by BLM as a basis for decisions concerning range sites, range improvements, and wildlife habitat sites, and for determining reclamation practices to address surface disturbance due to mineral development. In addition soil data have been used to locate sources of gravel and to determine the suitability of areas for use as water disposal pits for water produced from gas wells (BLM 1987). Order 3 soil surveys are not sufficiently detailed for many land management decisions and are in need of updating. In the sections below, the soil types found within the RMPPA are identified and discussed, along with specific conditions and trends. Watershed health standards are evaluated during Standards for Healthy Rangelands assessments (Appendix 8).

3.17.3.1 Soil Conditions and Characteristics

Soils in the RMPPA vary. They include shallow-to-deep and fine-to-coarse-textured soils. They vary in salt content, organic matter content, and parent material. Map 3-12 delineates soil zones based on precipitation zones within the RMPPA for which generalizations can be made about soil productivity, permeability, infiltration, stability and strength, and erosion potential. These areas are distinguished by varying amounts of precipitation (i.e., precipitation zones, elevation, soil temperature, and soil parent material) (BLM 1987). General conditions found in soils within Map Units A through F on Map 3-12 are discussed in more detail in the following sections. These conditions collectively influence watershed function and the development of healthy vegetation, which together enable human uses and provide wildlife habitat.

3.17.3.2 Soil Productivity

Soil productivity is the most important soil value in the RMPPA because it determines stocking rates for livestock through the amount of vegetation produced, it dictates the kinds of plant communities on which wildlife habitat is based, and it determines reclamation potential in areas of surface disturbance. Most soils in the RMPPA support vegetation that is used by livestock and that also serves as wildlife habitat. Soil characteristics and environmental factors that affect soil productivity include organic matter content, salt content, amount of precipitation, soil temperature, aspect, soil depth, and soil parent material.

Soil productivity is naturally low throughout the RMPPA, although it is higher around springs and along natural drainage ways (BLM 1987). Productivity varies depending on a number of factors, including soil depth, texture, topographic slope, slope aspect, and permeability. However variability in the amount of precipitation is the main factor in variations in soil production within the RMPPA. Within the RMPPA, Map Unit A (shown on Map 3-12) receives the least precipitation, and Map Unit C receives the most. The more precipitation an area receives, the more vegetative cover is present. Vegetative cover contributes organic matter to the soil, which in turn provides nutrients for plants, stores more moisture, and improves soil structure—all of which promote vegetative growth.

Map Units C and F have soils with thicker and darker surface horizons, indicating higher organic matter content. The darker surface horizons are due to the higher amount of vegetation typically found within these areas, and to colder temperatures in the case of Map Unit C. Colder temperatures slow the decay of organic material, thus allowing more organic matter to accumulate. The warmer temperatures in Map Unit F create a longer growing season, thus allowing more vegetation to grow and plants to produce more vegetative material. Map Units B, D, and E contain more organic matter than does Map Unit A, although none of these units have the dark surface layer (BLM 1987).

Other factors that affect productivity are depth to bedrock, crusting, and nutrient content. Soils in the RMPPA are generally shallow, with a depth to bedrock of less than 20 inches occurring in all map units, and occurring most in Map Unit C and least in Map Unit D. This restricts root penetration and lowers water-holding capacity, because water tends to run off these areas faster than it infiltrates. Crusting, which results from a breakdown in soil structure caused by high sodium content and raindrop impact on bare areas, reduces water infiltration and thereby salt leaching and root penetration. This occurs particularly in Map Unit A but can also occur in Map Units B, C, E, and F. Nitrogen and potassium are adequate for plant growth throughout the RMPPA, but phosphorus is limited.

As a result of all these factors, Map Unit A has the lowest overall soil productivity; Map Units B, D, and E are intermediate in production; and Map Units C and F have the highest soil productivity (BLM 1987). Bottomland and stream terrace soils are the most productive, but limitations include alkalinity, high clay content, low permeability, and flooding. Upland soils are moderately productive. Limitations include shallow depths, low permeability, and alkalinity. The productivity of dissected upland soil is unknown but is likely to be low. Playa productivity may be high if salinity is not a limiting factor.

3.17.3.3 Soil Permeability

The permeability of a soil affects its use for reservoirs, water disposal pits, sanitary landfills, and sewage lagoons. Such facilities require soils that are either impermeable or just sufficiently permeable to filter out impurities before the leached water reaches natural surface or ground water. The soils in Map Unit A are generally fine in texture and are either sufficiently impermeable to effectively hold or filter water or can be compacted to function as such. Map Units B, C, E, and F are less effective at holding or filtering water, but they can be aided in fulfilling this function through compaction. Map Unit D soils are very permeable, and even compaction does not enable them to hold water. For any of these soils, if the

underlying bedrock (typically within 60 inches of the surface) is fractured, the ability of the soil to contain water is markedly diminished. Piping (formation of tubular cavities) may also reduce the containment capacity of Map Unit A, where gypsum seams have been dissolved or wet-dry cycles have produced cracks in clays. Finally, the containment capacity of Map Units A, B, C, E, and F may be diminished adjacent to major drainages where strata of coarser materials, which are permeable and typically not good filters, may be embedded with finer materials.

3.17.3.4 Soil Strength and Stability

Soil strength is an important consideration during construction of roads and facilities because low-strength soils are subject to deformation. In areas of low soil strength, building foundation stability is low, and roads and drill pads can become rutted and slippery when wet. Soils composed predominantly of one particle size exhibit low strength. Soils containing a variety of particle sizes exhibit the greatest strength because they better fill in voids of varying sizes, causing more friction among particles. Within the RMPPA, soils within Map Unit A have low strength. Map Units B, C, E, and F have moderate strength; these textures are typically loamy, and compaction may be possible to increase strength and reduce the potential for deformation under a load. Soils in Map Unit D and portions of Map Unit A are sandy; because these soils are loose, they are subject to displacement under dry conditions. In Map Unit A, many soils have clayey or silty textures, making compaction difficult and creating deformation upon wetting under a load (BLM 1987).

Soil stability problems occur in Map Units A, B, E, and F, but Map unit C has the greatest stability problems. Map Unit C receives the greatest amount of precipitation, primarily in the form of snow. Soil becomes saturated from snowmelt, which increases soil weight. This can cause mass wasting, which is the downslope movement of rock and soil under the influence of gravity (BLM 1987).

3.17.3.5 Soil Erosion

Accelerated rates of erosion do occur within localized areas, including areas of surface disturbance and some drainage areas, and especially riparian areas where animals tend to congregate. Reduced vegetation along drainage ways tends to destabilize stream banks and contribute to stream downcutting and gullying. Accelerated stream bank erosion has historically occurred within the RMPPA in numerous locations, including the Muddy Creek, Sage Creek, Second Creek, and Third Sand Creek watersheds (BLM 1987).

Within the RMPPA the highest soil erosion rates occur within Map Unit A as a result of naturally low vegetative cover, soil crusting, low organic matter content, and soft shales which are susceptible to erosion. These characteristics are especially apparent in the Muddy Creek drainage. Because of greater vegetative cover and organic matter content and lower sodium content, rates of water erosion are lower in Map Units B, E, and F and lowest in Map Unit D. Map Unit D is susceptible to wind erosion; although it is protected by good vegetative cover, it could actively erode if vegetative cover were reduced. Wind erosion also occurs in Map Units A, B, C, E, and F, but at lower rates (BLM 1987).

In addition to the soil erosion that occurs in the generalized map units discussed above, stabilized intermittent sand dunes are present in hilly upland areas within the RMPPA. For example, the RMPPA contains the Sand Hills area, which is a unique and fragile dune area with diverse vegetation. BLM management objectives include protection of the unique vegetation complex and minimization of soil erosion. In addition, there is a band of frequently active sand dunes north of Seminoe Reservoir and stretching across the northern portion of the RMPPA. Dune Ponds, also within the RMPPA, is a 150-acre area consisting of large sand dunes. These scattered areas of sand dunes are easily eroded by wind when vegetation is removed.

3.17.3.6 Soil Salinity

Soluble salt levels affect management potentials as a result of toxicity, reduced infiltration rates, limits on nutrient availability, and reduction of water available to plants. Major causes of increased salinity contribution from public lands include overgrazing, OHV use, and energy exploration and extraction. These activities compact the soil surface and cause a reduction in plant cover, creating increased runoff carrying salt-laden sediments into drainages (BLM 1996). In addition, deteriorated riparian conditions can eventually convert perennial streams into ephemeral drainages where seasonal water tables fluctuate (Wichers 2002), as discussed in Section 3.15.3.

Salts in the soil stress plants by making water uptake more difficult. More precipitation received in an area translates into more moisture available to leach salt out of the rooting zone. Areas in which soils are sufficiently leached can produce good vegetative cover.

Varying concentrations of soluble salt in soil occur throughout the RMPPA. The most leaching occurs in Map Units C, D, and F, and the least in Map Unit A. Map Units B and E have soils that are sufficiently leached to produce good vegetative cover (BLM 1987).

3.18 Wild Horses

Following passage of the *Wild, Free-Roaming Horse and Burro Act* in 1971, BLM identified six areas used by wild horses within the current RMPPA. The following three herd areas failed to meet the criteria for suitably maintaining a healthy population of wild horses in accordance with the intent of the Act: Bolten, Checkerboard South, and Muddy Creek (subsequently known as Doty Mountain/Cherokee). Management of horses in these areas was not considered for the following reasons:

- The area was more than 50 percent privately controlled land, and the private landowners showed no interest in having their lands included in an HMA.
- Most of the horses were privately owned and claimed.
- Fencing and other barriers precluded free movement of wild horses to year-round habitat.

These conditions have not changed significantly since these decisions were made. Horses in these herd areas were removed.

A brief history of Wyoming BLM management of wild horses is contained in Appendix 12.

The following three herd areas were determined to be able to support viable healthy populations of wild horses: Cyclone Rim (later renamed Lost Creek), Stewart Creek/Chain Lakes, and Sand Creek (later renamed Adobe Town). Three HMA currently correspond to these three herd areas. Wild horses that leave designated HMAs are considered excess and are removed.

3.18.1 Herd Management Areas

The following paragraphs briefly describe the habitat and wild horses in the three identified HMAs within the RMPPA.

3.18.1.1 Adobe Town HMA

The Adobe Town HMA is located in south-central Wyoming between Interstate 80 and the Colorado-Wyoming border (Map 2-21). Topography in the area is varied, with everything from colorful eroded

desert badlands to wooded buttes and escarpments. In between these two extremes are extensive rolling-to-rough uplands interspersed with some desert playa and vegetated dune areas. The Adobe Town WSA is contained entirely within the Adobe Town HMA. Off-road restrictions and difficult terrain within the WSA provide a relatively undisturbed location for wild horses.

Total acreages for the HMA are shown in Table 3-38. It should be noted that 6.1 percent of the HMA is privately controlled land (deeded lands and Wyoming state land leases). These privately controlled lands are generally unfenced and freely available to the horses. A disproportionate share of the dependable water sources occurs on these lands. Typically these lands are controlled by the grazing permittee(s) in the area and used in conjunction with their public grazing operations.

Table 3-38. RMPPA Wild Horse AMLs and Populations

Area	Public Acres	Other Acres	AML	Average Rate of Annual Increase	Current Estimated Population[1]
HMAs					
Adobe Town	420,000	28,000	700	16%	839
Lost Creek	235,000	15,000	70	18%	143
Stewart Creek	215,000	16,000	150	18%	129
HMA Totals	870,000	59,000	920	-	1,111
Other Areas Affected by Wild Horses					
I-80 North	359,000	195,000	0	24%	19
I-80 South	333,000	356,000	0	23%	111
Bairoil Pasture	6,000	1,000	0	-[2]	-[2]
Other Areas Total	698,000	552,000	0	-	130
Total of All Areas	1,568,000	611,000	920	-	1,241

Notes:
1 Population estimation as of December 31, 2003
2 Wild horses in the Bairoil Pasture of the Stewart Creek allotment are managed with the excess wild horses in the I-80 North area.
Source: BLM, 2003.

Plant communities are very diverse in this large area. The most abundant plant community in the HMA is sagebrush/bunchgrass. Other plant communities present are desert shrub, grassland, mountain shrub, lentic riparian grass/sedge, juniper woodlands, and a very few aspen woodlands. Limited, sensitive desert riparian areas are important features in the landscape, as they provide much needed water resources for wild horses and wildlife.

The appropriate management level (AML) for wild horses in the Adobe Town HMA is 700 adult animals plus the unweaned colts of the year. It is estimated that there are currently around 839 wild horses in the HMA (Table 3-38). These horses have averaged a rate of annual increase of 16 percent per year. Genetically, wild horses in the Adobe Town HMA descend from domestic breeds such as escaped domestic saddle stock form surrounding populated areas.

3.18.1.2 Stewart Creek HMA

The Stewart Creek HMA is located in the west-central portion of the RMPPA, along the northern boarder (Map 2-21). It is traversed in a north-south direction by the Continental Divide, along Lost Soldier and Bull Springs rims. Adjacent to these rims on either side are strongly rolling uplands. These areas transition to the gently rolling uplands that comprise the majority of the HMA. Although annual precipitation varies between just under 7 inches to more than 10, most of the precipitation occurs as snow.

The most abundant plant community in this HMA is sagebrush/bunchgrass. Other communities present are desert shrub and grassland, with limited lentic riparian grass/sedge, juniper woodland, mountain shrub, and desert willow riparian types. Wild horses in the area have proven to be very adaptable to changes in their environment. During harsh winters they get by on coarse woody vegetation in place of grass (BLM 1994). Limited, sensitive desert riparian areas are important features in the landscape, as they provide much-needed water resources for wild horses and wildlife.

Total acreages for the HMA are shown in Table 3-38. It should be noted that 6.6 percent of the HMA is privately controlled land (fee lands and Wyoming state land leases). These privately controlled lands are generally unfenced and freely available to the horses. A disproportionate share of the dependable water sources occurs on these lands. Typically, these lands are controlled by the grazing permittee(s) in the area and used in conjunction with their public grazing operations.

The AML for wild horses in the Stewart Creek HMA is 150 plus the unweaned colts of the year. It is estimated that there are 129 wild horses in the HMA (Table 3-38). The horses in the HMA have averaged a rate of annual increase of 18 percent per year. The wild horses in the HMA are assumed to have been influenced by the routine escape of domestic saddle stock from the surrounding areas. Genetic testing on horses from the west side of the Lost Solider Divide has shown them to have some genetic characteristics of the Spanish Colonial Horse.

3.18.1.3 Lost Creek HMA

The Lost Creek HMA is located in the northwest corner of the RMPPA (Map 2-21). The HMA is joined on the east by the Stewart Creek HMA, on the north by the Antelope Hills HMA, and on the west by the Divide Basin HMA. The RMPPA does not manage the latter two HMAs. The Lost Creek HMA lies within the Great Divide Basin, a closed basin out of which no water flows.

Some desert playa and vegetated dune areas are interspersed throughout the HMA. The most abundant plant community in this HMA is sagebrush/bunchgrass. Other plant communities present include desert shrub, grassland, and lentic riparian grass/sedge primarily associated with desert wetland areas. Several sensitive desert wetland/riparian areas occur throughout the area, including both intermittent and perennial lakes and streams.

Total acreages for the HMA are shown in Table 3-38. It should be noted that 6 percent of the HMA is privately controlled land (fee lands and Wyoming state land leases). These privately controlled lands are generally unfenced and freely available to the horses. A disproportionate share of the dependable water sources occurs on these lands. Typically these lands are controlled by the grazing permittee(s) in the area and used in conjunction with their public grazing operations.

Genetic testing on the wild horses in the Lost Creek HMA has shown the horses carry a high percentage of genetic markers identified with the New World Iberian (Spanish Colonial) breeds. The Roger's genetic similarity index (a common index used to determine genetic similarity of various breeds) for the wild horses from the Lost Creek HMA was quite high (.845) for the New World Iberian breeds. In other words, the horses in the Lost Creek HMA are genetically more similar to the Spanish Mustang and other New World Iberian breeds than they are to other breeds, such as the American Quarter Horse or the Morgan. This characteristic makes the horses in the Lost Creek HMA unique among the wild horse herds of Wyoming tested so far. The small size of the Lost Creek wild horses positions them rather precariously, genetically speaking, to lose their unique marker through mixing with other wild horses. Fortunately the Stewart Creek horses on the west side of the Lost Soldier Divide are genetically similar, with a Roger's genetic similarity of .818 to the New World Iberian breeds, and therefore do not represent a significant threat to this genetic resource.

The AML for wild horses in the Lost Creek HMA is 70 adults plus the unweaned colts of the year. It is estimated that there are currently 143 wild horses present in the HMA. The horses in the HMA have averaged a rate of annual increase of 18 percent per year.

3.18.2 Other Areas Affected by Wild Horses

In addition to the three HMAs identified above, areas adjacent to these HMAs are affected by wild horses. As competition for resources within HMAs increases, some wild horses venture outside of HMA boundaries in search of forage and water resources. These horses are considered excess and are removed. There are areas to which wild horses commonly venture, including I-80 North below the Stewart Creek and Lost Creek HMAs, I-80 South above the Adobe Town HMA, and the Bairoil pasture of the Stewart Creek allotment northeast of the Stewart Creek HMA. Populations of horses in these areas are shown in Table 3-38.

Wild horse population fluctuations are influenced not just by the reproductive increases of wild horse populations, but also by their contact with other horse herds outside the RMPPA HMAs. These meta-populations provide increased genetic material to maintain viable populations. Table 3-39 shows the meta-populations of which the wild horses of the RMPPA are a part.

Table 3-39. Wild Horse Regional Meta-populations Associated with the RMPPA

RMPPA HMAs		Meta-populations		HMA(s)in the Meta-populations	Type of Interaction	Points of Contact
Name	AML	Name	AML			
Adobe Town	700	Stateline	1250	Adobe Town Salt Wells Creek Sand Wash (Co)[2]	Male migration, female exchange	Haystacks, Alkali, Sand Creek, Powder Wash
Stewart Creek	150	Red Desert[1]	790	Stewart Creek Lost Creek Antelope Hills Divide Basin	Male migration, female exchange	Hay Reservoir, Bare ring, Hadsell, Osborne Draw
Lost Creek	70	Red Desert[1]	790	Stewart Creek Green Mt Crooks Mt Lost Creek Antelope Hills Divide Basin	Male migration, female exchange	Hay Reservoir Bare ring, Hadsell, Osborne Draw

Notes:

1 Wild horses from the Sweetwater meta-populations (Green Mountain HMA and Crooks Mountain HMA) occasionally mix with wild horses in the Red Desert meta-populations.

2 Sand Wash HMA is located entirely in Colorado, within the BLM's Craig Field Office. Although managed by Colorado BLM, horses from the Sand Wash HMA provide biologically and genetically important interactions with horses from the other HMAs in the meta-populations.

Management of wild horses in the RMPPA is guided by the Rawlins Field Office Wild Horse Management Handbook. The handbook contains policy, practices, procedures, and technical support documentation that affect wild horse management. Specifically the handbook contains guidelines for wild horse management, such as how AMLs are monitored and adjusted, in addition to other wild horse management practices.

3.19 WILDLIFE AND FISH

This section focuses on those wildlife and fish species in the RMPPA that are of particular interest or importance to the public or the ecosystem because they are used in some way (hunted, observed, photographed, etc.), have intrinsic value, or because they have populations that are at potential risk (threatened, endangered, of special concern, or top food chain status). The millions of acres of varied BLM-managed lands within the RMPPA provide important habitat for wildlife and fish species, especially where such lands and the waters they contain occur in large unfragmented tracts and reaches.

3.19.1 General Wildlife

Terrestrial wildlife species, to the extent that they are managed, are overseen by state and Federal wildlife management agencies. WGFD is responsible for oversight of big game species, nongame species, and small game species that are non-migratory. The USFWS has oversight of migratory bird species, whether they are hunted (e.g., waterfowl) or not (e.g., passerine species such as warblers and sparrows), and of all Federal Threatened, Endangered, or Candidate plant and animal species. WGFD participates in these activities. However BLM manages millions of acres of habitat that support these wildlife species, and thus has an integral role in their ecological health and viability.

Wildlife habitat is best characterized by the vegetation types discussed in Section 3.15 and the water resources discussed in Section 3.17, although air quality (Section 3.2), geology and topography (Section 3.8), and soils (Section 3.17) are also important contributors to habitat character. Such factors as fire management; forestry; rights-of-way; livestock grazing; oil, gas, and other energy developments (e.g., windpower and coal mining); OHV use and other recreation; and wild horses also influence the quality of habitat, as do management actions applied throughout BLM-administered lands and in special management areas. Most wildlife species utilize vegetation on the basis of its physiognomy (e.g., structure [height and spacing] and growth form [gross morphology and growth aspect] of the predominant species, and leaf characteristics of the dominant or component plants). This means that a given species may use a shrub of a particular height and growth form irrespective of its species. Therefore the mapping of vegetation zones (Map 3-10) characterizes wildlife habitat in general terms. Especially important habitats are mountain shrub (mountain big sagebrush and antelope bitterbrush); monotypic stands of bitterbrush and true mountain mahogany; coniferous, rockland, aspen, riparian, and lowland sagebrush (primarily Wyoming big sagebrush on flatlands and basins below 7,000 feet) (Wichers 2002).

As is apparent from the vegetation map, the habitat diversity within the RMPPA is extreme, ranging from alpine barren areas in the Sierra Madre and the Snowy Range in the south-central portion of the RMPPA to desert barren areas in the Red Desert in the southwestern portion, with extensive grassland, shrub, and forest/woodland communities in between. The most historically important of these habitat types, on the basis of total species, number of breeders, number of sensitive species, and availability, are open aquatic, riparian (grassland, willow-waterbirch, aspen, and cottonwood), mountain shrub, juniper, aspen, aspen/conifer, ponderosa pine, Douglas fir, rockland in the Laramie Peak and North Platte Valley, and wet forested meadow (BLM 1987). The vegetation zones and plant community classes currently recognized in the RMPPA are discussed in Section 3.15. As noted above, the community classes that are most important are those associated with climate or water availability, the less abundant and more diverse shrub classes such as mountain shrub, deciduous woodland and forest classes, the less abundant coniferous classes such as ponderosa pine and Douglas fir, and areas of interspersed deciduous and coniferous trees. Within each vegetation zone, similar wildlife species will be found, although individual species will tend to prefer vegetation of a particular height and density. Within this preferred area, individual plants of a particular age or life stage may also be preferred. Thus it is important to manage each vegetation zone for maximum diversity in terms of age, height, and density so that the biodiversity

and ecological health and resilience of the plant communities and their wildlife inhabitants are maintained. At the same time, excessive fragmentation of vegetation zones is to be avoided so that wildlife species requiring large tracts of a similar physiognomic type can complete their life cycles successfully.

More than 374 vertebrate species have been documented in the RMPPA (BLM 1987). The vertebrate wildlife species that occur represent all major vertebrate classes: amphibians, reptiles, birds, and mammals. Fish are discussed in this section. Data are available primarily for birds, mammals, and fish because of particular interest in them by the hunting, fishing, and recreating public and by natural resource specialists. However there are some data available for amphibians and reptiles. The most important of the previously mentioned species are discussed below.

Small mammals within the RMPPA include cottontails, jackrabbits, snowshoe hares, squirrels, ground squirrels, mice, voles, and shrews. Other species within the area include badger, bobcat, marten, weasel, coyote, raccoon, red fox, swift fox, gray fox, skunk, beaver, mink, and muskrat.

Nongame species include all species or groups not discussed above. Such species are numerous and diverse, especially given the range of habitats present in the RMPPA. Because of limitations of knowledge, space, time, and general interest, only a few of these species or groups are addressed below. Each has an important and long-term association with the RMPPA. The hundreds of additional bird species that inhabit the RMPPA for all or a part of their life cycles are important components of the ecosystem and an important focus of the large segment of recreationists who enjoy bird watching. The diversity of these species is supported by the wide range of habitats present within the RMPPA. BLM is a participant in the Wyoming Partners in Flight, and specific biological objectives and recommendations for land birds are presented in the Wyoming Bird Conservation Plan.

3.19.1.1 Raptor Habitat Management

Raptors (birds of prey) found in the RMPPA include eagles, falcons, hawks, harriers, and owls. These species occupy an ecological position at the top of the food chain and, therefore, act as biological indicators of environmental quality because they are fewer in number, have longer reproductive cycles, and are more prone to bioaccumulation. Most of these species are also sensitive to disturbance, especially during their nesting cycles. Some species of raptors concentrate their nests on suitable strata along cliffs or other formations and use such sites year after year unless disturbed.

In the RMPPA, concentrations of ferruginous hawks or golden eagles and prairie falcons (depending on the nesting substrate) have been identified in the past at Shamrock Hills, Brown Canyon Rim, Seminoe, Red Rim, Atlantic Rim, Cherokee, Muddy Creek, Doty Mountain, Delaney Rim, Bolton Rim, Hanna, and Platte-Divide (BLM 1987). Identification of these nesting concentrations was based in part on a raptor study that began in 1975[3] and that has continued through the present, resulting in extensive documentation of raptor nesting in the RMPPA.

The intensity of this study has varied in response to proposals for development in the RMPPA. Extensive data were collected in the Shamrock Hills area beginning in 1988 in response to potential development of coalbed gasification. These efforts were renewed in 1997 through 2001 and are ongoing (Apple 2002a). In addition, beginning in 1998, extensive data collection was initiated in an area about 25 miles west of Rawlins and extending both north and south of I-80 in the vicinity of Wamsutter (Apple 2002a), where natural gas development occurs. Associated is a study on the use of artificial nest sites (a project begun in 1988) and a ferruginous hawk banding program (begun in 1993) (Apple 2002b).

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3 Only three records in the database predate this year.

The long-term database on nest locations is very effective in characterizing the raptor species that nest in the RMPPA and their nests. The data show not only the relative number of nests of each species, but the height and type of substrate on which they are built. This study provides extremely well-documented information on many of the species, especially the ferruginous hawk, which has been the primary focus of this effort. Of the total nests, 54.3 percent were on BLM-managed public land and 37.4 percent were on private land, with the remainder on Forest Service, state, other, or unrecorded land ownership types. The more focused portions of this overall study provide extensive additional data. For example, between 1998 and 2001, active ferruginous hawk nests were more often successful on artificial nest sites (81 percent) than on natural nest sites (65 percent). Overall nesting success for active nests of all species was 85.5 percent based on 2001 data, while in the Shamrock Hills Study Area, Continental Divide/Wamsutter II North of I-80, Continental Divide/Wamsutter II South of I-80 (Northern Segment), Continental Divide/Wamsutter II South of I-80 (Southern Segment), and other incidental areas, success of active nests was 92 percent, 80 percent, 80 percent, 93.9 percent, and 78.3 percent respectively (Apple 2002b). These areas were undergoing varying degrees of development at the time these data were collected. The Jep Canyon ACEC was established in part to maintain the productivity of nesting raptor pairs (BLM 1990a), as was the Shamrock Hills ACEC.

Data have also been collected on prey items noted in ferruginous hawk nests between 1993 and 2001 (Apple 2002b). Wyoming ground squirrels are by far the predominant prey species. Other prey species recorded at least once on the basis of prey remains were 13-lined ground squirrel, vole, sagebrush vole, cottontail rabbit, least chipmunk, prairie dog, western harvest mouse, short-tailed weasel, white-tailed prairie dog, northern pocket gopher, Greater sage-grouse, horned lark, sparrow species, and other songbirds. Voles, cottontails, and prairie dogs were regular if not frequent prey items. The remaining prey species appear to be incidental food items.

3.19.1.2 Waterfowl and Other Shorebird Habitat Management

Ducks and geese occur in aquatic areas throughout the RMPPA. Some individuals or species breed, winter, or remain yearlong in the state, while larger numbers pass through the RMPPA on spring or fall migration. The RMPPA includes the Central Flyway (east of the Continental Divide except for the Great Divide Basin) and the Pacific Flyway (west of the Continental Divide and the Great Divide Basin). Most of these species depend on wetlands or open water that is sufficiently shallow to support rooted vegetation, and they feed on the biotic communities developed in such habitats. Many species feed on insects and small fish or amphibians in addition to, or instead of, plant foods in these aquatic areas. Species that primarily eat fish may feed in deeper water where there is insufficient light to support rooted vegetation. In addition, some species feed frequently on upland grasses and forbs in grassy fields and meadows where such vegetation is succulent and sufficiently open to enable rapid flight and avoid harboring predators. Such habitats support waterfowl and other shorebirds year-round. Nesting cover is an important attribute for both upland and riparian nesting species.

The various natural lakes, constructed reservoirs, and streams within the RMPPA provide important habitat for waterfowl and other shorebirds. The most important of the lakes and reservoirs are Seminoe Reservoir, Pathfinder Reservoir, Bucklin Reservoir, Shirley Basin Reservoir, Teton Reservoir, Little Sage Creek Reservoir, Flowing Well Reservoir, Wheatland Reservoir, Lake Hattie, Cooper Lake, James Lake, and the Muddy Creek wetlands complex, but even small pits, reservoirs, and playa lakebeds provide important habitat when adequate water is available. Development of water sources in normally dry desert regions has created habitat and increased production of waterfowl and other bird species. Because of unlimited nesting habitat in the rangelands around these waters (compared to farming around prairie potholes), nesting success and brood sizes are often larger. In addition, pools in the numerous streams and their tributaries provide important habitat. Only some of these aquatic resources are on BLM-managed public land.

3.19.1.3 Neotropical Migratory Bird Habitat Management

The United States has ratified international conventions regarding the protection of migratory birds. *The Migratory Bird Treaty Act* (MBTA) of 1918 (16 USC 703-711) implements the protective measures of these conventions. The MBTA prohibits "taking," which is the killing, possession, or transport of any migratory bird or their eggs, parts, or nests except as authorized by a valid permit. These actions may be permitted only for educational, scientific, and recreational purposes, and harvest is limited to levels that prevent overutilization. *Executive Order* 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, was issued in January 2001 and emphasizes that federal actions are subject to the MBTA. It directs Federal agencies (such as BLM) to evaluate the effects of agency actions in NEPA documents like this Draft EIS.

Under the MBTA, permits can be issued by USFWS for the intentional take of specific birds and nests that have been identified prior to application for the permit; however no permits can be issued for take that is incidental to the action being taken (i.e., incidental take). For example, if by constructing a livestock water development an active migratory bird nest is destroyed, the action would constitute an "incidental take" of the nest where the intent of the action was not to destroy the migratory bird nest but to construct a livestock water development. Therefore taking the nest is incidental to constructing the development.

All bird species likely to be found within the RMPPA are protected under the MBTA, with the exception of house sparrow, European starling, and rock dove. Any incidental take of these protected species would constitute a violation of the MBTA.

3.19.1.4 Upland Game Bird Habitat Management

Upland game birds in Wyoming that are native to the state include blue grouse, ruffed grouse, Greater sage-grouse, sharp-tailed grouse, and mourning doves. Upland game birds that are introduced include pheasant, chukar, gray partridge, and turkeys. Greater sage-grouse are the most important of these species, especially on BLM-managed lands. Greater sage-grouse are discussed in the BLM Wyoming State Director's Sensitive Species List section of this document. BLM habitat management is directed toward native species.

There are three other species of grouse that are known to occur within the RMPPA. These species include the Columbian and plains sharp-tailed grouse and the blue grouse. Columbian sharp-tailed grouse are discussed in the BLM Wyoming State Director's Sensitive Species List section of this document. The range of the plains sharp-tailed grouse extends eastward from the divide. Blue grouse are found primarily in the Ferris and Seminoe Mountains, the Laramie Peak area, and throughout forest fringes associated with the Medicine Bow National Forest.

The current range of the plains sharp-tailed grouse includes eastern Wyoming, northeastern Colorado, and portions of Nebraska. This species has the potential to occur throughout the eastern portion of the RMPPA wherever remnants of appropriate habitat occur. In Wyoming the populations are highest in Goshen County and eastern Platte and Laramie counties. The optimum habitat includes an interspersion of plant communities with extensive ecotones, including grassland, grassland-shrub mixtures, and mixed-grass prairie occasionally broken by brushy draws. Dancing grounds are located in these mixed shrub-grassland habitats, and broods are reared in habitats where shrubs are interspersed with dense herbaceous cover. Wintering habitat includes aspen parklands and stands of chokecherry, aspen, cottonwood, green ash, and willow, especially when the snow is deep.

Blue grouse tend to use habitat that contains mountain shrubland, aspen/conifer woodland, aspen woodland, ponderosa pine/Douglas fir forest, limber pine woodland, and lodgepole pine forest. These grouse prefer to occupy the borders between these habitat types as well as small, interspersed riparian areas for breeding, nesting, and brood rearing (BLM 1987).

3.19.1.5 Big Game Species Habitat Management

Big game species in the RMPPA include pronghorn, deer (mule deer and small numbers of white-tailed deer), elk, moose, black bear, mountain lion (black bear and mountain lion are classified as trophy game animals in Wyoming statutes), and bighorn sheep. These species are either herbivores (pronghorn, deer, elk, moose, bighorn sheep) competing to some degree with other herbivorous wildlife, livestock, and wild horses; carnivores (mountain lion), competing with other wildlife predators; or omnivores (black bear), which have characteristics of both preceding groups.

The populations of the big game species that live in habitat managed by BLM are managed by the WGFD using a complex process that considers both quantitative and qualitative data. Three WGFD regions (Laramie, Green River, and Lander) cover much of the RMPPA. The big game populations evaluated most extensively in all three regions are pronghorn, mule deer, and elk. In the Laramie Region, white-tailed deer, moose, and bighorn sheep populations are also evaluated. Of these, pronghorn, mule deer, and elk are the primary species present on BLM-managed lands within the RMPPA.

Information considered in the WGFD evaluation process includes population indices and harvest statistics for individual herd units. Population indices are such indicators as the number of bucks per 100 does and the number of fawns per 100 does—information that provides perspective on population balance and health. Depending on species, a variety of methods are used to determine herd unit ratio data and data on population trends. Population estimates, considered together with population trend, range condition, weather, management objectives, and the socioeconomic factors of hunter demand and license revenues, are used to develop population objectives for each herd unit. Using WGFD information that was averaged from 1997–2001, comparisons can be made about the species richness and productivity across Wyoming. When numbers for antelope, mule deer, and elk are combined for similar-sized geographic units, the harvest data for the Sierra Madre/Snowy Range area within the RMPPA are similar to the Sublette region around Pinedale, considered the most productive big game region in the state. In addition, recreational days and the economic benefits associated with hunting were 50 percent higher for the Sierra Madre/Snowy Range area when compared to the Sublette region.

Human disturbance of big game, whether it is intentional (e.g., harassment) or unintentional (i.e., accidental), results in increased energy costs to the alerted animal (Bromley 1985). The disturbed big game animal incurs a physiological cost either through excitement (preparation for exertion) or locomotion. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to poorer (lower)-quality habitat. If the disturbance becomes chronic or continuous, these costs can result in reduced animal fitness and reproductive potential (Geist 1978).

BLM defines "flight distance" (or displacement distance) as that to which a person can approach a wild animal without causing it to flee. Factors that influence displacement distance in big game include—

- Inherent species-specific characteristics.
- The seasonally changing threshold of sensitivity as a result of reproductive and nutritional status.
- The type of habitat (e.g., longer disturbance distances in open habitats).
- The specific experience of the individual or group (e.g., extent and type of exposure to humans/habituation).
- Weather (adverse weather [wind, fog, etc.] may decrease the disturbance).

- Time of day (e.g., animals generally are more tolerant during dawn and dusk periods).
- The social structure of the animals of interest (a group of individuals is generally more tolerant than solitary individuals).

Several studies have been conducted over the past 25 years in an effort to determine the extent to which human activities influence big game. Many of these studies focus on the potential impacts to big game from oil and gas exploration and production, surface mining, road development, and recreation. In some cases researchers attempted to determine the distance at which these activities resulted in disturbance to big game. This information was compiled and used to estimate an average distance at which all or a majority of the animals of a particular species would remain undisturbed during well construction and road use (Table 3-40). This average distance does not represent an absolute or definitive value, but rather a measure of the anticipated displacement of big game from areas adjacent to such activities. In some cases topographic or habitat features may provide protection from the visual disturbance and noise associated with these activities and allow animals to remain undisturbed within the average displacement distance.

Table 3-40. Potential Displacement for Big Game Species

Big Game Species	Type of Disturbance	Potential Displacement Distance (miles)	Supporting Literature
Pronghorn	Well construction/workovers	0.5	Gusey (1986); Easterly et al. (1991). Bruns (1977); Autenrieth (1983); Reeve (1984); Yeo et al. (1984)
	Road traffic/operations and maintenance	0.25	
Mule Deer	Well construction/workovers	1.0	Hiatt and Baker (1981); Gusey (1986) Perry and Overly (1976); Freddy (1986); Freddy et al. (1986); O'Neil and Witmer (1991).
	Road traffic/operations and maintenance	0.75	
Elk	Well construction/workovers	1.5	Hiatt and Baker (1981); Gusey (1986); Brekke (1988).
	Road traffic/operations and maintenance	1.0	Ward (19973, 1976); Ward et al. (1973); Perry and Overly (1976); Rost and Bailey (1979); Ryder et al. (1986); O'Neil and Witmer (1991).

Mule deer are generally less sensitive to human disturbance than elk and in some cases may be less sensitive than pronghorn. The concept of the level of impact varying by season was not considered because summer habitat is not a limiting factor, whereas crucial winter habitat is limited, therefore disturbance would most likely not be an issue to these species except for the limitation on crucial winter habitat. Within the RMPPA only 35 percent of identified big game crucial winter range is located on BLM-administered public lands. Increased development and roads in crucial winter range compound impacts to big game species by increasing public access to the winter range for road maintenance, condensate removal, pumpers (meter readers), recreation, potential poaching, and other factors.

Pronghorn

Pronghorn are a unique animal of the western plains and are the only living species in their taxonomic family (Antilocapridae). Herds of up to 1,000 individuals once inhabited the plains; now herds commonly exceed 100 individuals, especially during winter. During winter, herds undertake local

migrations to areas that are more protected from the natural elements or that have more available forage. During the breeding season, herds break up, and bucks oversee a harem of one to perhaps 15 females (Cochrum 1962). Wyoming is the center of the pronghorn range, and the RMPPA has one of the highest densities of pronghorn in the world (Kotter 2002; Lanka 2002). Pronghorn inhabit a wide variety of open rangeland habitat types throughout the RMPPA and forage primarily on Wyoming big sagebrush and other shrubs.

In most herd units, antelope populations are being raised through conservative harvests. Habitat conditions are generally good in terms of supporting antelope, and the long-term trend of decreasing domestic sheep numbers has probably benefited antelope by reducing competition for forage, particularly on winter ranges. Current management issues affecting antelope are varied, but the most important one is livestock fencing that restricts animal movement. Many historic fences were constructed to control domestic sheep and don't meet current fence standards needed to control cattle grazing. During the severe winter of 1983–84, many antelope were caught in the corner of these fences and eventually died. Converting these types of fences to current fence standards whenever and wherever possible is a high priority of both BLM and WGFD. Another management issue is maintaining crucial winter range in terms of both health and acreage. During severe winters, animals concentrate on these habitats, and browse use of key species often reaches 100 percent. During more mild winters, antelope will spend more time on adjacent transition habitat that allows the crucial winter range areas to recover. Development in or loss of this transition habitat is a concern to maintaining antelope crucial winter range.

Map 2-53 also shows the 3,860,667 acres of crucial winter range for pronghorn within the RMPPA. This acreage includes federal, private, and state lands. BLM-administered lands include 544,300 acres. These areas are found especially in the open flatlands, in locations like the eastern side of the Great Divide Basin, close along the Wyoming-Colorado state line west of Baggs, the Shirley Basin south to Medicine Bow, and north of Saratoga in the rolling topography east of the North Platte River.

Deer

Both mule deer and white-tailed deer occur in the RMPPA, although mule deer are by far the more abundant. Mule deer are distributed throughout the seasonal ranges in the RMPPA and generally prefer habitat types in the early stages of plant succession, with numerous shrubs. They use the woody riparian, shrublands, juniper woodland, and aspen woodland habitat types extensively during spring, summer, and fall. These habitat types provide adequate forage areas, with succulent vegetation for lactating females and adequate cover for security and fawning. During winter, mule deer move to lower elevations to avoid deep snow that covers their forage. They are often found in juniper and limber pine woodlands, big sagebrush/rabbitbrush, bitterbrush/sagebrush steppe, and riparian habitat types (BLM 1987). White-tailed deer use woody riparian habitats (willow, waterbirch, and cottonwood) along the major creeks and rivers for both forage and cover.

Mule deer populations across the RMPPA are being maintained or increased through reduced harvest. Although recent events like the winter conditions of 1992–93 have kept mule deer numbers at lower levels than desired, it is unlikely that the high population of mule deer observed in the 1960s and 1970s will be repeated. Loss of crucial winter range along valley bottoms and restricted movement by transportation corridors and other fences are limiting factors to growth in mule deer herds. In some locations, such as the Little Snake and North Platte River valleys, conditions of crucial winter range are generally fair to poor. Plant communities are heavily used and shrublands are being taken over by juniper woodlands. Although summer habitats are in better condition, shrublands in many locations are becoming more mature and decadent, with mountain shrubs and aspen converting to predominantly sagebrush. Prescribed burns and other vegetative treatments help to rejuvenate these plant communities, but not enough is occurring. In addition to their habitat, other mule deer management issues include restrictive

fencing (described under antelope), increased disturbance and stress due to industrial development and recreational off-road vehicle use, expansion of chronic wasting disease, and housing encroachment into historic habitat, particularly in the Laramie Range and the upper Platte River valley.

Map 2-54 also shows the 1,468,885 acres of crucial winter range for mule deer within the RMPPA. This acreage includes federal, private, and state lands. BLM-administered lands include 368,700 acres. These areas are generally found in three types of places: on the flanks of mountains (e.g., the Sierra Madre and the Snowy, Laramie, Seminoe, Shirley, and Ferris Mountains), along the drainages (e.g., North Platte and Medicine Bow rivers), and in the badlands along the Wyoming-Colorado border, centered on Baggs.

Elk

Elk are distributed throughout the RMPPA, especially adjacent to and in areas of higher elevation that have woody cover. In summer, elk use aspen and conifer woodlands for security and thermal cover, ranging out into upland meadows, sagebrush/mixed grass, and mountain shrub habitat types to forage. In winter, elk move to lower elevations, foraging especially in sagebrush/mixed grass, big sagebrush/rabbitbrush, and mountain shrub habitat types, especially in windswept areas where snow depth is less. During severe weather, elk concentrate in crucial winter range, areas within their normal winter range that are most likely to provide thermal cover and forage. For parturition, elk move into areas that provide particularly good security cover and succulent forage. Elk occur in herds to a greater extent than do the other big game mammals. Areas of particular importance to specific elk herds are in the vicinity of Baggs, the Ferris Mountains and Seminoe Reservoir, Shirley Mountain, Encampment, the Saratoga Valley, Laramie Peak, Jelm Mountain, Wick-Beumee, and Pennock Mountain (BLM 1987). Particularly important characteristics of these areas are as follows:

- **Baggs:** provides summer, winter/yearlong calving and crucial winter range habitat for elk that migrate from summer range in Miller Hill, the Sierra Madre, and the Medicine Bow National Forest on the east, and from Colorado on the south to crucial winter range in the vicinity of Baggs. Most of the calving area for this herd is in Medicine Bow National Forest (BLM 1987). Part of this area is within the Jep Canyon ACEC (BLM 1990a).

- **Ferris Mountains/Seminoe Reservoir:** provides summer, winter/yearlong, and crucial winter range for elk that migrate from summer range in the Ferris Mountains to crucial winter range on the north side of the mountains, as well as from summer range in the vicinity of Bradley Peak (south of the Ferris Mountains) to crucial winter range southwest of the lower portions of Pathfinder Reservoir. Calving areas have not been identified.

- **Shirley Mountain:** provides summer, winter/yearlong, and crucial winter range for elk that migrate from summer ranges on Shirley Mountain and the Freezeout Mountains to crucial winter range around Chalk Mountain on the south side of the Freezeout Mountains and southeast of the Miracle Mile.

- **Encampment:** provides winter/yearlong and crucial winter range for elk.

- **Saratoga Valley:** provides calving areas, summer, yearlong, and crucial winter range for elk.

- **Laramie Peak:** provides summer, winter/yearlong, and crucial winter range for elk.

- **Jelm Mountain:** provides primary crucial winter range for elk that summer in Medicine Bow National Forest.

- **Wick-Beumee:** provides winter/yearlong and crucial winter range, and parturition habitat for elk on BLM-managed public lands.

- **Pennock Mountain:** provides winter, winter/yearlong and crucial winter range, and parturition habitat for elk on BLM-managed public lands.

In contrast to antelope and mule deer, elk populations have been above desired levels, leading to more liberal harvests to reduce animal numbers. Despite high numbers of elk, habitat conditions are generally good to support existing populations. Since elk spend more of their time at higher elevations where they are not disturbed by human activity, a smaller amount of their habitat has been converted to other uses when compared to that of mule deer or antelope. In addition, because elk diets are similar to cattle, efforts to improve range conditions for cattle would also benefit elk. Management issues concerning elk include the restrictive fencing, disturbance, and stress from off-road vehicle use; expansion of chronic wasting disease; and housing encroachment into historic habitat, particularly the Laramie Range. Elk populations are also more influenced by movement across the state line with Colorado, making management and population assessments much more difficult than with antelope or mule deer.

The 604,758 acres of crucial winter range and the 200,912 acres of parturition areas shown in Map 2-56 reflect the areas of importance discussed above. This acreage includes federal, private, and state lands. BLM-administered lands include 206,500 acres of elk crucial winter range. North of I-80, winter range is identified on the northeast flanks of the Ferris and Seminoe mountains; south of I-80, winter range is identified on the west slopes of the Sierra Madre in the North Platte River Valley, between and north of the Sierra Madre and the Snowy Range, on the northeast flanks of the Snowy Range, and east of Laramie on the east side of the Laramie Mountains. Crucial winter range is often an area within the general winter range that has the best thermal cover and most available forage even in the most extreme weather conditions. Areas identified on Map 2-56 are in the Ferris Mountains, the Seminoe Mountains, the Shirley Mountains, and the Snowy Range, in each case on the lower slopes where microclimates provide conditions needed for survival. Parturition areas are similarly in microclimates, where hiding cover and moist, succulent forage provide shelter and adequate moisture for nursing mothers and young elk calves. Such areas are identified in Map 2-56 around the flanks of the Snowy Range and on the east side of the Sierra Madre.

Bighorn Sheep

Map 2-55 shows crucial winter range and lambing areas for bighorn sheep within the RMPPA. BLM-administered lands include 25,000 acres of crucial winter range.

Because of public interest in them, bighorn sheep are particularly well characterized in the RMPPA. They prefer open grassy ridgetops, slopes, or benches within 100 meters of rocky outcrops, precipitous cliffs, or steep rocky slopes. They most commonly use rockland, upland meadow, sagebrush/mixed grass, big sagebrush/rabbitbrush, and mountain shrub habitat types, foraging on forbs and grasses from early summer to late fall when they begin browsing on sagebrush, rabbitbrush, and bitterbrush as snows cover their other forage. Bighorn sheep have been reintroduced/augmented into the Ferris Mountains/Seminoe Reservoir area, near Encampment, in the Saratoga Valley, and at Laramie Peak (BLM 1987). Bighorn sheep are managed cooperatively by BLM for habitat and by WGFD for population.

Other Big Game Species and Trophy Game Animals

Within the RMPPA there are WGFD management areas for moose (Snowy Range) and trophy game animals including black bear (Laramie Peak, Snowy Range, and Sierra Madre) and mountain lion (Iron Mountain, Laramie Peak, Snowy Range, Seminoe, Sierra Madre, and Haystacks). These represent areas where populations of these species are sufficient to support hunting and to warrant hunting management by WGFD. Data are not readily available to characterize the individual management areas for these

species. These populations are a concern for both agencies: BLM manages habitat and WGFD manages the populations.

3.19.1.6 Amphibians Habitat Management

Amphibians are tetrapod, moist-skinned vertebrates, usually without scales and include frogs, toads, and salamanders. Amphibians live both in water and on land and play important roles in many ecosystems. The larvae of Wyoming species are aquatic. The adults are normally terrestrial, feeding on land, breeding in water, and often escaping into water from their predators. Toads are credited with controlling insect populations. In arid regions, amphibians remain buried in moist soil during daylight hours and emerge to feed at night.

Amphibians represent a food source for many mammals, birds, snakes, and fish. Their principle defense against predators are their ability to move and hide quickly and the production of toxic substances by their skin glands. Breeding calls of male frogs and toads attract mature adults of the same species to suitable breeding sites. Twelve species of amphibians are found in Wyoming: one species of salamander and eleven species of frogs and toads.

The tiger salamander is found within the RMPPA and is easily recognized by its rather conspicuous mottled, barred, or vermiculated color pattern, its moist skin, and the presence of a tail. They require a fairly moist environment and are found throughout the planning area in rodent burrows and lentic habitats during the breeding season, and in moist, aquatic, or underground habitats throughout the remainder of the year. The tiger salamander preys on insects, earthworms, and occasionally small vertebrates.

Toad species located within the RMPPA include the plains spadefoot, Great Basin spadefoot, boreal toad, Wyoming toad, and Woodhouse's toad. Spadefoots are adapted to arid habitats and burrow into soil to prevent desiccation, forage at night, and breed irregularly through the summer in response to periods of heavy rain. The loud call of the breeding male serves to attract other breeding adults, both male and female, to breeding congregations over long distances. Spadefoots spend the winter buried deep within the soil to avoid desiccation and to spend dormancy below the frost line.

Frog species located within the RMPPA include the bullfrog, northern leopard frog, wood frog, and boreal chorus frog. Frogs are slim-waisted, long-legged, smooth-skinned amphibians. True frogs usually have distinctive breeding calls; some also have warning calls and release calls. Eggs are usually laid in large masses that rest on the pond bottom rather than attached to submerged vegetation (Baxter et al. 1980).

3.19.1.7 Reptiles Habitat Management

Reptiles have become adapted to living and reproducing entirely on land. They include turtles, lizards, and snakes. Their skin is dry and normally covered with either horny scales or bony plates to reduce loss of water from the skin and to serve as a protective armor. Their digits are armed with horny claws. The eggs of reptiles are covered by a leathery shell and are normally deposited in soil or sand.

Turtle species located within the RMPPA include the Western painted turtle and common snapping turtle. Turtles are the most primitive of the reptiles, having evolved nearly 200 million years ago. Most turtles are aquatic, although a few live entirely on land. Turtles have unique methods of breathing and a reduced metabolism, which allows certain turtles to pass the period of winter dormancy in pond bottoms.

Lizard species located within the RMPPA include the many-lined skink, northern sagebrush lizard, red-lipped prairie lizard, northern prairie lizard, eastern short-horned lizard, and northern earless lizard.

Lizards are small active reptiles. They are able to regulate their body temperature to permit activity over a broad range of air temperatures. Behavior, agility, and insectivorous habits make the lizard one of the more successful groups of cold-blooded vertebrates. Lizards are found in grasslands and shrub deserts, boulders, cliffs, trees, and loose sand.

Snake species located within the RMPPA include the plains hognose snake, western smooth green snake, pale milk snake, Great Basin gopher snake, bullsnake, wandering garter snake, western plains garter snake, and prairie rattlesnake. Snakes are legless reptiles with a body covering of scales. They are adapted to preying on small rodents and lizards. Snakes are mostly diurnal, terrestrial predators. Some are aquatic, some live in trees, and some live in burrows (Baxter et al. 1980).

3.19.1.8 Fish Habitat Management

Fish habitats include perennial and intermittent streams, springs, and flatwater (lakes and reservoirs) that support fish through at least a portion of the year. Condition of the fish habitats is related to hydrologic conditions of the upland and riparian areas associated with or contributing to a specific stream or water body, and to stream channel characteristics. Aquatic habitat quality varies by location and orientation to geographic landforms and vegetation.

Riparian vegetation moderates water temperatures, adds structure to the banks to reduce erosion, provides instream habitat for fish, and provides organic material for aquatic macroinvertebrates. Vegetated flood plains dissipate stream energy, store water for later release, provide areas of infiltration for ground water, support the hyporheic zone of the river, and provide rearing areas for juvenile fish. The quality of the physical aquatic habitat is refined further by water quality. Specifically, water temperature, turbidity, and dissolved oxygen determine the amount of habitat that is usable by different fish species.

Public lands within the RMPPA provide habitat for eight fish families. Wyoming BLM has classified five species as sensitive: the Colorado River cutthroat trout, bluehead sucker, flannelmouth sucker, roundtail chub, and leatherside chub. In addition, four endangered fish species can be found downstream of the RMPPA within the Colorado River basin (razorback sucker, humpback chub, bonytail chub, and Colorado Pikeminnow), and one endangered fish species, pallid sturgeon, can be found downstream of the RMPPA in the Platte River basin. Five of these species are federally listed under the ESA, 15 species are native, and 12 species are introduced (non-native).

Three drainages occur within the RMPPA: the Colorado River watershed in the western portion, the North Platte River watershed in the eastern portion, and the Great Divide Basin in the northwest.

Several introduced trout species are widely distributed in the RMPPA, occupying the vast majority of suitable coldwater habitats. Specifically, brook trout can be found in most mid-high elevation coldwater streams within the RMPPA.

3.19.2 Threatened, Endangered, Candidate, and Proposed Wildlife Species

The species listed below are likely to occur within the RMPPA (Appendix 10). They are (1) federally protected; (2) contain critical habitat; (3) have been determined to be eligible for listing but are precluded (candidate); (4) are part of a nonessential, experimental population; and/or (5) occur in either the North Platte River or Colorado River system. These species are discussed in further detail in sections 3.19.2.1 and 3.19.2.11.

Section 7 of the ESA requires that Federal agencies (such as BLM) address impacts on species listed under the ESA through consultations with USFWS (BLM 2004b). Consultations begin informally when a Federal agency requests a list of species listed under the ESA. If a listed species exists in the area being assessed, informal consultation will continue and/or BLM may prepare a Biological Assessment (BA). The initial determination of effect is made by the lead agency, in this case BLM (50 CFR Part 420). If the BA determines that the Proposed Action may adversely affect a listed species or its habitat, then BLM must enter formal consultation with USFWS. USFWS then prepares a Biological Opinion (BO) that determines whether or not the preferred alternative would adversely affect listed species or critical habitat. The BO is based on information provided in the BA, but the BO may concur with or dispute the determination of impact. The process of formal and informal consultation with USFWS ensures that BLM actions conserve listed species and their critical habitat.

3.19.2.1 Bald Eagle Habitat Management (Threatened)

Bald eagles appear to be recovering rangewide in the lower 48 states, however they are still listed in the ESA and require special consideration in evaluation of project impacts. In the RMPPA, the bald eagle is generally a winter migrant, but some birds nest in the RMPPA. Usable nesting habitats do exist in the RMPPA and, as prey is available, there is the potential for additional nesting bald eagles.

Bald eagles are believed to live for over 30 years in the wild, and even longer in captivity. They mate for life and often reuse old nests from previous years. The eagles' preferred nesting locations are close to rivers, lakes, marshes, and wetland areas. Primary concerns for bald eagles include disease, lack of food, bad weather, and human interference (BLM 2004b).

3.19.2.2 Black-Footed Ferret Habitat Management (Endangered)

Black-footed ferrets are associated with prairie dog communities, which provide potential habitat within the RMPPA. Prairie dog burrows provide potential retreats for ferrets, and the prairie dogs themselves provide a supply of food. Black-footed ferret numbers have been shown to be directly linked to fluctuations in the prairie dog population. In the RMPPA, both the black-tailed prairie dog (*Cynomys ludovicianus*) and the white-tailed prairie dog (*Cynomys leucurus*) are present. Any disturbance to prairie dog towns may affect the black-footed ferret populations. A primary concern, aside from direct loss of the food base, is the potential for distemper transmission from domestic canines to the prairie dogs. A nonessential experimental population of black-footed ferrets has been reintroduced within the RMPPA in the vicinity of the Shirley Basin. Although naturally occurring populations of the black-footed ferrets are no longer known within the RMPPA, suitable habitat does exist, therefore there is always the potential for ferrets to occur (BLM 2004b).

3.19.2.3 Black-Tailed Prairie Dog Habitat Management (Candidate)

Black-tailed prairie dogs inhabit dry upland prairies and are located in the northeast corner of the RMPPA. These animals are diurnal and live in towns. Within towns, small groups of black-tailed prairie dogs will display territorial behavior toward adjacent groups. They feed mostly on forbs and grasses but may eat grasshoppers and other insects. They live in burrows with mounds that are usually 1 to 2 feet high and 25 to 75 feet apart from each other. Black-tailed prairie dogs may be dormant for short periods of time in cold weather but are not true hibernators. They do compete with livestock for food. Although once numerous on the prairies, they are now reduced to a few towns through poisoning operations. The black-tailed prairie dog has a yellowish body, but the tip of the tail is black (Burt et al. 1980) (BLM 2004b).

3.19.2.4 Canada Lynx Habitat Management (Threatened)

The Canada lynx is a secretive, forest-dwelling cat that inhabits northern latitudes and high mountains. The lynx feeds primarily on small mammals and birds, particularly snowshoe hares. Habitats utilized by the Canada lynx include old growth forests. Their home range can be significant as they forage for food. BLM-administered public lands have limited direct habitat for the lynx, however they may provide corridors for movement and habitat for forage. There are no identified Lynx Analysis Units (LAU) located on BLM-administered public lands within the RMPPA, but there are LAUs identified on USFS lands adjacent to BLM-administered lands within the RMPPA.

The primary limits to Canada lynx recovery are adequate habitat areas, fragmentation of habitats, lack of forage, and human intervention (BLM 2004b).

3.19.2.5 Platte River System Species (Endangered and Threatened)

The Platte River system species include the least tern, the piping plover, the whooping crane, the Eskimo curlew, the Western prairie fringed orchid, and the pallid sturgeon, all of which occur in the Platte River system in association with riverine habitat. The Western prairie fringed orchid is discussed within the Vegetation section. Least tern populations are listed as endangered in Nebraska, Colorado, and Montana, but not in Wyoming. The piping plover is listed as threatened, with Critical habitat designated in Nebraska and Montana. The Eskimo curlew is listed as an endangered species in Wyoming, Colorado, and Nebraska, but its populations are so low that very little is known about the current distribution of the species. Existing populations are known to occur in Rhode Island, Oklahoma, Arkansas, South Dakota, and Nebraska. The pallid sturgeon is listed as an endangered species and is found almost exclusively in the headwaters of the Missouri River (in the vicinity of Fort Benton/Great Falls, MT) downstream to the Mississippi River near New Orleans, LA. In addition, the pallid sturgeon is found in the Platte River near its confluence with the Missouri River. Although individuals of the five animal species listed above are not likely to be present in any abundance in Wyoming or in the RMPPA, their populations are highly susceptible to actions upstream in the Platte River system. Therefore any RMPPA actions that may cause water depletion in the Platte River system are carefully considered (BLM 2004b) (Appendix 11).

3.19.2.6 Preble's Meadow Jumping Mouse Habitat Management and Critical Habitat Management (Threatened)

The Preble's meadow jumping mouse is a small rodent with big feet that are adapted to jumping. It is closely related to other subspecies of meadow mice. The diet of these rodents consists of seeds, fruits, fungi, and insects. Hibernation occurs from October through May in small underground burrows that the mouse excavates. Nests are made of grass, leaves, or woody material excavated several centimeters below ground level. Preble's meadow jumping mice are primarily nocturnal or crepuscular but are occasionally observed during the day. Their preferred habitat is low undergrowth consisting of grasses, forbs, or a mixture of both in wet meadows and riparian corridors, or where tall shrubs and low trees provide adequate cover. The Preble's meadow jumping mouse exhibits a preference for lush vegetation along streams and herbaceous understories in wooded areas in close proximity to water. Threats to the Preble's meadow jumping mouse are the loss of riparian habitat, fragmentation of habitat, and reduction in preferred forage.

The Preble's meadow jumping mouse has been recently documented in two counties, along Crow Creek at F.E. Warren Air Force Base (Laramie County) and in the Lodgepole Creek drainage within the Medicine Bow National Forest (Albany County). The July 17, 2002, Federal Register (pp. 47,153–47,210) states that in Wyoming, capture locations of mice confirmed as the Preble's meadow jumping mice, and locations of mice identified in the field as Preble's meadow jumping mice, extend in a band

from the town of Douglas (just outside the RMPPA) southward along the Laramie Range to the Colorado border, with some captures in Laramie County as well as in other counties outside of the RMPPA (BLM 2004b).

3.19.2.7 Western Boreal Toad Habitat Management (Candidate)

The Southern Rocky Mountain population of the boreal toad (*Bufo boreas*) has suffered drastic population reductions since the early 1980s in the Southern Rockies and declines in the Sierra Madre. The western boreal toad is currently a candidate species for listing under the *Endangered Species Act* of 1973, as amended. Causes for decline are being investigated and include impacts from the occurrence of the chytrid fungus (*Batrachochytrium dendrobatidis*). Habitats utilized by this species include wet meadows and marshes, including riparian areas and pond margins. A Conservation Plan and Agreement for the management and recovery of the Southern Rocky Mountain population of the boreal toad was completed in February 2001 (BLM 2004b).

3.19.2.8 Wyoming Toad Habitat Management (Endangered)

The Wyoming toad is a Federal endangered species whose known natural populations since 1987 have been restricted to a 2-square-mile area around Mortenson Lake, near Laramie and within the RMPPA. An ongoing captive breeding program and reintroductions at selected sites within the toad's historic range in the Laramie Basin are enabling population increases by this species (BLM 2004b).

3.19.2.9 Yellow-Billed Cuckoo Habitat Management (Candidate)

The yellow-billed cuckoo was designated as a candidate for listing by USFWS on July 25, 2001. It utilizes riparian and woodland habitats along rivers and streams in the western United States. The primary forage for the yellow-billed cuckoo is large insects and occasionally small frogs and lizards. The predominant impact on the yellow-billed cuckoo is the loss of large blocks of riparian habitat due to fragmentation, overgrazing, exotic plant community changes, river management, and agricultural conversion of native vegetation. The yellow-billed cuckoo west of the Continental Divide is considered a distinct population segment (BLM 2004b).

3.19.2.10 Colorado River System Species

The humpback chub, Colorado pikeminnow, bonytail chub, and razorback sucker are endemic species to the Colorado River drainage. Although these species do not occur within the RMPPA boundary, management actions within the boundary could affect the downstream habitats of these species. These four Colorado River fish are federally listed as endangered and are directly affected by activities that may deplete water in the Colorado River watershed. USFWS has determined that federal actions resulting in water depletion in the Colorado River system might affect these fish species (BLM 2004b) (Appendix 11) and would require consultation.

Depletions include evaporative losses and consumptive use of surface or ground water within the affected basin, often characterized as diversions less return flows. Project elements that could be associated with depletions include but are not limited to ponds (detention, recreation, irrigation storage, and stock watering), lakes (recreation, irrigation storage, municipal storage, and power generation), pipelines, wells, diversion structures, and water treatment facilities.

A recovery plan and the resulting Recovery Implementation Program for the four Colorado River fish has been approved. The recovery plan includes life history descriptions, distribution, reason for decline,

current conservation efforts, and the recovery strategy for the species. The Recovery Implementation plan includes the actions that must be taken to remove the species from federal listing (BLM 2004b).

3.19.2.11 Threatened, Endangered, Candidate, and Proposed Plant Species

Threatened, endangered, candidate, and proposed plants that are located within the RMPPA are discussed in further detail in Vegetation section, 3.15.7.

3.19.3 BLM Wyoming State Director's Sensitive Species List Habitat Management

BLM and WGFD are responsible for managing a wide array of wildlife and associated habitat in the RMPPA. In general WGFD is responsible for managing the wildlife populations and BLM manages the habitats. Wildlife species listed on the BLM Wyoming State Director's Sensitive Species List and their associated habitats are discussed in this section. These animals are recognized as being of particular interest to the public and are a focus for management. BLM Sensitive Plant species are discussed in further detail in the Vegetation section, 3.15.8.

Currently, 20 mammal, bird, amphibian, fish, and plant species in the RMPPA are federally listed or are candidates and must be taken into consideration for management activities (Appendix 10). BLM has also identified an additional 9 state sensitive mammal species, 16 bird species, 2 amphibian species, 5 fish species, and 8 plants.

Information is provided below on the habitats, regulatory and consultation requirements, and the species of concern relevant to the RMPPA planning process.

3.19.3.1 Habitats Supporting Species of Special Concern

The RMPPA includes a diversity of habitats on which BLM generally focuses most management efforts. These habitats are the major plant communities or terrestrial features within the review area that are important to wildlife. Wildlife habitats include streamside riparian, springs, seeps, wet meadows, seasonal wetlands, playas and lakebeds, cliffs, caves, talus slopes, dry meadows, dryland shrubs, juniper woodlands, ponderosa pine forests, mixed conifer forests, and quaking aspen groves.

Ongoing changes to these important vegetation communities, many of them caused by humans, have resulted in alterations in the animal habitat within the RMPPA. Conversion of wet meadows to dry meadows is highly unlikely to occur on BLM-administered lands but may occur on private lands adjacent to BLM lands, or on private lands in general. Such conversion could have a cumulative effect on these species and their habitats. For example wet meadows may be converted to dry meadows as a result of a water tables being lowered by pumping or water diversion. Juniper encroachment is converting shrublands to woodlands, primarily because of changes in fire regimes. Aspen groves are not regenerating themselves and are diminishing in size and numbers. BLM manages habitat on public lands for species that are threatened or endangered, or are candidates for or proposed for listing under Federal and state mandates. BLM staff also manage habitat on public lands for species on the Wyoming BLM Sensitive Species List under BLM mandate to avoid further decline of these species.

3.19.3.2 Mountain Plover Habitat Management

The mountain plover breeds and nests in the RMPPA, typically utilizing habitats characterized as mixed-grass and shortgrass prairie, cushion plant communities, shrub-steppe, plains, alkali flats, agricultural

lands, and prairie dog towns. Approximately 50 percent of the RMPPA is potential mountain plover habitat: mountain plover surveys have identified large areas of occupied habitat where mountain plovers breed and nest. Plovers may nest on sites where vegetation is sparse or absent, or near closely cropped areas. Mountain plovers are rarely found near water and show a preference for previously disturbed or modified habitats. The primary forage for the mountain plover is insects, grass seeds, and berries. Within the RMPPA, the nesting period appears to be the most critical time for the mountain plover. Predation, disturbance, abandonment of the nest, and direct destruction of the nest are potential impacts.

3.19.3.3 White-Tailed Prairie Dog Habitat Management

White-tailed prairie dogs inhabit open or slightly brushy country, including habitat with scattered junipers and pines and are located throughout the RMPPA. These species are similar to the black-tailed prairie dog but are less colonial. These species do hibernate from October or November to March. The white-tailed prairie dog has a yellowish body, but the tip of the tail is white (Burt et al. 1980).

3.19.3.4 Greater Sage-Grouse Habitat Management

Map 3-13 shows the general locations of Greater sage-grouse (*Centrocercus spp.*) leks, or strutting grounds, and adjacent nesting areas within the RMPPA. During spring, grouse concentrate for courtship and breeding in these areas, which are typically in openings surrounded by sagebrush, with an average canopy density of 10 to 30 percent. Greater sage-grouse nest under sagebrush, with 60 percent of hens nesting within a 2-mile radius of the lek, and 70 percent of hens nesting within a 4-mile radius of the lek. Young birds rely initially on insects. During warm, dry summer periods, grouse tend to stay within 1.5 miles of intermittent and perennial streams, where they feed on succulent forbs. Greater sage-grouse diets shift to a majority of sagebrush later in the year. Wintering areas for Greater sage-grouse typically contain tall sagebrush that is available above the snow for cover and food (BLM 1987). Total shrub canopy cover, residual grass cover, nonfood forb cover, and litter cover are the best predictors of Greater sage-grouse nesting habitat (Holloran 1999; Lyon 2000). Typically Greater sage-grouse nests are located within sagebrush communities that have 10 to 30 percent canopy cover (Holloran 1999; Lyon 2000). The chance of a sagebrush nest successfully hatching will increase 30 percent if it is in combination with herbaceous vegetation exhibiting 20 percent cover and equal to or greater than 15 cm in height (Holloran 1999). Nest success ranges from 12 to 86 percent, which is relatively low compared to other prairie grouse species (Connelly et al. 2000). Maintaining continuous tracts of suitable habitat and a suitable distance from disturbance are critical to the success of Greater sage-grouse.

Greater sage-grouse have been extirpated from five states and one Canadian province, and populations over the remainder of its range have declined an average of 33 percent from 1985 to 1995. Conservative estimates suggest that 50 percent of the original area occupied by sage grouse is no longer capable of supporting the species on an annual basis (Connelly and Braun 1997). Wyoming historically supports more Greater sage-grouse than any other state because of the prevalence of sagebrush habitats (Patterson 1952). The areas in central and western Wyoming where sagebrush dominates landscapes and grouse populations remain relatively contiguous and intact, cumulatively represent one of the species' last strongholds. The number of male sage grouse counted per lek in Wyoming decreased 17 percent between 1985 and 1995 (Connelly and Braun 1997), and regional declines as high as 73 percent between 1988 and 1999 have been recorded. No causative factors have been identified that explain population reductions throughout Wyoming; although changes in the sagebrush-dominated areas where the birds typically reside is thought to be one of the principal factors.

Existing RMPPA-wide and statewide guidance restricts exploration and development activity within 2 miles of a lek center. There is also a timing stipulation within 2 miles of the lek center that protects breeding and nesting Greater sage-grouse, as well as a timing stipulation on winter habitat that protects

wintering Greater sage-grouse. It should be noted that approximately 40 percent of the nesting birds would not be protected by current timing stipulations. Efforts are being made to map suitable nesting habitat, which may extend beyond the 2-mile buffer, because this would allow development to occur on unsuitable habitat within current existing buffers in the future. This causes severely fragmented habitats, and habitat treatments may not be effective mitigation to offset impacts of the initial development. When sagebrush habitats are degraded by such things as wildland fires, clearing, or herbicide treatments, vegetation reestablishment may take several years. Mountain big sagebrush on productive sites may recover in 15 to 25 years, and in some cases 30 years. Wyoming big sagebrush may require 30 to 40 years to recover. Basin big sagebrush has intermediate recovery rates between these two species (Slater 2003).

If 40 percent of nesting, early brood-rearing, or winter habitat has been lost or severely degraded within the range of a population, the management emphasis is to protect remaining sagebrush that is at least somewhat suitable for these functions (Connelly et al. 2000). Oil and gas developments within fragmented Greater sage-grouse habitats should completely avoid remaining suitable habitats. Within comparatively intact sagebrush ecosystems, treating up to 20 percent of degraded nesting and early brood-rearing habitats, and 30 percent of the winter habitat, may be acceptable to improve habitat conditions (e.g., restoring herbaceous understory; creating open patches of herbaceous vegetation; creating thin dense sagebrush canopies exceeding 30 percent cover; creating openings within dense sagebrush; regenerating the shrub component by setting back succession; or enhancing herbaceous understory by reducing herbivory). At some point it becomes difficult to mitigate habitat loss by treating vegetation, because the interim loss of habitat to the treatment, combined with the habitat loss that is being mitigated, create an unacceptable level of impact to Greater sage-grouse (Connelly et al. 2000). These impacts are related not only to loss of nesting and roosting habitat but also decreased food availability. Brood movement decreases with optimal food availability, resulting in lower predator exposure and energetic costs of foraging (Lyon 2000). When availability of forbs and grass is lowered, broods move longer distances and expend more energy to find forage. The increase of movement, in addition to decreased grass for screening, may cause chicks to be more exposed to predation (Lyon 2000).

In addition to habitat loss, development adjacent to sage grouse leks sites may attribute to declines in yearling male recruitment. Braun (1986) hypothesized that adult male Greater sage-grouse return to leks where they have established a territory until they die. Mining activity and large-scale habitat loss adjacent to these leks reduce the number of yearling males recruited to replace the adults. Increased road construction associated with such development may also impact Greater sage-grouse populations. Construction of these roads results in permanent travel routes, improved public access, increased long-term traffic-related disturbance to previously inaccessible regions, indirect noise impacts to leks from the road, and direct mortality (Braun 1998). Roads also provide a clear pathway for predator movement, unimpeded by vegetation or other obstructions (Lyon 2000). The road effect-distance, or the distance from a road at which a population density decrease is detected, is positively correlated with increased traffic density and speed and is more critical in years when wildlife populations are low (Forman and Alexander 1998). Studies conducted in Montana, Wyoming, and Colorado suggest that some recovery of sage grouse populations may occur after a site has been initially developed (with subsequent reclamation of energy development, roads, etc.) (Braun 1997). However there has been no evidence that population levels attain their size before the disturbance.

Female sage grouse also demonstrate site fidelity in relation to nesting areas surrounding the lek (Lyon 2000; Schroeder et al. 1999). In addition female yearlings nest in the same areas as their mothers (Lyon 2000). Even in areas of high disturbance, females continue to maintain their site fidelity, however this is not without some behavioral modifications. The results from a study conducted by Lyon (2000) indicated that hens captured on disturbed leks demonstrated lower nest initiation rates, traveled twice as far to nest

sites, and selected higher total shrub canopy cover and live sagebrush canopy cover than hens captured off of undisturbed leks.

3.19.3.5 Columbian Sharp-tailed Grouse Habitat Management

Historically in Wyoming, the range of the Columbian sharp-tailed grouse extended westward from the Continental Divide. Currently the only Wyoming population of Columbian sharp-tailed grouse is found within the RMPPA, located from the Colorado state line north to the Sand Hills ACEC. These grouse typically are found in mountain and basin big sagebrush habitat. In spring this species concentrates on traditional dancing grounds for courtship and breeding. These dancing grounds are typically found in mixed-shrub habitat of antelope bitterbrush, snowberry, serviceberry, chokecherry, and big sagebrush, evenly mixed with grasses and forbs. Broods in Wyoming are found most often in mountain shrub and sagebrush, with a high density of snowberry. Birds move to ridges and knolls in mountain shrub habitat during the fall, and then move to riparian habitat with exposed mixed-shrub communities at all elevations in the winter, where they feed on buds, berries, and catkins (BLM 1987). There is currently no hunting season for Columbian sharp-tailed grouse, but there are some accidental takings where the populations overlap with Greater sage-grouse. The bird was proposed for listing, but this was found not warranted by USFWS.

3.19.3.6 Other BLM Wyoming State Director's Sensitive Species Habitat Management

In addition to the BLM Wyoming State Director's Sensitive Species discussed in detail above, there are eight mammals, four raptors, eight neotropical migratory birds, two amphibians, and four fish species that are also included on this list and are identified below. The BLM Wyoming State Director's Sensitive Plant Species that are located within the RMPPA are discussed in further detail in the Vegetation Section, 3.15.8.

Mammals

The sensitive mammals include three bat species, one shrew species, one gopher species, and one fox species, which are listed below. The habitats required to support the life functions of the species are also listed below:

- Dwarf Shrew: mountain foothill shrub and grassland habitats
- Wyoming Pocket Gopher: meadows with loose soil
- Swift Fox: grasslands and greasewood-dominated flats
- Long-eared Myotis: caves, rocky outcrops, and abandoned mines
- Fringed Myotis: caves and abandoned mines
- Townsend's Big-eared Bat: caves, rocky outcrops, and abandoned mines
- Spotted Bat: cliffs over perennial water and basin-prairie shrub
- Pygmy Rabbit: basin-prairie and riparian shrub.

Birds

The Migratory Bird Treaty Act of 1918 protects waterfowl, eagles, raptors, and other avian species that migrate through the RMPPA. Specific concerns include harassment, collection, molestation, disturbance, or killing. Impacts to nesting migratory birds, including collection of eggs, nests, or birds, and harassment of nesting birds, are all considered activities that violate the *Migratory Bird Treaty Act*.

There are a diversity of neotropical migratory bird species located throughout the RMPPA area that require specific habitat types for their life cycles. These species can be either generalists or specialists and occupy one or more of the following habitat types: forest and woodland communities, grasslands, shrub communities, and wetland/riparian communities including desert riparian, foothills, and mountain riparian communities (Section 3.15, Vegetation). These species occupy diverse niches and may require additional management.

Raptors

BLM Sensitive raptors include species that feed on rodents and avifauna found in the RMPPA. These are as follows:

- Ferruginous Hawk: basin-prairie shrub, grasslands, and outcroppings
- Peregrine Falcon: tall cliffs
- Burrowing Owl: grasslands, basin/prairie shrub, and prairie dog towns
- Northern Goshawk: conifers and deciduous forests.

Neotropical Migratory Birds

BLM Sensitive neotropical migratory birds found in the RMPPA include the following"

- Loggerhead Shrike: basin-prairie and mountain foothill shrub
- White-Faced Ibis: marshes and wet meadows (shorebird)
- Trumpeter Swan: lakes, ponds, and rivers (migratory)
- Long-Billed Curlew: grasslands, plains, and wet meadows
- Brewer's Sparrow: basin-prairie shrub
- Sage Thrasher: basin-prairie and mountain foothill shrub
- Sage Sparrow: basin-prairie and mountain foothill shrub
- Baird's Sparrow: grasslands and weedy fields.

Amphibians

The northern leopard frog and the Great Basin spadefoot toad have been identified as Sensitive Species by BLM. They occur in marshes and wetlands in the project area. There is a regionwide decline in these species, resulting in initiation of several amphibian recovery efforts by Federal and state entities.

Reptiles

At this time there are no Sensitive reptiles identified on the BLM Wyoming State Director's Sensitive Species List for the RMPPA.

Fish

Of the native fishes found within the RMPPA, five species have been identified as Sensitive by Wyoming BLM. These include the Colorado River cutthroat trout, roundtail chub, bluehead sucker, flannelmouth sucker, and hornyhead chub. In response to observed declines in the distribution of these species, conservation strategies have been developed or initiated in cooperation with state natural resource management agencies and Federal agencies.

Factors that have been identified as contributing to the observed reduction in the range of Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) include the effects of introduced fish and land management practices that alter the suitability of coldwater stream habitat. Management of Colorado

River cutthroat trout populations within the RMPPA is guided by two efforts: the Conservation Agreement and Strategy for Colorado River Cutthroat Trout in the states of Colorado, Utah, and Wyoming provides rangewide guidance, and the Conservation Plan for Colorado River Cutthroat Trout—Little Snake River, Southeastern Wyoming, details actions to be taken locally to ensure the persistence of this species in the Little Snake River enclave. This local plan identifies areas where the management of this species will be emphasized. Within the RMPPA the area of emphasis is the upper Muddy Creek watershed. Within the upper Muddy Creek watershed, the plan identifies actions that will need to be taken to restore the stream (now occupied by introduced fish) to the native fish community. These actions include the removal of introduced fish, reintroduction of native fish, and management of fish habitats. These actions will result in the temporary loss of angling opportunities while the introduced fish are removed and subsequently replaced with native fishes.

As a signatory to the local management plan for Colorado River cutthroat trout, the RMPPA has significant responsibilities for the management of habitats within the upper Muddy Creek drainage to increase the suitability of the systems for reintroduction of Colorado River cutthroat trout and to increase the stability of riparian systems. As actions are taken to reach this goal, the number of stream miles available to coldwater fish such as trout will increase. It is anticipated that the number of stream miles available to trout species will roughly double as a result of implementing these conservation strategies, providing increased angling opportunities and helping to ensure the persistence of this native fish. Increased riparian functionality and stability would further increase the suitability of riparian habitats for a number of terrestrial and aquatic wildlife species, such as big game species and amphibians.

Additional conservation planning efforts have been initiated for roundtail chub, bluehead sucker, and flannelmouth sucker throughout their range as a result of observed declines in the distribution of these species. These declines have been attributed to a combination of factors, including the effects of introduced fish, water development activities, and land management activities. Current conservation planning efforts emphasize the need to better understand populations of these native fish and factors affecting their viability to identify biologically meaningful conservation actions. As a result of these needs, the RFO, in cooperation with the University of Wyoming and WGFD, has been actively conducting research on the habitat associations, movements, and fish community associations of these three species within the Muddy Creek watershed. The fish community of the Muddy Creek watershed is unique to Wyoming, harboring populations of each of these three native fishes. The presence of these species presents a unique opportunity for BLM as well as its cooperators to proactively contribute to the understanding of the habitat requirements and the life history characteristics of these species. These efforts will be used to help develop effective and biologically meaningful conservation strategies that preclude the need to list these species as threatened or endangered under the ESA.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter objectively evaluates the environmental impacts of implementing each alternative described in Chapter 2. This chapter forms the analytic basis for the comparative summary of impacts presented in Section 2.8. Chapter 3 describes the existing conditions of the resource topics that would be affected by the alternatives. The organization of this chapter parallels that of Chapter 3; the same resource topics are presented in alphabetical order. Because resource topics are often interrelated, one section may refer to another.

4.1 INTRODUCTION

The purpose of this chapter is to determine the potential for significant impact of the "federal action" on the "human environment." The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) states that the "human environment" shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment [40 Code of Federal Regulations (CFR) §1508.14]. The "federal action" is the Bureau of Land Management's (BLM) selection of an alternative plan on which future land use actions would be based.

There are many BLM management actions that are common to all alternatives. Impacts that are common to all are discussed under the Impacts Common To All Alternatives section under each heading. Impacts of management actions that are the same for two or more alternatives or vary by alternative are discussed under each resource heading. Some BLM management actions may affect only certain resources and alternatives. If an activity or action is not addressed in a given section, it is because no impacts are anticipated.

Compliance with applicable laws, regulations, and policies is a part of day-to-day business. A description of the authorities that apply to the selection and implementation of the management actions for the Resource Management Plan (RMP) is presented in Section 1.4. Such regulations deal with air quality, cultural resources, natural history resources, accessibility, hazardous materials, threatened and endangered species, and water quality, for example. The effects discussed in the analysis are those that would result from implementation of management actions, not those that would result from compliance with laws, regulations, and policies.

Types of Impacts

Analysis of the alternatives focuses on identifying types of impacts and estimating their potential significance. Throughout this chapter the terms "impact" and "effect" are synonymous. While impacts may be perceived as positive (beneficial) or negative (adverse), those determinations are left for the reader of this document to decide. An overview of the types of impacts is presented below. Cumulative impacts are defined and discussed separately in Section 4.20.

Direct Impacts

These are effects caused by the action and occur at the time and place of the action. Examples include the elimination of original land use as a result of the erection of a structure.

Indirect Impacts

Indirect impacts are effects that are caused by the action but occur later in time or are farther removed in distance, but are still reasonably foreseeable and related to the action by a chain of cause and effect. Indirect impacts may reach beyond the natural and physical environment (e.g., environmental impact) to include growth-inducing effects and other effects related to induced changes to resource users (e.g., non-environmental impact).

Determination of Significance

Both direct and indirect impacts may be significant. "Significant" requires consideration of the context and intensity of the impact. This means that an action must be analyzed in several contexts—such as the immediate vicinity, affected interests, and the locality. Both short-term and long-term effects are relevant. Intensity refers to the severity of the impact. Thus, significant impacts have intensity that must be considered negligible, minor, greater, or substantial.

Determining significance is complex. The significance of an impact is dynamic and thus may change during the planning period. Significance can be "real" and supportable by fact, or "perceived" and perhaps not fully supportable even with rigorous study. For this analysis, the approach for establishing significance criteria was based on, but not limited to, legal requirements, public perception, monitoring data, and professional judgment.

Specific significance criteria are presented for each resource topic. The criteria provide thresholds beyond which impacts would be considered significant. Each resource topic ends with a summary statement regarding significant effects.

Regions of Influence

Regions of influence (ROI) are the potential areas that an alternative may reasonably affect. ROIs can vary by resource topic. Limits of ROI may be natural features (such as a watershed), political boundaries (such as a county), or industry-accepted norms of the resource (such as used in one aspect of air quality).

The ROI for all resource topics includes all public lands and minerals administered by BLM within the Resource Management Plan Planning Area (RMPPA), as well as the following:

- The ROI for impacts concerning socioeconomics includes four counties in southern Wyoming: Albany, Carbon, Laramie, and a portion of Sweetwater.
- The ROI for impacts concerning air quality includes the nearby air quality sensitive areas, such as national parks and wilderness areas. In addition, a multistate regional area was considered for haze issues. More details on the regional areas and the specific locations of areas outside of the RMPPA are found in the *Air Quality Technical Support Document (AQTSD)*.
- The ROI for the cumulative impact assessment is presented in Section 4.20.

Methods and Assumptions

Impact analysis is a cause and effect process. In evaluating the context of an impact, an affected resource is compared to the available area or quantity of that resource. The analysis identified resources that would be altered based on management actions and then predicted changes to these resources. The magnitude or scale of the resource change was defined, and a judgment as to the significance of that

change was made based on the significance criteria. Additional information regarding specific methods of analysis is presented for each resource topic.

Environmental impacts associated with the alternatives are caused by land use activities. Certain assumptions are made regarding level of land use activity, resource condition, and resource response on which to determine potential impacts. The analysis is based on the following assumptions:

- This planning effort will recognize valid existing rights.
- Actions must comply with laws, executive orders, and regulations.
- Lands covered in the Environmental Impact Statement (EIS) for the planning effort include any/all lands that may affect or be affected by the management occurring on BLM-administered public lands in the RMPPA. However, the planning decisions in the RMP will apply only to BLM-administered public lands and federal mineral estate in the RMPPA.
- Planning decisions in the RMPPA also apply to BLM-administered federal minerals that underlie nonfederal lands (split estate).
- Within the RMPPA, there will be no RMP decisions made on nonfederal land surface or mineral estate, on federal lands administered by other federal agencies, or the federal mineral estate underlying federal lands administered by other federal agencies.
- A collaborative and multijurisdictional approach will be used, where possible, to jointly determine the desired plant communities and management direction for the public lands.
- To the extent possible and within legal and regulatory parameters, BLM management and planning decisions will be consistent with the planning and management decisions of other agencies, state and local governments, and Indian tribes, with jurisdictions intermingled with the RMPPA.
- Planning and management direction will be focused on the relative values of resources and not exclusively the greatest economic return or economic output.
- For the planning effort, current scientific information, research, and new technologies will be used.
- Reasonably foreseeable action or activity (RFA) scenarios for all land and resource uses (including minerals) will be developed and portrayed based on historical, existing, and projected levels for all programs.
- Existing endangered species recovery plans, including plans for reintroduction of endangered species and other species, will be considered. Consultation, coordination, and cooperation with the Fish and Wildlife Service (FWS) will be in accordance with the 2000 BLM/FWS Interagency Memorandum of Understanding (MOU) regarding Section 7 Consultation. All existing biological assessments and biological opinions regarding areas within the RMPPA will be reviewed for applicability.
- Restrictions or prohibitions will be placed on activities in specific areas to protect sensitive resources.
- Mitigation requirements exist that prevent or limit direct impacts associated with land use activities or that reclaim the land after the activity has been completed.

- Standards and guidelines assess rangeland health and provide strategies to achieve resource conditions and management objectives.
- Projections of the level of activity for land uses are based on historical trends, existing land use agreements such as leases or permits, and statements of interest in land use by individuals and industry organizations.
- Analysis will consider impacts of land use activities that occur regardless of location of the land use, and impacts dependent on the location of the activity and potentially affected resources.
- Funding would be available to implement the alternatives described in Chapter 2.
- The Hazard Management and Resource Restoration Program (HMRRP) will manage the hazardous materials associated with all alternatives in the same general manner in accordance with laws, policies, and regulations. The objectives of the HMRRP are to protect public health, safety, and the environment on public lands; emphasize waste reduction for BLM-authorized and BLM-initiated actions; comply with applicable federal and state laws; prevent waste contamination from BLM-authorized actions; minimize federal exposure to the liabilities associated with hazardous materials management and waste management on public lands; and integrate pollution prevention, hazardous materials, waste management, and waste reduction policies and controls into all BLM programs. Details of the HMRRP program can be found in Appendix 32.
- The introduction of invasive invertebrates, vertebrates, microorganisms, and pathogens can threaten the stability of ecosystems, create serious human health consequences, and cause substantial economic burdens. Large majorities of native and non-native species do not pose a threat to natural or human systems. However, if any of these species becomes a concern, the Rawlins Field Office (RFO) would cooperate and coordinate with appropriate government agencies, private industry, and other interested parties involved in public education efforts and control, management, and research of invasive species.

Additional assumptions are presented in the Methods section under each resource topic.

BLM manages public lands for multiple uses in accordance with the Federal Land Policy and Management Act (FLPMA). Land use decisions are made that protect the resources while allowing for multiple-use of those resources, such as livestock grazing, energy development, and recreation. Where there are conflicts between resource uses, or a land use activity may result in irreversible or irretrievable impacts to the environment, BLM may restrict or prohibit some land uses in specific areas. To ensure that BLM meets its mandate of multiple-use in land management actions, the impacts of the alternatives on resource users are identified and assessed as part of the planning process. The projected impacts on land use activities and the associated environmental impacts of land uses are characterized and evaluated for each of the alternatives. It is important to note that all management prescriptions for each resource and resource use directly or indirectly relate to each other; therefore, impacts of other prescriptions and guidance may apply to each resource management activity.

4.2 Air Quality

This section presents the impacts on air quality from management actions of other resource programs. Existing conditions concerning air quality are described in Section 3.2.

Significance Criteria

Because this analysis is qualitative, there are limited significance criteria that can be used. However, if and when specific activities are proposed at the implementation stage requiring quantitative analysis, impacts to air quality would be compared to the following significance criteria:

- The National Ambient Air Quality Standards (NAAQS) or Wyoming Ambient Air Quality Standards (WAAQS)
- Federal guidelines for visibility impairment and/or atmospheric deposition.

For this qualitative analysis, only a general statement about NAAQS and WAAQS can be made. More detailed information on the significance criteria is included in the AQTSD, Appendix 4).

Methods of Analysis

A qualitative emission comparison approach was selected for analysis of impacts on air quality. This approach was used because (1) sufficient specific data were not available on future projects, (2) limited time was available to complete the analysis, (3) quantitative analysis will be required as development projects are defined in the future, and (4) the Wyoming Department of Environmental Quality-Air Quality Division (WDEQ-AQD) will require demonstration of compliance with federal and state air quality regulations and standards for any future development projects. Given the uncertainties concerning the number, nature, and specific location of future emission sources and activities, the emission comparison approach provides a sound basis to compare the potential impacts under the various alternatives. A more detailed justification and a detailed list of all assumptions used in this impact assessment are presented in the AQTSD.

The emissions inventory was developed for the RMPPA using best available information concerning activities on BLM land provided by the RFO and summarized in the AQTSD. The calculations used emissions factors accepted and recognized by state and federal regulatory agencies. This analysis selected three different time frames to evaluated future emissions. The time frames reflect the current base year conditions, the short-term impacts, and the long-term impacts. It is assumed that all, if any, emission growth will be constant and linear in time. The inventory time frames are—

- Current emissions (using the year 2003 as a basis)
- Five-year potential emissions for the short term (2008)
- Twenty-year potential emissions for the long term (2023).

The base emissions reflect the year 2003, because the base year well data are for oil and gas wells on the ground ending October 31, 2003.

The analysis is based on the following assumptions:

- Emission factors recommended by the U.S. Environmental Protection Agency (EPA) (EPA 1995) are appropriate for all activities, except for those emission factors that have been lowered through WDEQ-AQD best available control technology (BACT) requirements.
- Activity factors (or the quantification of activity for each resource provided by the RFO) are appropriate for the base year and future time frames.
- Any anticipated recreational growth would follow growth trends for Wyoming over the past 10 years.

- For the qualitative analysis, only emissions from RFO BLM-administered activities are included. For the cumulative analysis, emissions calculations are included for other federal and nonfederal actions throughout the state.
- Criteria pollutants and hazardous air pollutants (HAP) are included in the calculations.
- Coal mining activity would be 1.2 million tons per year production, with the coal mining activity ceasing in 2004; and coal mine lands reclamation continuing for the next 8 years, thereafter.
- No trona mining activity would occur on RFO BLM land.
- Prescribed and wildland fire emissions are estimated by Simple Approach Smoke Estimation Model (SASEM) (Sestak and Riebau, 1988).

Emissions were calculated for the following activities: coalbed natural gas (CBNG) development, coal mining, lands and realty actions, livestock management activities, off-highway vehicle (OHV) use, resource roads, disposable mineral development, vegetation management (including prescribed fire), and conventional natural gas development. Activities related to cultural resources, paleontology, recreation, transportation and access, noxious and invasive weed control, wild horses, and wildlife and fish are assumed to be minor sources of air emissions.

Figures 4-1 through 4-4 provide a summary of potential oil and gas wells for all the alternatives. These are the total number of wells that are projected to be operational at any given time. The calculations take into account new wells added minus old wells abandoned. All alternatives indicate projected growth in oil and gas development.

The emissions estimates found in Figures 4-5 through 4-20 present emission calculations for all alternatives. The base year (or base) calculations are also used to compare air quality impacts under other alternatives. As project-specific developments are proposed, quantitative air quality analysis would be conducted for project-specific assessments performed pursuant to NEPA.

Potential air emissions were identified for all resource programs. Additional detailed data concerning emissions are appended in the AQTSD, Appendix 4. The emissions from each of the individual resources are outlined below.

Figure 4-5 presents a summary of base year estimated emissions for actions occurring on lands administered by BLM within RMPPA. More detailed information on the emissions factors and calculations is appended in Appendix 4.

The AQTSD also includes the calculation methodology and specific reference sources used to develop emissions data. The total emissions were broken down for CBNG, conventional oil and gas, and other BLM activities for each alternative and for the 5- and 20-year time frames (Figures 4-9 through 4-20). As shown in Figures 4-9 through 4-16, growth in air emission is anticipated in the short- and long-term from oil and gas activities.

The increase in potential annual emissions over time for all ambient air constituents was calculated from the information presented in Figures 4-5 through 4-8 and is shown in Table 4-1 and Figures 4-21 through 4-24 for each alternative. For Alternative 2 growth in particulate emissions from mineral material disposal is anticipated. For Alternative 3 increased prescribed fire activities would increase particulate matter. Again, calculation details are found in the AQTSD and in the emission tables.

Table 4-1. Increase in Annual Air Emissions from 2003 Conditions on BLM-Administered Lands within the RMPPA [a]

Time Frame	PM_{10}	$PM_{2.5}$	NO_x	SO_2	CO	VOC	HAP
Alternative 1							
2008	519 (28%)	135 (22%)	2,228 (69%)	29 (48%)	2,074 (101%)	4,831 (35%)	537 (38%)
2023	1,047 (57%)	397 (64%)	6,932 (214%)	64 (105%)	7,433 (361%)	7,109 (52%)	921 (64%)
Alternative 2							
2008	576 (31%)	151 (24%)	2,440 (76%)	33 (54%)	2,206 (107%)	5,369 (39%)	594 (42%)
2023	1,132 (61%)	429 (69%)	7,433 (230%)	69 (113%)	7,856 (381%)	8,848 (64%)	1,109 (78%)
Alternative 3							
2008	289 (16%)	73 (12%)	1,414 (44%)	13 (21%)	1,575 (76%)	1,953 (14%)	236 (17%)
2023	699 (38%)	275 (44%)	5,046 (156%)	40 (66%)	5,806 (282%)	2,775 (20%)	434 (30%)
Alternative 4							
2008	411 (22%)	109 (17%)	1,823 (56%)	19 (31%)	1,949 (95%)	4,596 (33%)	512 (36%)
2023	934 (50%)	368 (59%)	6,500 (201%)	53 (87%)	7,273 (353%)	6,585 (48%)	867 (61%)

[a] Constituents increase in tons per year and (in percentage from base year emissions)

The State of Wyoming has the regulatory authority to require best available control technology. Impacts on visibility and atmospheric deposition could be mitigated by reducing emission of fine particulate matter, nitrogen oxides, and volatile organic compounds. Possible methods that could mitigate air quality impacts are shown in Table A4-15 in Appendix 4. This table applies only to traditional oil and gas development.

4.2.1 Impacts Common to All Alternatives

Because this air quality analysis is qualitative, specific impacts of resource activities on air quality cannot be made. However, it is BLM's judgment that several of the resources areas listed below (Cultural Management, Paleontology, Socioeconomics, Special Management Areas (SMA), Wild Horses, and Wildlife and Fish) will have only minor or negligible impacts on air quality.

The air quality monitoring activities, which include construction of monitoring stations and vehicular travel to service the monitoring stations, would have minimal impact on air resources. Information obtained from monitoring would likely add to the knowledge base upon which future air-related decisions would be made.

Very short-term, localized, and increases in fugitive dust emissions would occur during excavations for data recovery at cultural resource sites.

Wildland and prescribed fires would cause short-term emissions of particulate matter (PM) and carbon monoxide (CO) that could be spread over large portions of the RMPPA depending on the size of the fire and wind conditions. In addition, particulate emissions, CO, nitrogen oxides (NO_x), and hydrocarbons (VOC) (which include HAPs) would result from use of heavy equipment during fire suppression activities. (Recent studies have suggested that mercury can be released from fire activities). Emissions

would be generated from internal combustion engines from both vehicular exhausts (referred to as tailpipe emissions) and directly from engines (chainsaws, etc.).

The use of heavy equipment during timber hauling operations, such as logging trucks, on paved and unpaved roads would cause emissions of PM, CO, NOx, and VOCs. The burning of slash piles after timber harvesting would cause short-term emissions of PM and CO. The use of skidders or tractors for skidding timber materials from the harvesting area to the loading or decking area during timber harvest would produce some of the same emissions, but to a lesser degree.

The various construction activities authorized under Lands and Realty management (such as wind power, communication sites, transmission lines, pipeline projects) would produce emissions of PM. Soil disturbance and travel on unpaved roads are the main causes of the emissions. Tailpipe emissions from vehicular travel and emissions from equipment use would result from construction activities.

Vehicle travel associated with the trucking of livestock and constructing and maintaining range improvements would generate tailpipe emissions and dust.

Air emissions from combustion processes and construction activities would be produced from all the activities associated with oil and gas development and minerals mining.

Air emissions would be produced during all phases of oil and gas development, including exploration, well development, production, and well abandonment and road closures. During exploration and development, traffic on unpaved and paved roads would cause emissions of PM, CO, NO_x, sulfur dioxide (SO_2), and VOCs. During well development and completion, well flaring and associated emissions would cause PM, CO, NO_x, SO_2, and VOC emissions (which includes HAPs). Also, during well development, drilling activities and construction activities would cause particulate emissions and tailpipe emissions because of heavy equipment usage.

Air emissions are probable during oil and gas production. Emissions of NO_x and CO from compression activities (burning of natural gas) would occur. PM, CO, NO_x, and VOCs would be produced from any glycol operations and flashing. Any flaring would cause PM, CO, NO_x, SO_2, and VOC emissions (which includes HAPs).

During well abandonment and road closure, PM from travel over unpaved roads and demolition activities would result.

Air emissions would be produced during mining operations and reclamation activities. During mining activities, PM emissions would be produced from overburden removal, blasting, truck loading, bulldozing, grading, storage piles, railroad loading, and travel of heavy equipment over unpaved roads. Gaseous emissions from tailpipes (CO, NO_x, SO_2, and VOCs) would occur from heavy equipment, trains, and vehicular travel.

The use of OHVs would cause fugitive dust emissions of PM from traffic on unpaved trails, and emissions of PM, CO, NO_x, and VOCs directly from the tailpipe. In the winter, tailpipe emissions primarily occur from snowmobiles.

Short-term, localized, and increases in vehicular fugitive dust emissions would occur during excavations at and travel to paleontological sites.

PM emissions from travel on unpaved roads and gaseous tailpipe emissions from vehicles would occur.

Upward trends in populations within the RMPPA create the potential for long-term additional increases in emissions from all other resource management programs.

Impacts to air quality would result from activities in SMAs from exhaust emissions and fugitive dust. Those activities associated with the management of SMAs (e.g., fire management and project construction) are covered under the other resource topics.

The maintenance of unpaved roads and shoulders of paved resource roads would cause PM emissions and tailpipe emissions. Of particular concern are the emissions of PM from road graders.

Trucks and heavy equipment (chain saws, fire engines, bull dozers) used in vegetation management and control would cause dust from unpaved roads. In addition, prescribed fires used for vegetation treatment would cause particulate and gaseous emissions. Truck and equipment to conduct and control prescribed fire would cause tailpipe emissions. Areas receiving vegetation treatment would add short-term increases in PM until vegetations recover sufficiently to stabilize exposed soil.

No direct impacts to air resources would occur from visual resource management (VRM). Management practices, mitigation measures designed to retain visual quality of the VRM Class I and II areas, would reduce or eliminate emissions from development and OHV use. Management within VRM Class III and IV areas create the potential for long-term increases in emissions.

Trucks, heavy equipment, and helicopters used to gather wild horses would cause a short-term increase in tailpipe and fugitive dust emissions.

Construction activity to manage wildlife and fish habitat would contribute to air emissions of PM. To a lesser degree, CO, NO_x, SO_2, and VOCs would be generated from tailpipes. These impacts would be short term.

4.2.2 Impacts Under the Alternative 1: Continuation of Existing Management

Figure 4-25 summarizes total and specific pollutant emissions for all the alternatives. Alternative 1 emissions have been estimated for the base year (2003) time frame, and the emissions estimated for 5-year and 20-year time horizons. The total emissions increase over time for this alternative from the base year of 20,960 tons per year of pollutants to 43,545 tons per year by 2023.

4.2.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Figure 4-25 summarizes total and specific pollutant emissions for all the alternatives. Alternative 2 emissions have been estimated for the base year (2003) time frame, and the emissions estimated for 5-year and 20-year time horizons. The total emissions increase over time for this alternative from the base year of 20,960 tons per year of pollutants to 46,298 tons per year by 2023, the highest of any alternative.

4.2.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Figure 4-25 summarizes total and specific pollutant emissions for all the alternatives. Alternative 3 emissions have been estimated for the base year (2003) time frame, and the emissions estimated for 5-

year and 20-year time horizons. The total emissions increase over time for this alternative from the base year of 20,960 tons per year of pollutants to 35,282 tons per year by 2023, the lowest of any alternative.

4.2.5 Impacts Under Alternative 4: Preferred Alternative

Figure 4-25 summarizes total and specific pollutant emissions for all the alternatives. Alternative 4 emissions have been estimated for the base year (2003) time frame, and the emissions estimated for 5-year and 20-year time horizons. The total emissions increase over time for this alternative from the base year of 20,960 tons per year of pollutants to 42,305 tons per year by 2023.

4.3 Cultural Resources

This section presents the impacts to cultural resources from management actions for other resource programs. Existing conditions concerning cultural resource management are described in Section 3.3.

Significance Criteria

Impacts to cultural resources would be considered significant if the following were to occur:

- Management actions that result in adverse effects to properties listed or determined eligible for listing on the National Register of Historic Places (NRHP) or considered important to Native American groups.

Methods of Analysis

The analysis of environmental impacts is based on interdisciplinary team knowledge of resources and the project area, review of existing literature, and information provided by other agencies and institutions. Effects are quantified where possible. In cases where quantitative data is not readily available, best professional judgment or qualitative assessments are used to describe impacts.

The criteria for assessing impacts are those stipulated by the federal regulations for Protection of Historic Properties, which state that an undertaking may have an adverse effect when it—

> *"May alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR Part 800.5(a)(1)). Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther in distance or be cumulative.*

The analysis is based on the following assumptions:

- The overall density of archeological sites in the planning area is estimated to be approximately 20 sites per section (640 acres), or approximately 1 site per every 32 acres. Of these sites, about 29 percent prove to be significant in terms of NRHP criteria. The density is based on less than 11 percent of BLM surface area that has been inventoried at Class III intensity (see "Cultural Resource Inventory Classes" in the glossary for definition).
- Cultural resources would continue to be found throughout the RMPPA.

- The number of sites that would be impacted by various actions is directly correlated with the degree, nature, and quantity of surface disturbing and other disruptive activities within the planning area.
- When avoidance would be detrimental to other resource values and management direction, mitigation of impacts to cultural resources would be performed in proportion to their significance.
- Cultural resource protection would occur in accordance with State Historic Preservation Officer (SHPO) coordination requirements and other federal regulations.
- A cultural resource inventory, evaluation of site NRHP eligibility, and assessment of potential effects from federal actions is required by law before the initiation of all surface disturbing and other disruptive activities. This generally requires a Class III (100 percent) survey of the affected area. This allows for prescriptive mitigation of impacts through avoidance or other measures where necessary, and effectively minimizes or eliminates the potential for unmitigated impacts to identified cultural resources.
- All authorizations for land and resource use will comply with the Wyoming Standard Mitigation Guidelines for Surface Disturbing Activities (Appendix 1) and cultural resource laws and regulations, as outlined in Appendix 5.

4.3.1 Impacts Common to All Alternatives

Maintaining proper air quality would help protect and preserve environmentally sensitive cultural resources, such as rock art, aspen art, and historic and prehistoric wooden structures. Air quality management actions, such as development of air quality monitoring stations, would require standard inventory and mitigation measures to minimize impacts on cultural resources.

Cultural resource management actions would provide direct protection to cultural properties from surface disturbing and other disruptive activities. Protection measures for cultural resources include cultural resource inventory, avoidance, evaluation of NRHP eligibility, and mitigation of potential effects from federal undertakings. Specifically, areas within one-quarter of a mile of cultural properties where the setting contributes to NRHP eligibility would be avoidance areas for all surface disturbing and other disruptive activities. This would protect the physical integrity of these properties from surface disturbing and other disruptive activities that may compromise the values making them eligible for NRHP. These protective measures are required by law before the initiation of any surface disturbing and other disruptive activity (Appendix 5). In those areas where inventory, evaluation, and avoidance are not considered adequate to preserve cultural resources, mitigation measures would be prescribed on a case-by-case basis, depending upon the nature of the action and the type of cultural resource involved. Mitigation measures would ensure that any potential impact from the proposed action would not result in significant effects to known historic properties.

Cultural resource inventories, recordation, evaluations, and data recovery excavations would increase the site database and further our understanding of history and prehistory. This increased knowledge would allow for the implementation of revised and more appropriate practices to manage future undertakings. Data recovery excavations would remove all or a portion of in situ cultural materials at sites, thereby resulting in potential future data loss should new data recovery and analysis techniques be developed. Cultural resources that have been determined not eligible for the NRHP would be discharged from management and therefore would no longer be protected from future management actions. Managing cultural resources on a case-by-case basis would limit the ability to proactively manage high-potential areas and reduce impacts from, and conflicts with, other resource uses.

Consideration of a cultural resource's contributing setting in conjunction with compliance with laws and regulations would result in mitigation of all developments within the setting, ensuring no significant effects occur. This would ensure the protection of cultural resources such as Native American sacred sites, traditional cultural properties, and sites where the setting contributes to the NRHP eligibility.

Pursuing land acquisitions to preserve cultural resources would increase protection of cultural properties that would otherwise fall outside of federal jurisdiction. Cultural resources located within land acquisitions would benefit from protection measures afforded by cultural resource laws and regulations. Cultural resources located outside of federal jurisdiction are not afforded the same protection measures; thus, irreplaceable data would have a greater likelihood of being lost.

Displacement and loss of cultural resources would occur as a result of wildland fires, surface disturbances caused by suppression activities (e.g., construction of fire lines, bulldozing access roads, and general movement of heavy equipment), and post-fire rehabilitation activities. Displacement of cultural resources adversely affects the potential to understand the context of the site and limits the ability to extrapolate data regarding prehistoric settlement and subsistence patterns. Because of the unplanned nature of wildland fires, impacts to cultural resources from wildland fires and suppression activities are generally assessed subsequent to the fire.

Rock art, either Native American or Euro-American, would be damaged by smoke and soot as well as by rock exfoliation or spalling caused by the extreme heat associated with wildland fires. Loss of vegetation from wildland fires and suppression activities would increase the potential for soil erosion, resulting in displacement and/or loss of cultural resources. However, wildland fires would generally enhance surface visibility (at least in the short term), allowing otherwise undetected, nonflammable cultural materials to be identified and recorded. During large fires, cultural resource specialists would be present to ensure that suppression activities do not adversely affect known historic properties. In addition, cultural resource specialists would occasionally inventory fire lines and access roads prior to suppression activities to ensure protection of cultural properties. Suppression activities would also minimize the potential for devastating wildland fires, which would help preserve flammable cultural resources such as historic and prehistoric wooden structures and aspen carvings.

Surface disturbing and other disruptive activities resulting from forest management, lands and realty management, livestock grazing management, minerals management, OHV management, recreation resources management, vegetation management, and wildlife and fisheries management actions would have the potential to directly impact cultural resources not identified prior to the activity. Unanticipated subsurface discoveries (cultural resources discovered during ground-disturbing activities) would occur from surface disturbing and other disruptive activities. Unanticipated discoveries would result in displacement or loss (either complete or partial) of the cultural resource involved. Displacement of cultural resources adversely affects the potential to understand the context of the site and limits the ability to extrapolate data regarding prehistoric settlement and subsistence patterns. However, mitigation of impacts from discoveries is often accomplished through data recovery excavations that increase our understanding of prehistory. The number of unanticipated discoveries would be directly proportional to the amount of surface disturbance. Potential impacts to cultural resources identified in a discovery situation would be greater than impacts to resources that were previously identified (and thereby avoided or subjected to mitigation measures) because damage to discovered sites occurs prior to their recordation and evaluation, thereby complicating mitigation procedures.

Lands and realty management, livestock grazing management, minerals management, recreation resources management, and wildlife and fisheries management actions resulting in development projects within the setting that contributes to NRHP eligibility would be mitigated to prevent significant effects. Assessment of potential impacts would be conducted through viewshed analyses, on-site inspection, and

photo inspection. Mitigation measures would include, but are not limited to, decreasing the height of structures, using paint and topography to blend structures into the background, mowing and reseeding right-of-way (ROW) corridors, and using materials that match the existing environment to construct access roads (Appendix 5).

Implementing the Wyoming Standards for Healthy Rangelands (BLM 1997) would maintain or improve soil stability and vegetation cover, thereby protecting cultural resources. Overuse of an area by livestock, wildlife, and wild horses would potentially accelerate soil erosion, which would potentially lead to exposure and destruction of cultural resources. Livestock trampling and wallowing directly impacts cultural artifacts and features on or just below the surface through breakage and scattering. Livestock scratching and rubbing affects certain types of cultural properties, including historic and prehistoric structures and rock art sites. In most instances, impacts from these types of animal behaviors on cultural resources would be minimal. However, long-term impacts from grazing would potentially occur from repeated trampling on cultural sites over time, especially along fence lines, near water sources, and in sheltered or shaded areas. Proper construction of water developments and range improvements, and proper placement of salt and mineral supplements would help minimize adverse impacts to cultural resources. Areas would be inventoried and evaluated for cultural resources prior to the construction of fences, water developments, and other range improvements, and appropriate mitigation measures would be implemented if needed.

Lands and realty management actions not associated with minerals development would disturb approximately 5,794 acres over the 20-year planning period under all alternatives. These actions would potentially affect an estimated 181 cultural properties, of which an estimated 53 would be eligible for the NRHP. Required cultural resource inventory, recordation, and mitigation procedures conducted in conjunction with ROW actions would serve to protect most cultural resources from significant damage and increase the database of known cultural properties. A small but proportional number of these sites would be adversely impacted as a result of unanticipated discoveries, potentially resulting in significant impacts.

OHV use on improved roads would have negligible effects on cultural resources. However, the majority of unimproved two-track roads and vehicle routes within the RMPPA have not been inventoried for cultural resources, increasing the potential for unmitigated impacts. OHV use of these roads and vehicle routes would disturb or displace cultural resources located within the roadways. Inappropriate use of unimproved roads and vehicle routes by OHVs would accelerate erosion and thus disturb soils that contain cultural resources. OHV use of historic roads, especially in areas with poor ground conditions, would potentially have an adverse effect on the physical integrity of the road.

Impacts to cultural resources from paleontology management would be minimal. Standard inventory and recordation procedures conducted in conjunction with paleontology management actions would protect cultural resources.

Protections afforded to SMAs (i.e., restrictions on surface disturbing and other disruptive activities) would indirectly protect cultural resources located in these areas by reducing the potential for unanticipated discoveries and subsequent loss of cultural information. ROW exclusion requirements and no surface occupancy (NSO) stipulations would provide the greatest level of protection by prohibiting surface disturbing activities. Special recreation management area (SRMA) management would encourage recreation and development of facilities, which could result in damage to cultural resources through ground-disturbing activities and indirectly through the larger presence of human activity. Cultural inventories would be completed before any new facilities are constructed. The Rawlins OHV SRMA would be open to OHV use. This area has been inventoried at the Class III level, and no significant

cultural resources were identified. Therefore, impacts to cultural resources from use of the Rawlins OHV SRMA would be negligible.

Transportation and access management would impact cultural resources by pursuing new access areas (Table 2-8) and consolidating public lands to increase recreational opportunities in these new areas, which would increase the potential for incidental or purposeful disturbance of cultural resources. Facilitating use of these areas would result in increased surface disturbing and other disruptive recreational activity and loss of vegetative cover, which would increase the potential for exposure and destruction of cultural resources.

Actions designed to maintain vegetation resources would protect cultural resources by managing surface disturbance and minimizing soil erosion, which would help prevent the degradation of soils that may contain cultural resources. Achieving the Wyoming Standards for Healthy Rangelands (BLM 1997) would maintain or improve environmental conditions, soil stability, and vegetation cover, thereby protecting cultural resources. Vegetation treatments would reduce cover in the short term, allowing otherwise undetected cultural materials to be identified and recorded. However, vegetation treatments would also likely increase soil erosion in the short term and potentially result in displacement and/or loss of cultural resources. Displacement of cultural resources adversely affects the potential to understand the context of the site and limits the ability to extrapolate data regarding prehistoric settlement and subsistence patterns.

In all VRM management classes, activities would be mitigated so as not to compromise the objectives of the VRM class (Appendix 25). Cultural properties located in VRM Class I areas (67,730 acres) would be protected because surface disturbing and other disruptive activities would be prohibited in these areas. The integrity of the setting of cultural resources located in VRM Class II areas would also receive protection from management actions that would require structures to blend into the landscape when possible, thus minimizing the potential for adverse effects (Appendix 5). Cultural properties located in VRM Class III and IV areas would be subject to a higher level of surface disturbing and other disruptive activity, as these areas allow for moderate and high levels of landscape alteration, respectively.

Controlling or preventing surface disturbing and other disruptive activities in wetland/riparian areas would protect cultural resources in these areas by reducing the potential for unanticipated discoveries. Soils management would provide long-term indirect benefits to cultural resources by minimizing soil erosion, thereby preserving cultural properties.

Restrictions on surface disturbing and other disruptive activities in big game, waterfowl, amphibian, and federally listed species habitat would protect cultural resources in these areas by reducing the potential for unanticipated discoveries.

4.3.2 Impacts Under Alternative 1: Continuation of Existing Management

Wildland suppression activities would be managed for appropriate management response (AMR), which would consider protection of natural and cultural resources. This would help reduce damage to cultural resources caused by suppression activities by considering these resources when determining the degree and location of suppression activities.

Forest management actions would result in the treatment of up to 7,000 acres of forestlands over the 20-year planning period for commercial and pre-commercial thinning and to fulfill Stewardship and Service Contracts associated with the Healthy Forest Restoration Act of 2003. The surface-disturbance associated with these activities would potentially affect an estimated 218 cultural properties, of which an estimated 63 would be eligible for the NRHP. Moreover, allowing noncommercial firewood gathering without

considering potential cultural resource impacts would potentially result in a limited loss of cultural resources, such as tree carvings and historic and prehistoric wooden structures. In addition, approximately 25,900 acres would be available for commercial timber harvest, which would increase soil erosion and subsequent deterioration of cultural resources. The surface disturbance associated with this activity would potentially affect an estimated 809 cultural properties, of which an estimated 235 would be eligible for the NRHP. Approximately 1,600 of these acres would overlap with treatment areas. Standard inventory and mitigation procedures conducted in conjunction with forest management actions would protect most cultural resources from significant damage and would increase the database of known cultural properties.

The lands and realty management program has identified 61,010 acres of lands for disposal under this alternative, which would potentially affect an estimated 1,907 cultural properties, of which approximately 553 would be eligible for the NRHP. Land disposal would place these cultural properties outside of federal jurisdiction and thereby eliminate protection under federal management policies. Cultural resource inventories and evaluations required prior to transferring lands from federal jurisdiction would ensure that cultural properties are adequately documented, evaluated, and mitigated prior to ownership changes. BLM may retain or obtain lands containing important cultural and historic resources, providing protection under federal management policies.

Withdrawals would be pursued on approximately 14,450 acres, which would result in closure of these areas to locatable mineral entry and future disposal actions. This would provide additional protection to cultural resources located in these areas by reducing surface disturbing and other disruptive activities and eliminating the possibility of placing undiscovered cultural resources outside of federal jurisdiction.

Approximately 900 acres would be disturbed by the construction of livestock range improvements over the next 20 years. This would potentially affect an estimated 28 cultural properties, of which an estimated 8 would be eligible for the NRHP. Standard inventory and recordation procedures conducted in conjunction with range improvement actions would protect most cultural resources from significant damage and would increase the database of known cultural properties. A small but proportional number of these sites would be adversely impacted as a result of unanticipated discoveries.

Under Alternative 1, it is anticipated that 8,945 oil and gas wells would be drilled over the next 20 years, disturbing approximately 61,895 acres of land (including all related facilities and pipelines). This would potentially affect an estimated 1,934 cultural properties, of which an estimated 561 would be eligible to be placed on the NRHP. Standard inventory and recordation procedures conducted in conjunction with mineral development would protect most cultural resources from significant damage and would increase the database of known cultural properties. A small but proportional number of these sites would be adversely impacted as a result of unanticipated discoveries.

Impacts to cultural resources from OHV management would be minor. With the exception of the Dune Ponds Cooperative Management Area (CMA) and 33,500 acres of closed areas, OHV travel would be limited to designated or existing roads and vehicle routes. The unvegetated portions of the Dune Ponds CMA would be open to OHV use. This 3,730-acre CMA has not been inventoried for cultural resources. Continued unrestricted use of these areas would potentially disturb or displace cultural resources. However, because of the limited area and the active nature of the sand dunes, this impact would be minimal. Cultural resources located in areas closed to OHV use (33,500 acres) would be completely protected from OHV-related impacts.

Although impacts to cultural resources could occur from recreation activities, certain recreation areas would be managed to limit surface disturbance. Implementing an NSO stipulation for oil and gas development activities in developed and undeveloped recreation sites (9,660 acres) and intensively

managing such activity within one-quarter of a mile of these sites (7,930 acres) would limit surface disturbance and thereby help prevent damage to cultural resources located in these areas. Closing developed recreation sites (2,600 acres) to locatable mineral entry and mineral material disposals would provide further protection from surface disturbing and other disruptive activities. In addition, surface-disturbing and other disruptive activities would be intensively managed in the west end of the Ferris Mountains and the Adobe Town fringe areas, which would reduce the potential for damage to cultural resources in these areas.

Surface use restrictions associated with management of SMAs would indirectly protect cultural resources located in these areas by reducing the potential for unanticipated discoveries and subsequent loss of cultural information. The Sand Hills Area of Critical Environmental Concern (ACEC) (7,960 acres), Jep Canyon ACEC (13,810 acres), Chain Lakes wildlife habitat management area (30,470 acres), Wick-Beumee wildlife habitat management area (280 acres), Laramie Plains Lakes area (1,600 acres), Upper Muddy Creek Watershed/Grizzly area (70,780 acres), White-Tailed Prairie Dog areas, Shirley Mountain Caves SRMA (24,400 acres), and North Platte River SRMA (5,060 acres, including one-quarter of a mile either side of the river) would require intensive management of surface disturbing and other disruptive activities. Intensive management would potentially restrict the amount and size of surface disturbance, decreasing the potential to disturb buried cultural deposits located within the SMAs.

The area within one-quarter of a mile, or the visual horizon, of the Cherokee and Overland trails would be an avoidance area for surface disturbing and other disruptive activities. In most cases, proposed facilities would be relocated outside of the avoidance area. If the location cannot be avoided, mitigation measures would be required to reduce the potential for impacts to cultural resources.

All surface disturbing and other disruptive activities within wilderness study areas (WSA) (63,530 acres) and one-quarter of a mile of the Encampment River Wild and Scenic River (WSR) (Map 2-19) and surface disturbance associated with new leases within the Stratton Sagebrush Steppe Research Area ACEC (5,530 acres) would be prohibited, thereby providing the greatest level of protection to cultural resources.

Management of the Sand Hills ACEC and potential JO Ranch expansion area would benefit the historic JO Ranch through the intensive management of surface disturbing and other disruptive activities within the 18-acre area surrounding the ranch complex and through the stabilization of the historic ranch to preserve its historic integrity. Other cultural resources in the Sand Hills ACEC (7,960 acres) would be indirectly protected through the intensive management of surface disturbing and other disruptive activities.

Vegetation and weed treatments would minimize the potential for devastating wildfires, increasing the long-term protection of perishable cultural resources, such as historic and prehistoric wooden structures and aspen carvings that could be lost in such events. Vegetation and weed treatments would impact approximately 106,000 acres in the RMPPA over the next 20 years. Although as many as 3,313 cultural properties would potentially be involved, only a small portion of these sites would be sensitive to vegetation treatment measures. Inventory and recordation procedures conducted in conjunction with vegetation treatments would serve to protect sensitive cultural resources from significant damage.

Approximately 359,610 acres would be designated as VRM Class II under this alternative. This would provide indirect protections to the setting of Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility.

Requiring that surface disturbing and other disruptive activities avoid identified 100-year flood plains; areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas; and areas within 100

feet of the inner gorge of ephemeral channels would provide additional protection to cultural resources located in these areas by reducing the potential for such activities to damage undocumented resources.

Avoidance or intensive management of surface disturbing and other disruptive activities in sensitive wildlife habitats would preserve cultural sites located in these areas. Cultural resources would not be affected in active raptor nests areas (19,230 acres) where surface disturbing activities are prohibited.

Summary

It is anticipated that 98,339 acres would be disturbed as a result of activities related to forest management, lands and realty management, livestock management, and minerals management. This disturbance would potentially impact an estimated 3,073 cultural properties, of which 891 would potentially be eligible for the NRHP.

Approximately 173,810 acres would be protected from surface disturbing and other disruptive activities as a result of VRM Class I areas, SMAs, and NSO stipulations. These management actions would provide the greatest indirect protection to cultural resources by eliminating the potential for surface disturbing and other disruptive activities in these areas. In addition, 359,610 acres would be designated as VRM Class II. This would provide indirect protection to the setting of Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility through the intensive mitigation of visual impacts. Actions associated with other SMAs; water quality, watershed, and soils management; and wildlife and fisheries management would also provide indirect protection to cultural resources through avoidance and intensive mitigation of surface disturbing and other disruptive activities.

It is anticipated that significant impacts to cultural resources would occur. As discussed in the above analysis, any surface disturbance has the potential to damage and/or destroy cultural properties potentially eligible for the NRHP through unanticipated discoveries (i.e., cultural resources discovered during ground-disturbing activities). Unanticipated discoveries would result in the loss of some or occasionally all of the cultural resource involved. Although standard inventory and mitigation procedures conducted in conjunction with surface disturbing and other disruptive activities would protect most cultural resources from significant damage, some unanticipated discoveries would likely occur. The potential for significant impacts would be directly proportional to the amount of surface disturbance.

4.3.3 Impacts Under Alternative 2: Emphasis on Development of Resources

The impacts to cultural resources from recreation management and water quality, watershed, and soils management would be the same as those identified in Alternative 1.

Impacts to cultural resources from cultural resource management actions would be similar to those identified in Alternative 1. However, land acquisitions to preserve and protect select cultural properties would not be as actively pursued, allowing a greater number of significant properties to be impacted that would have been protected under Alternative 1. Compliance with laws and regulations would mitigate adverse effects to the visual integrity of the setting. Mitigation measures outlined in Alternative 1 would still occur; however, the potential for collective adverse effects to the contributing setting would be increased. This would occur because developments would be allowed with less restrictive mitigation, which individually may not compromise the values for which the property is eligible; however, when several developments are permitted with less restrictive mitigation, the property's historic setting would more likely be compromised to the point that it is no longer contributing to the overall eligibility.

Impacts to cultural resources from fire and fuels management would be similar to those identified in Alternative 1, except that more wildland fires would be suppressed. This would reduce the damage to flammable cultural resources, such as historic and prehistoric wooden structures and aspen carvings. Increased suppression and associated surface disturbance would potentially result in impacts to a greater number of buried cultural deposits. Furthermore, increased suppression would increase the potential for catastrophic fires in the long term through the build up of flammable materials that would damage a wider range of cultural resource types.

Commercial timber harvesting would be increased under this alternative, as clear cuts would be larger. Standard inventory and mitigation procedures conducted in conjunction with forest management actions would protect most cultural resources from significant damage and would increase the database of known cultural properties.

Impacts to cultural resources from lands and realty management would be similar to those identified in Alternative 1, except an additional 730 acres would be pursued for withdrawal. This would result in closure of these areas to locatable mineral entry and future disposal actions, thereby providing additional protection to cultural resources located in these areas by reducing surface disturbing and other disruptive activities and eliminating the possibility of placing undiscovered cultural resources outside of federal jurisdiction. Furthermore, an additional 14,780 acres would be precluded from disposal actions. This would further reduce the amount of land that could be removed from federal jurisdiction and therefore the number of cultural resources that could be exempt from federal management policies.

Impacts of livestock grazing management on cultural resources would be similar to those identified in Alternative 1, except approximately 1,140 acres would be disturbed by the construction of livestock range improvements over the 20-year planning period. This would potentially affect an estimated 36 cultural resources, 10 of which would be potentially eligible for the NRHP.

Impacts of oil and gas management actions on cultural resources would be similar to those impacts identified in Alternative 1, except that more acreage would be open to oil and gas leasing with fewer restrictions from other programs. Areas closed to leasing or otherwise restricted from development, surface disturbing and other disruptive activities, or surface occupancy would be reduced. Overall, 9,198 wells would be drilled over the next 20 years, disturbing approximately 63,649 acres (including all related facilities and pipelines). This would potentially affect an estimated 1,989 cultural properties, of which 577 would be potentially eligible for the NRHP. The increase in development would increase the potential for unanticipated subsurface discoveries. However, a greater number of cultural resource inventories and site mitigations (e.g., excavations) would be required, which would expand the cultural resource database.

Impacts to cultural resources from OHV management would be similar to those identified in Alternative 1. However, an additional 480 acres would be open to OHV use, which would increase the potential for damage to cultural resources located in these areas.

Impacts to cultural resources from SMAs would be similar to those impacts identified in Alternative 1, except the NSO stipulation on new leases within the Stratton Sagebrush Steppe Research Area ACEC (5,530 acres) would not be required. Instead, operators would be required to submit a management plan to describe how activities would affect research objectives, which would lead to the implementation of best management practices (BMP) and necessary mitigation measures. As a result, surface disturbance associated with new leases would likely occur within the ACEC, thereby increasing the potential for unanticipated discoveries of cultural resources.

Impacts from vegetation management actions on cultural resources would be similar to those identified in Alternative 1, except that vegetation and weed treatments would be increased to approximately 1,003,720 acres over the next 20 years. An estimated 31,356 cultural properties would be involved in these areas; however, only a small portion of these sites would be sensitive to vegetation treatment measures. Inventory and recordation procedures conducted in conjunction with vegetation treatments would protect sensitive cultural resources from significant damage.

Under this alternative, 125,660 fewer acres would be designated as VRM Class II than under Alternative 1 for a total of 233,950 acres. As a result, fewer Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility would be protected.

Impacts to cultural resources from wildlife and fisheries management would be similar to those identified in Alternative 1, except that restrictions on surface disturbances would be reduced in sensitive wildlife habitat areas. As a result, surface disturbing and disruptive activities would be allowed over a larger area, resulting in adverse impacts to intact buried cultural deposits.

Summary

Under Alternative 2, impacts to cultural resources would be similar to those impacts identified in Alternative 1. However, a slightly greater number of acres would be disturbed, potentially impacting an increased number of cultural properties. It is anticipated that 98,793 acres would be disturbed over the 20-year planning period as a result of lands and realty management, livestock management, and minerals management activities. This disturbance would potentially impact an estimated 2,900 cultural properties, of which 841 would potentially be eligible for the NRHP. These numbers do not include disturbance acreage or sites potentially impacted from forest management actions. We anticipate that more sites would be impacted by surface disturbance and disruptive activities than anticipated in Alternative 1.

Approximately 77,270 acres would be protected from surface disturbing and disruptive activities as a result of VRM Class I areas, SMAs, and NSO stipulations. These management actions would provide the greatest indirect protection to cultural resources by eliminating the potential for surface disturbing and other disruptive activities in these areas. The VRM Class II areas would be reduced to include 233,950 acres, resulting in the protection of fewer Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility. In addition, there would be less indirect protection to cultural resources because of the decrease in surface restrictions included in management actions for other resource programs.

It is anticipated that significant impacts to cultural resources would occur. As discussed in the above analysis, any surface disturbance has the potential to damage and/or destroy cultural properties potentially eligible for the NRHP through unanticipated discoveries (i.e., cultural resources discovered during ground-disturbing activities). Unanticipated discoveries result in the loss of some or occasionally all of the cultural resource involved. Although standard inventory and mitigation procedures conducted in conjunction with surface disturbing and other disruptive activities would protect most cultural resources from significant damage, some unanticipated discoveries would likely occur. Because disturbance of more surface acres is anticipated, the potential for significant impacts would increase as compared to Alternative 1.

4.3.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts from cultural resource management on cultural resources would be similar to those identified in Alternative 1. However, prohibiting surface disturbing and other disruptive activities within one-quarter of a mile of historic properties where the setting contributes to NRHP eligibility would indirectly protect all of the cultural resources within that zone. This would ensure the protection of those sites from activities that may compromise the values making them eligible for NRHP.

Fewer wildland fires would be suppressed under this alternative than under Alternative 1, which would increase the potential for damage to flammable cultural resources such as historic and prehistoric wooden structures and aspen carvings. Damage to rock art from the extreme heat and smoke associated with wildland fires would also increase. Wildland fires would likely increase in intensity, which would result in increased soil erosion, greater loss of vegetation, slower recovery of plant communities, and consequential deterioration of cultural properties. However, the potential for damage to buried cultural resources from fire suppression activities would be decreased from Alternative 1, because there would be fewer ground-disturbing activities.

The impacts of forest management on cultural resources would be similar to Alternative 1, except that commercial logging and forest product extraction would be prohibited. This would eliminate potential impacts to cultural resources from logging activities. However, up to 30,000 acres would still be available for forest management treatments, which would have the potential of impacting an estimated 938 cultural properties, 272 of which would potentially be eligible for NRHP. Noncommercial forest product extraction would continue, potentially impacting a small number of cultural properties such as historic tree carvings or wood structures.

Impacts to cultural resources from lands and realty management would decrease, as compared to Alternative 1. Under Alternative 3, no lands would be available for disposal and approximately 272,350 acres would be pursued for withdrawal. Retaining all lands under federal jurisdiction would maintain protections associated with federal management policies. The withdrawal of 272,350 acres would result in closure of these areas to locatable mineral development and future disposal actions. This would provide additional protection to cultural resources located in these areas by reducing surface disturbing and other disruptive activities and eliminating the possibility of placing undiscovered cultural resources outside of federal jurisdiction.

Impacts to cultural resources from livestock grazing management would be similar to those identified in Alternative 1. However, the emphasis on fence modification as opposed to new fence construction and the emphasis on small-scale as opposed to large-scale water developments would result in the disturbance of 480 fewer acres over the next 20 years. Under this alternative, only 420 acres would be disturbed, potentially affecting an estimated 13 cultural properties or an estimated 4 eligible properties. However, as a result, there would be fewer cultural resource inventories, reducing the potential to increase the site database and further our understanding of history and prehistory.

Impacts to cultural resources from oil and gas development would be similar to those impacts identified in Alternative 1, except that less acreage would be open to oil and gas leasing with greater constraints from other programs. Areas closed to leasing or otherwise restricted from development, surface disturbing and other disruptive activities, or surface occupancy would be increased. Overall, 8,632 wells would be drilled over the next 20 years, disturbing approximately 56,505 acres (including all related facilities and pipelines). This would potentially affect an estimated 1,766 cultural properties, 512 of which would potentially be eligible for NRHP. The decrease in development would decrease the potential for

unanticipated subsurface discoveries. However, fewer cultural resource inventories and site mitigations (e.g., excavations) would be required, which would serve to expand the cultural resource database.

Impacts from OHV management actions on cultural resources would be similar to those identified in Alternative 1, except that the 3,730 acre Dune Ponds CMA would be closed to OHV use, thereby eliminating OHV-related impacts to the cultural resources in this area.

Impacts to cultural resources from recreation management would be similar to those identified in Alternative 1, except developed and undeveloped recreation sites (9,660 acres) and the surrounding ½-mile area (15,800 acres) would be subject to NSO stipulations. These actions would serve to reduce the potential for damage to cultural resources in these areas by limiting the level of surface disturbing and other disruptive activities.

Preservation of the Adobe Town fringe areas (31,510 total acres) and the west end of the Ferris Mountains (5,270 total acres) would prevent surface disturbance associated with development in these areas. As a result, an estimated 984 cultural properties would be protected in the Adobe Town fringe areas, and an estimated 166 cultural properties would be protected in the Ferris Mountains.

Impacts to cultural resources from SMAs would be similar to those impacts identified in Alternative 1, except management of surface disturbance within SMAs would be more restrictive. Surface disturbance associated with new oil and gas leases would be prohibited in the following areas: the Como Bluff ACEC (1,690 acres), Upper Muddy Creek Watershed/Grizzly ACEC (70,780 acres), Sand Hills ACEC (12,700 acres), Jep Canyon wildlife habitat management area (13,810 acres), Stratton Sagebrush Steppe Research Area ACEC (5,530 acres), Chain Lakes ACEC (30,470 acres), Wick-Beumee wildlife habitat management area (280 acres), Shirley Mountain Bat Cave ACEC (520 acres), Laramie Plains Lakes ACEC (1,600 acres), and North Platte River SRMA (10,370 acres, including one-half of a mile either side of the river).

Management actions associated with the Sand Hills/JO Ranch Expansion ACEC (12,700 acres) would benefit the historic nature of the ranch and associated facilities. Using the ranch as an interpretive center would provide the cultural resource program with a venue for public education on 19th century ranching practices and settlement in the area. Classifying the ranch and surrounding setting as VRM Class II would prevent development activities from adversely affecting the historic setting of the area.

The Historic Trails ACEC would be expanded to include the Rawlins to Baggs and Rawlins to Fort Washakie Freight Roads, increasing the ACEC acreage by about 25,000 acres. Surface disturbing activities would be prohibited within the ACEC, which would potentially protect an estimated 781 additional cultural properties within this area. The expansion would also increase the area designated as VRM Class II, which would provide further protection to intact buried cultural deposits located in these areas. Historic properties where the setting contributes to NRHP eligibility would also benefit because management actions would require structures to blend into the landscape when possible, thus minimizing the occurrence of adverse effects (Appendix 5).

Impacts from vegetation management actions on cultural resources would be similar to those identified in Alternative 1, except that vegetation and weed treatments would be increased to 806,840 acres over the next 20 years. An estimated 25,205 cultural properties would be involved in these areas; however, only a small portion of these cultural properties would be sensitive to vegetation treatment measures. Inventory and recordation procedures conducted in conjunction with vegetation treatments would protect sensitive cultural resources from significant damage. Managing for desired plant community (DPC) would reduce the potential for impacts to cultural resources by enhancing specific plant communities that improve soil stability. However, management for DPC would potentially result in increased herbaceous cover, which

would reduce the potential to locate previously unidentified cultural resources and further our understanding of history and prehistory.

Impacts to cultural resources from VRM management would be similar to those identified under Alternative 1, except 582,200 more acres would be designated as VRM Class II for a total of 941,810 acres. As a result, a significantly greater number Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility would receive appropriate mitigation (Appendix 5).

Impacts to cultural resources from water quality, watershed, and soils management would be similar to those identified in Alternative 1. However, prohibiting the surface discharge of produced water from CBNG activities in the Colorado River Basin would eliminate the potential for such discharges to expose and damage cultural resources located in stream channels. Under this alternative, development of off-channel reservoirs for water disposal would be limited; water development projects that result in greater than 1 acre of depletion in Muddy Creek would be prohibited; and reservoirs greater than 0.25 acres in size in stream channels would be restricted, which typically include dams, spreader dikes, and spillways that extend outside of the stream channel. These restrictions would provide additional protection to cultural resources located in riparian areas by limiting surface disturbance and associated damage to undocumented resources.

Impacts to cultural resources from wildlife and fisheries management would be similar to those impacts identified in Alternative 1, except that restrictions on surface disturbances would increase in sensitive wildlife habitat areas. A greater number of areas would be avoidance areas for surface disturbing and other disruptive activities under this alternative, which would reduce the potential for damage to cultural resources located in these areas. Fewer surface locations within big game crucial winter range and within 2 miles of Greater sage-grouse and sharp-tailed grouse leks would decrease the potential to impact the visual setting of cultural properties.

Summary

Under Alternative 3, impacts to cultural resources would be similar to those impacts identified in Alternative 1. However, fewer acres would be disturbed, potentially impacting fewer cultural properties. It is anticipated that 92,719 acres would be disturbed over the 20-year planning period as a result of forest management, lands and realty management, livestock management, and minerals management activities. This disturbance would potentially impact an estimated 2,897 cultural properties, of which 840 would potentially be eligible for NRHP. This would represent a decrease of 176 cultural properties and 51 NRHP-eligible properties affected as compared to Alternative 1.

Approximately 425,280 acres would be protected from surface disturbing and other disruptive activities as a result of VRM Class I areas, SMAs, and NSO stipulations. These management actions would provide the greatest indirect protection to cultural resources by eliminating the potential for surface-disturbing and other disruptive activities in these areas. The Class II areas would be increased to include 941,810 acres, resulting in the protection of a greater number of Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility. In addition, there would be more indirect protection to cultural resources because of the increase in surface restrictions included in management actions for other resource programs.

It is anticipated that significant impacts to cultural resources would occur. As discussed in the above analysis, any surface disturbance has the potential to damage and/or destroy cultural properties potentially eligible for NRHP through unanticipated discoveries (i.e., cultural resources discovered during ground-disturbing activities). Unanticipated discoveries result in the loss of some or occasionally all of the

cultural resource involved. Although standard inventory and mitigation procedures conducted in conjunction with surface disturbing activities would protect most cultural resources from significant damage, some unanticipated discoveries would likely occur. Because disturbance of fewer surface acres is anticipated, the potential for significant impacts would decrease as compared to Alternative 1.

4.3.5 Impacts Under Alternative 4: Preferred Alternative

Impacts on cultural resources from fire and fuels management and livestock grazing management would be the same as those identified in Alternative 1.

Impacts resulting from cultural resource management would be the same as those identified in Alternative 3.

Impacts to cultural resources from forest management would be similar to those identified in Alternative 1, except 6,700 fewer acres would be available for commercial timber harvest. This would decrease the potential for damage to cultural resources associated with logging activities. Specifically, this would impact 210 fewer cultural properties (or 60 properties eligible for NRHP) than forest management actions under Alternative 1.

Impacts to cultural resources from lands and realty management would be similar to those identified in Alternative 1, except an additional 6,790 acres would be pursued for withdrawal. This would result in closure of these areas to locatable mineral entry and future disposal actions, which would provide additional protection to cultural resources located in these areas (an estimated 644 properties) by reducing surface disturbing and other disruptive activities and eliminating the possibility of placing undiscovered cultural resources outside of federal jurisdiction. Furthermore, an additional 14,780 acres would be precluded from disposal actions, reducing the number of cultural resources (an estimated 461 properties) that would be removed from federal jurisdiction.

Impacts to cultural resources from oil and gas development would be similar to those identified in Alternative 1, except that less acreage would be open to oil and gas leasing with greater constraints from other programs. Areas closed to leasing or otherwise restricted from development, surface disturbing and other disruptive activities, or surface occupancy would be increased. Overall, 8,822 wells would be drilled over the next 20 years, disturbing approximately 57,819 acres (including all related facilities and pipelines). This would potentially affect an estimated 1,807 cultural properties, 524 of which would potentially be eligible for NRHP. The decrease in development would decrease the potential for unanticipated subsurface discoveries. However, fewer cultural resource inventories and site mitigations (e.g., excavations) would be required, which serve to expand the cultural resource database.

Impacts to cultural resources from OHV management would be similar to those identified in Alternative 1, except an additional 11,010 acres would be closed to OHV use. This would eliminate the potential for damage to cultural resources associated with OHV use in these areas.

Impacts to cultural resources from recreation management would be similar to those identified in Alternative 1, except developed and undeveloped recreation sites (9,660 acres) and the surrounding ¼-mile area (7,930 acres) would be subject to NSO stipulations. In addition, the west end of the Ferris Mountains (5,300 acres) would be closed to new oil and gas leasing, and surface disturbing activities on existing leases would be intensively managed to preserve naturalness in the area. Surface disturbing and other disruptive activities within the Adobe Town fringe areas (31,510 acres) would also be intensively managed. These actions would reduce the potential for damage to cultural resources in these areas by limiting the level of surface disturbing and other disruptive activities.

Impacts to cultural resources from management of SMAs would be similar to those identified in Alternative 1, except surface disturbing and other disruptive activities would be prohibited within one-quarter of a mile (or the visual horizon) of the Cherokee and Overland trails. Prohibitions on surface-disturbing and other disruptive activities within the Encampment River WSR (Map 2-19) would be expanded to include the entire viewshed of the river segment. These actions would increase indirect protections to cultural resources by substantially reducing the level of surface disturbance that would be allowed within these areas.

The Sand Hills ACEC and proposed JO Ranch expansion would be expanded, which would provide further protection for the historic JO Ranch and its viewshed. This expansion would also increase the amount of area that would be intensively managed for surface disturbing and other disruptive activities, which would increase protection to a greater number of cultural resources. Reduction of the Historic Trails SMA to exclude the Rawlins to Baggs and Rawlins to Fort Washakie Freight Roads would reduce the number of sites protected from activities that may compromise the values making them eligible for NRHP.

Impacts to cultural resources from vegetation management would be similar to those impacts identified in Alternative 1, except that vegetation and weed treatments (mechanical, biological, chemical, and prescribed fire) would be increased to include 828,460 acres over the next 20 years. An estimated 25,880 cultural properties would be involved in this area; however, only a small portion of these sites would be sensitive to vegetation treatment measures. Inventory and recordation procedures conducted in conjunction with vegetation treatments would protect sensitive cultural resources from significant damage.

Impacts on cultural resources from VRM management would be similar to those identified in Alternative 1, except 229,920 more acres would be designated as VRM Class II for a total of 589,530 acres. As a result, a greater number Native American sacred sites, traditional cultural properties, and other cultural properties whose setting contributes to their NRHP eligibility would be protected.

Impacts to cultural resources from water quality, watershed, and soils management would be similar to Alternative 1. However, prohibiting the surface discharge of produced water from CBNG activities in the Colorado River Basin would eliminate the potential for such discharges to expose and damage cultural resources located in stream channels. Limiting the development of off-channel reservoirs would provide additional protection to cultural resources located in riparian areas by limiting surface disturbance and associated damage to undocumented resources.

Impacts to cultural resources from wildlife and fisheries management would be similar to those impacts identified in Alternative 1, except that restrictions on surface disturbances would increase in sensitive wildlife habitat areas. A greater number of areas would be avoidance areas for surface disturbing and other disruptive activities under this alternative, which would reduce the potential for damage to cultural resources located in these areas. Fewer surface locations within big game crucial winter range would decrease the potential to impact the visual setting of cultural properties.

Summary

Under Alternative 4, impacts to cultural resources would be similar to those impacts identified in Alternative 1. However, fewer acres would be disturbed, potentially impacting fewer cultural properties. It is anticipated that 87,583 acres would be disturbed over the 20-year planning period as a result of forest management, lands and realty management, livestock management, and minerals management activities. This disturbance would potentially impact an estimated 2,737 cultural properties, of which 794 would

potentially be eligible for NRHP. This would represent a decrease of 336 cultural properties and 97 NRHP eligible properties affected as compared to Alternative 1.

Approximately 225,830 acres would be protected from surface disturbing and other disruptive activities as a result of VRM Class I areas, SMAs, and NSO stipulations. These management actions would provide the greatest indirect protection to cultural resources by eliminating the potential for surface-disturbing and other disruptive activities in these areas. The VRM Class II areas would be increased to include 589,530 acres, resulting in the protection of a greater number of Native American sacred sites, traditional cultural properties, and other cultural properties where the setting contributes to their NRHP eligibility. In addition, there would be more indirect protection to cultural resources from the increase in restrictions included in management actions for other resource programs.

It is anticipated that significant impacts to cultural resources would occur. As discussed in the above analysis, any surface disturbance has the potential to damage and/or destroy cultural properties potentially eligible for the NRHP through unanticipated discoveries (i.e., cultural resources discovered during ground- disturbing activities). Unanticipated discoveries result in the loss of some or occasionally all of the cultural resource involved. Although standard inventory and mitigation procedures conducted in conjunction with surface disturbing and other disruptive activities would protect most cultural resources from significant damage, some unanticipated discoveries would likely occur. Because disturbance of fewer surface acres is anticipated, the potential for significant impacts would decrease as compared to Alternative 1.

4.4 Wildland Fire and Fuels

This section presents potential impacts on wildland fire and fuels management from management actions for other resource programs. Discussion of wildland fire and fuel management in this section relates only to wildland fire suppression and fuel reduction. Vegetative treatments (including prescribed burns, mechanical, chemical, or biological treatments) for nonfuel reduction objectives are discussed in Section 4.15. Existing conditions for fire and fuels management are described in Section 3.4.

Significance Criteria

Impacts to fire and fuels management would be considered significant if the following were to occur:

- Actions resulting in a substantial increased risk from wildland fire to public health and safety, other resource values, or destruction of property
- Changes in vegetation communities that result in increased size, complexity, and frequency of wildland fires
- Management actions fail to reintroduce wildland fire into its natural role in the ecosystem.

Methods of Analysis

Impact analyses and conclusions are based on interdisciplinary team knowledge of resources and the project area, as well as a review of existing literature. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate.

The analysis was based on the following assumptions:

- A direct relationship exists between level of human use within the planning area and the frequency of human-caused fires.
- A direct relationship exists between fuel loads (standing and nonstanding vegetation) and potential fire size and intensity.
- BLM-administered land would be treated annually with prescribed fire, mechanical treatments, and chemical treatments. Additional acres would be treated annually with mechanical methods to reduce fire potential in wildland and urban interface areas.
- The chance of wildland fire within the RMPPA that could seriously damage sensitive resource values is considered to be moderate.
- Reasonably foreseeable development (RFD) and RFA can be found in Appendix 33.

4.4.1 Impacts Common to All Alternatives

Protections afforded to cultural resources and surrounding areas (e.g., identified historical trails, buildings, and cultural sites) include limitations and restrictions related to fire management, which would potentially affect the methods of fire suppression. The isolated public land parcels found within or near private lands would increase the amount and complexity of BLM's involvement in the suppression of fires, particularly in urban interface fires. However, BLM's involvement would be reduced as land tenure adjustments occur (i.e., approximately 500 acres per year would be disposed). OHV use would increase the potential for wildland fire ignition by catalytic converters on OHVs.

Increase in public land use (e.g., recreation) within the RMPPA, and development of private lands adjacent to public lands, would increase the frequency of human-caused fires and the need for fuels treatments, mitigation strategies, education, hazard reduction plans, and wildland fire prevention. Increased frequency of fire would also reduce the opportunity to reintroduce wildland fire into fire-dependent ecosystems.

The proliferation of roads in remote areas would increase fire occurrence, by introducing additional human-caused ignition sources. However, an improved road network in the RMPPA would improve emergency vehicle access and enable an earlier response to fire ignitions.

4.4.2 Impacts Under Alternative 1: Continuation of Existing Management

The AMR would occur on every acre in the RMPPA, giving managers the flexibility to place wildland fire fighting resources where they are most needed to allow wildland fire to benefit other resources when appropriate. Any fire suppression activities that result in a reduction of the size and intensity of wildland fire in the long term would increase the opportunity for larger, more intense fires. An estimated 4,000 acres of wildland fire occurring annually would not achieve the goal of reintroducing fire into fire-dependent ecosystems.

Increases in population and development under minerals and transportation and access management could increase the frequency of human-caused fires and the potential for large wildland fires to occur. However, roads to timber harvest areas and roads and pipelines associated with mineral development would improve access, create fuel breaks, and provide fire control lines when backfired in suppression situations. Also, the ability to use wildland fire for resource benefit would allow for the reintroduction of fire into fire-dependent ecosystems while reducing large fire suppression efforts.

Mineral development would require a greater emphasis on wildland fire suppression and fuels management in areas adjacent to industrial interface for purposes of public health and safety and protection of property values. An increase in the number of fuel reduction projects, especially in wildland urban interfaces (WUI), would slow the spread and improve opportunity for the containment and control of wildland fire. Also, assistance to local communities would improve public and firefighter safety and increase the ability of cooperators to suppress wildland fires. Public service announcements and newspaper articles, in conjunction with posting bans would aid public understanding and compliance with fire regulations and reduce the potential for human-caused fire ignition.

Increased recreation, such as camping and backpacking, could indirectly result in increased wildland fire ignition because of an associated increase in the number of ignition sources (e.g., campfires and catalytic converters). However, recreationists could assist the fire program by spotting and reporting wildland fires, which could improve response time.

Achieving forest health objectives would reduce the amount of dead and downed forest fuels resulting from insect damage, disease, and overgrowth, which would reduce the frequency and intensity of wildland fire. Forest management actions that reduce conifer encroachment in aspen communities would reduce the frequency and intensity of wildland fire. Harvest of timber, firewood gathering, and thinning activities would reduce fuels but would increase ignition sources (e.g., chainsaws). In the long term, achieving forest health and a diverse mosaic of age classes within forest communities would reduce the size and intensity of wildland fires.

Livestock grazing, in some situations, could reduce fine fuels and decrease the capacity for the spread of wildland fires. However, in the long term the accumulation of larger fuel sources (e.g., shrub vegetation) between fires would increase the potential for larger more intense wildland fires to occur. Water developments for livestock provide additional sources of water for fire suppression activities, and livestock trails create fuel breaks if back-burned during fire suppression efforts, which could further aid in the control of wildland fire.

Vegetation management actions to achieve healthy, DPCs would promote mosaic vegetation patterns, which could slow the spread of wildland fires and reduce the size and intensity of wildland fires in treatment areas in the short term. Over the long term, however, the amount of acres designated for treatment under this alternative (2,500 acres, not including invasive weed treatments) would not be adequate to create the diversity of seral stages necessary for long-term vegetation health, resulting in the majority of plant communities being in late seral stages and increasing the potential for wildland fires to occur.

Wildlife management (i.e., special status wildlife species habitat) would affect AMR by increasing the complexity of wildland fire management. Specific vegetation goals for wildlife species habitat would be considered during decisions for allowing wildland fire to be used as a resource benefit, or when considering whether suppression is the appropriate response.

Management of special status plant species and the presence of established weed populations would affect AMR by increasing the complexity of wildland fire management. For example, the use of heavy equipment to build fire lines may not be possible in Special Status Species populations or in established weed populations (i.e., to prevent spread).

Summary

Increases in public land use and development under minerals and transportation and access management could increase the potential for large, human-caused wildland fires to occur. However, a greater emphasis

on fire prevention, suppression, and fuels management, especially in WUIs, could moderate this increase. Also, roads and pipelines associated with increased development would improve access for fire crews, create fuel breaks, and provide fire control lines when backfired in suppression situations.

The ability to use wildland fire for resource benefit would allow for the reintroduction of fire into fire ecosystems, which could reduce large fire suppression efforts over the long term.

Vegetation treatments applied under this alternative would not be adequate to create the diversity of seral stages necessary to decrease the potential for wildland fires.

4.4.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Emphasis on fire suppression of all wildland fires under this alternative would reduce the amount of acreage burned each year (an estimated 2,000 acres/year). However, minimizing the use of wildland fire for resource benefit could increase large fire suppression efforts. Also, the emphasis on fire suppression would increase the need for and complexity of rehabilitation and restoration efforts of fire suppression-related disturbance.

Management actions aimed at reducing the spread of noxious and invasive species (e.g., cheatgrass) would also reduce the potential for fire ignition and spread over the long term. In the short term, plant communities with established populations of noxious and invasive species could alter natural wildland fire frequency, size, and intensity and could increase the complexity of wildland fire management. In addition, the significant increase in landscape-scale vegetation treatments (24,400 acres/year) would create more diverse vegetation communities in treated areas and reduce the size and intensity of wildland fires.

The impacts to fire and fuels management from transportation and access management and livestock management would be the same as Alternative 1.

Impacts from wildlife management are similar to those of Alternative 1. Mitigation for Special Status Species would result in fewer restrictions on fuels reduction projects.

Impacts from forest management would be similar to those of Alternative 1, except larger blocks of commercial timber harvest areas under Alternative 2 would reduce fire fuels. This reduction of fire fuels could decrease potential for the spread of wildland fire in harvested areas.

The termination of the Como Bluff, Jep Canyon, Shamrock Hill and Sand Hill ACECs would eliminate any special restrictions on fire suppression activities, which could reduce the complexity of AMR in these areas.

Summary

The approximate 10-fold increase in vegetation and weed treatments would reduce the annual size of wildland fires to an estimated 2,000 acres. However, the emphasis on fire suppression of all wildland fires under this alternative, and the associated reduction in amount of acreage burned each year, would limit the reintroduction of wildland fire into fire-dependent ecosystems and would increase the need for and complexity of rehabilitation and restoration efforts.

Similar to Alternative 1, increased development would increase sources of fire ignition, which could increase the complexity of AMR.

4.4.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

The emphasis on the use of wildland fire for resource benefit would increase the reintroduction of fire into fire-dependent ecosystems (8,000 acres per year) and would minimize large fire suppression efforts. No commercial timber harvest under this alternative would require increased fuel reduction and would increase the complexity of AMR.

The impacts to fire and fuels management from transportation and access management and livestock management would be the same as Alternative 1.

Management of SMAs (i.e., ACECs, SRMAs) would increase the complexity of wildland fire and fuels management through restrictions on the use of surface disturbing fuels removal and fire suppression equipment. However, the management of the Encampment watershed as a community protection area for municipal water supply would change the AMR strategy for this area to emphasize suppression efforts. Fuel reduction projects would be allowed in this watershed to reduce the impact of wildland fires

Wildlife management restrictions on fuels management activities (i.e., seasonal restrictions on raptor nests, big game parturition areas, threatened and endangered species habitat, and Greater sage-grouse and sharp-tailed grouse leks) would reduce the window of opportunity to conduct fuels management activities.

The increase in vegetation treatments (11,800 acres, plus those acres receiving weed treatments) would result in a higher proportion of vegetation communities in early to mid-seral condition. However, because of the large number of smaller treatments, the increase in the mosaic vegetation patterns would not be adequate to slow the spread of wildland fires, or to reduce potential fire size and intensity. Similar to Alternative 2, management actions aimed at reducing the spread of noxious and invasive species (e.g., cheatgrass) would reduce the potential for fire ignition and spread over the long term. However, plant communities with established populations of noxious and invasive species could alter natural wildland fire frequency, size, and intensity, and could increase the complexity of wildland fire management in the short term.

Summary

In the short term, vegetation treatments would not be adequate to reduce potential fire size and intensity. Over the long term, the emphasis on the use of wildland fire for resource benefit could achieve the goal of reintroduction of the role of wildland fire into fire-dependent ecosystems. Similar to Alternative 2, management actions aimed at reducing the spread of noxious and invasive species (e.g., cheatgrass) would reduce the potential for fire ignition and spread over the long term. However, plant communities with established populations of noxious and invasive species could alter natural wildland fire frequency, size, and intensity, and could increase the complexity of wildland fire management in the short term.

Management of wildlife and SMAs under Alternative 3 would increase the complexity of AMR and reduce the window of opportunity to conduct fuels management activities.

4.4.5 Impacts Under Alternative 4: Preferred Alternative

The impacts to fire and fuels management from transportation and access management, and livestock grazing management would be the same as Alternative 1.

Impacts from forest management would also be the same as Alternative 1, except that fewer acres available for commercial timber harvest would increase the possibility of wildland fire in these areas

(6,700 acres). Also, greater emphasis on the use of wildland fire for resource benefit would result in an increase in vegetation treatments (an estimated 16,400 acres/year, not including weed treatments). These treatments would create more diverse vegetation communities in treated areas and reduce the size and intensity of wildland fires.

In areas of intermixed land ownership, additional coordination between state, private, and federal lands would be necessary to suppress fires under the AMR. Within the Blowout Penstemon ACEC, additional management actions would be required to use wildland fire as a tool for early plant succession.

Similar to Alternative 3, wildlife management restrictions on fuels management activities (i.e., seasonal restrictions on raptor nests, big game parturition areas, threatened and endangered species habitat, and Greater sage-grouse and sharp-tailed grouse leks) would reduce the window of opportunity to conduct fuels management activities.

Summary

Greater emphasis on the use of wildland fire for resource benefit would result in an increase in fuels treatments (an estimated 16,400 acres, not including weed treatments). These treatments would create more diverse vegetation communities in treated areas and reduce the size and intensity of wildland fires.

Similar to Alternative 2, management actions aimed at reducing the spread of noxious and invasive species (e.g., cheatgrass) would reduce the potential for fire ignition and spread over the long term. However, plant communities with established populations of noxious and invasive species could alter natural wildland fire frequency, size, and intensity, and could increase the complexity of wildland fire management in the short term.

Similar to Alternative 3, wildlife management actions would increase the complexity of AMR and reduce the window of opportunity to conduct fuels management activities.

4.5 Forest Resources

This section presents potential impacts to forest management from management actions for other resource programs. Potential impacts to forest vegetation are presented in the Vegetation section (4.15). Existing conditions concerning forest resources and their management are described in Section 3.5.

Significance Criteria

Impacts on forests would be considered significant if any of the following were to occur:

- Management actions create substantive changes in forest health values.
- Management actions substantially alter the ability to harvest timber or minor wood products (i.e., post and pole, Christmas trees, firewood, and wildlings).

Methods of Analysis

Impact analyses and conclusions are based on interdisciplinary team knowledge of resources and the project area, as well as a review of existing literature. Effects are quantified where possible using field investigations, aerial photography, and geographic information systems. In the absence of quantitative data, best professional judgment was used. Impacts are described using ranges of potential impacts or in qualitative terms if appropriate.

The analysis was based on the following assumptions:

- In all areas that have been designated for forest health and fire fuels reduction treatments, 40 percent of the wood product material would be harvested by thinning, 40 percent would be removed through fire fuels reduction (i.e., prescribed fire and the mechanical removal of any fire hazardous fuel products), and less than 20 percent would be harvested by means of clear cut.
- Clear-cut areas, which would not exceed 10 acres, would be revegetated within 5 to 7 years after harvest. Temporary roads would be revegetated within 3 to 5 years after closure. No new permanent roads would be constructed for forest management, but some roads would be temporarily improved to allow for timber harvest.
- Management practices would include removal of encroaching conifers from aspen stands to release the stand and improve aspen stand health in some locations. Most woodlands (see "Woodland" in the glossary) would continue in succession until disturbed by natural causes.
- RFDs and RFAs can be found in Appendix 33.

4.5.1 Impacts Common to All Alternatives

Cultural resource laws and regulations would potentially affect the type and amount of forest management actions. Forest thinning projects or commercial harvest would potentially be modified if a known NRHP-eligible cultural resource site were present. In very rare cases, a forest management project would be precluded if redesign or other mitigation measures were not adequate. However, the potential for this to occur is negligible.

Developed recreational sites would not be available for timber harvesting. Because recreational sites are generally small and not heavily forested, there would be very little impact on commercial harvesting. Recreational pursuits in forested areas are generally compatible with most forest management activities, including forest health objectives and some timber harvesting. In areas not set aside for recreational use, the impact would be low or negligible.

4.5.2 Impacts Under Alternative 1: Continuation of Existing Management

The decline in local demand for saw timber has directly reduced timber harvests and is expected to continue over the long term. Reductions in harvests would contribute to overgrowth of forest stands, thus creating the need for alternative management actions. There would be an increase in alternative methods for achieving the Healthy Forest Initiative goals. Because of this decline in demand for saw timber, forest management would focus on forest health for ecological objectives, rather than timber production.

The condition of the commercial forestland would improve over the long term because mature and over-mature trees would be removed and replaced with younger healthier stands. Management actions are designed to help control insect and disease outbreaks. Over the next 100 years, the nonharvested commercial forestland would continue to follow a natural succession with increased likelihood of insects, disease, wildland fire, and stagnation problems.

The majority of forestland within the RMPPA falls within the suppression fire management category. Although this designation would increase the potential for fuel loading, it would also protect timber stands that would be used in commercial harvest. There would be an increased need for forest management actions including thinning projects, prescribed burns, and commercial harvest.

Table 4-2 shows the change in age-class distribution of lodgepole pine over the next 100 years. As shown in the table, an improvement would occur in age-class distribution.

Table 4-2. Long-Term (100 Years) Age-Class Redistribution of Lodgepole Pine Under Current Management

Age Class (Years)	Present Situation (%)	Long-Term Change (%)	Ideal Age-Class Distribution (%)
0–10	6	8	10
10–40	17	24	30
40–70	16	24	30
70 or more	60	44	30

Source: Medicine Bow-Divide (Great Divide Resource Area) EIS, 1988 (with the present situation percentage updated to account for the past 15 years).

Pursuing legal access to Shirley Mountain, Elk Mountain, Arlington, and Little Medicine would increase the ability to control insect and disease on BLM forested lands. Individual problem areas would be more likely to be treated in a timely manner, improving the overall condition of the forestlands. Access would allow commercial harvesting of timber.

The greatest potential for fluid mineral development occurs outside forested areas; therefore, impacts from mineral development would be negligible. Other types of mineral actions including mineral material disposals, locatable mineral entry, and mining for saleable minerals do occur in forested areas. These activities would remove timber for the construction of access roads and mine sites, potentially reducing commercial harvest size. However, the development of a road network associated with mineral actions would improve access to potential harvest areas.

Most forested areas within the RMPPA are open to OHV use on designated roads and vehicle routes. Impacts on forest management from OHV use could result from additional two-tracks and increased erosion. However, these impacts are expected to be minor.

Vegetation management actions would help to achieve the objectives of the Healthy Forest Initiative by removing decadent stands and conifer encroachment in aspen stands. The amount of timber available for commercial harvest would be reduced in the short term; however, the overall health of the stands would increase in the long term.

Forested public land adjacent to the Medicine Bow National Forest and a portion of Shirley Mountain are managed under VRM Class II. Timber harvests in these areas would be VRM classifications. VRM classifications would impact forest management by influencing the size and shape of harvest units, and determining the location and construction of access roads.

Elk and mule deer habitat in forested areas would require more intensive management, which would potentially modify timber harvest plans; however, the forest management practices generally improve habitat for big game species. Timing stipulations for wildlife protection would seasonally limit forest management practices such as timber harvest and thinning activities.

Summary

Forest management practices would potentially be modified through stipulations from cultural, VRM, and wildlife management actions. The overall health of timber stands would be improved through increased access and forest management actions. There would be some loss of harvestable acreage from minerals, OHV, and cultural resource management actions.

4.5.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from lands and realty management; minerals management; OHV management; SMA management; vegetation management; water quality, watershed, and soils management; and wildlife and fish management would be the same as those in Alternative 1.

The decline in local demand for saw timber has directly reduced timber harvests and is expected to continue over the long term. Reductions in harvests would contribute to overgrowth of forest stands, thus creating the need for alternative management actions. There would be an increase in alternative methods for achieving the Healthy Forest Initiative goals. Forest management would focus on forest health for timber production, rather than ecological objectives.

Legal access to Shirley Mountain, Elk Mountain, Arlington, and Little Medicine would not be pursued, decreasing the ability to control insect and disease on BLM forested lands. Individual problem areas would be less likely to be treated in a timely manner, compromising the overall condition of the forestlands.

Impacts resulting from VRM management would be similar to those in Alternative 1, except that Shirley Mountain would be designated as VRM Class III. This change would reduce restrictions on forest management practices, which would provide more opportunities for timber harvest in the area.

Summary

Forest management practices would potentially be modified through stipulations from cultural and wildlife management actions. The overall health of timber stands would be improved through increased forest management actions. Access to isolated parcels would not be pursued, potentially reducing overall forest health in localized areas. There would be some loss of harvestable acreage from minerals, OHV, and cultural resource management actions. There would be an increased potential for timber harvest with fewer VRM restrictions.

4.5.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts from lands and realty management, OHV management, and VRM management would be the same as those in Alternative 1.

The use of wildland fire for resource benefit would result in improved forest health. This could include areas of decadent forest stands, stands infested with insects or disease, and species like ponderosa pine that have a short fire return interval.

Increased access to forested areas, specifically the Arlington, Little Medicine, Shirley Mountain, North Laramie River, Pine Mountain, and other forested areas and woodlands would improve opportunities for forest health management.

Impacts from minerals management would be the same as Alternative 1, except there would be more restrictions placed on surface disturbing and other disruptive activities, which would protect forest resources.

Impacts resulting from vegetation management would be the same as those in Alternative 1, except the reintroduction of fire into the ecosystem would improve stand health in fire-dependent ecosystems.

Impacts resulting from water quality, watershed, and soils management would be the same as those in Alternative 1, except for the Encampment River Watershed (municipal water supply), which would need to be managed for minimum disturbance. This could limit some types of forest management actions such as fire in this area.

Impacts resulting from wildlife and fisheries management would be the same as those in Alternative 1, except there would be more protection placed on wildlife protections from timing stipulations, which would potentially influence the type of forest management actions.

Summary

Forest management practices would potentially be modified through stipulations from cultural, VRM, and wildlife management actions. The overall health of timber stands would be improved through increased access and forest management actions. There would be some loss of harvestable acreage from minerals, OHV, and cultural resource management actions. Minimal impacts to forest health would occur as a result of the reintroduction of natural fire into the forest and woodland resources.

4.5.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from fire and fuels management, cultural resource management, lands and realty, and mineral resource management would be the same as those in Alternative 1.

Impacts from transportation management; vegetation management; water quality, watershed, and soils management; and wildlife and fish management would be the same as those of Alternative 3.

Forest management would benefit forest health by reducing fuels, increasing mosaic classes, and providing for commercial harvest of timber. However, fewer acres of allowable commercial timber would reduce the amount of timber that could be harvested and increase the amount of acres needed for additional management activities other than harvest.

OHV management would be similar to Alternative 1, except that restricting OHV use to access big game kills and campsites to an area within 300 feet of designated roads and vehicle routes (as compared to no restrictions for these purposes under Alternative 1) would provide additional protection of forest resources from OHV disturbance.

Impacts resulting from the management of SMAs would be the same as those under Alternative 1, except that additional restrictions on timber harvest within one-quarter of a mile of the bat cave complex (Cave Creek Cave) within the Shirley Mountain Bat Cave ACEC would restrict timber harvest in these areas.

Summary

Forest management practices would potentially be modified through stipulations from cultural and wildlife management actions. The overall health of timber stands would be improved through increased access and forest management actions. There would be some loss of harvestable acreage from minerals, OHV, and cultural resource management actions. There would be an increased potential for timber harvest with fewer VRM restrictions. Restrictions on timber harvest within one-quarter of a mile of the Shirley Mountain Bat Cave ACEC and the reduction in the acres available for timber harvest would require other forest management practices to improve forest health and limit opportunities for timber harvest.

4.6 LANDS AND REALTY

This section describes potential impacts on lands and realty management from management actions of other resource programs. Lands and realty management includes land tenure adjustments (sales, exchanges, and acquisitions) and ROWs. Existing conditions concerning lands and realty are described in Section 3.6.

Significance Criteria

Impacts to lands and realty management would be considered significant if either of the following were to occur:

- Substantial reduction in opportunity for ROW authorizations and development activities
- Substantial reduction in the opportunity for land tenure adjustments.

Methods of Analysis

Analysis of the potential impacts on lands and realty management involved close collaboration among BLM resource specialists to compile information based on expertise and knowledge within the RFO. Impact analyses and conclusions are therefore based on the interdisciplinary team knowledge of resources and review of existing literature, as well as information provided by experts in BLM and other agencies. Spatial analysis was conducted using ESRI's ArcGIS Desktop computer software. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate.

The analysis is based on the following assumptions:

- The lands and realty program is a support program rather than an environmental component. The program responds to requests for authorizations, permits, leases, land tenure adjustments, etc., from other programs or outside entities. The discussion of the effects on the lands and realty program under each alternative will be limited to the influences on community expansion opportunities and ROW authorizations for other permitted activities. That is, whether the effects of other resource actions would potentially influence or modify the location, size, or design of a given proposal or, in some limited cases, preclude a lands and realty action from being approved.
- The demand for disposal of public land would average about 500 acres per year. This acreage includes disposal via direct sale, competitive sale, modified competitive sale, recreation and public purpose (R&PP) lease, desert land entry (DLE) patent, or exchange. Before any disposals, lands would be examined for the presence of high-value resources. Lands containing high surface values would not be disposed of, or the disposal would provide for those values to be preserved. The BLM Rawlins Field Office Land Exchange Criteria (Appendix 6) would be used to screen potential land exchanges for possible resource conflicts. Therefore land disposals would not substantially affect other resource programs. Lands identified for disposal under Sec. 203 and 206 of FLPMA and identified as such in this plan are hereby classified for disposal under Section 7 of the Taylor Grazing Act of 1934, as amended (43 USC 315f).
- It is anticipated that the existing withdrawals (with the exception of approximately 3,200 acres of Bureau of Reclamation [BOR] withdrawals) would be retained throughout the life of the plan. However, a withdrawal review program would be initiated to determine if those withdrawals would be retained, revoked, or modified.

- The effects of development and designation of transportation and utility ROW corridors would be mitigated on a case-by-case basis. Generally, this would be accomplished by locating future transportation and utility ROWs adjacent to existing facilities (where possible). Designated ROW corridors identified on Map 2-2 shall have a variable width either side of the centerline of the existing facilities (see lands and realty section, Chapter 2). The corridors would be designated for 1. aboveground and below-ground power lines, 2. telephone lines, 3. fiber optic lines, 4. pipelines, 5. access roads, and 6. other linear type ROWs. Specific proposals would require site-specific environmental analysis and compliance with established permitting processes. Activities generally excluded from ROW corridors include mineral materials disposals, range and wildlife habitat improvements involving surface disturbance and facility construction, campgrounds and public recreation facilities, and other facilities that would attract public use. ROW facilities would not be placed adjacent to each other if resource conflicts or issues with safety or incompatibility were identified. Criteria for designated ROW corridors are presented in Appendix 34. Designated corridors may vary by total width, number, type, extent, and compatibility of activities. New oil and gas wells would be sited outside these designated ROW corridors. The designated width, allowable uses, and excluded uses may be modified during implementation of the approved RMP.

- Disposal of small, isolated parcels of public land would decrease the cost of public land administration in the RMPPA and enhance efficiency in management of the remaining public lands. In addition, the disposal of these small parcels would decrease conflicts between public land users and private landowners.

- Competitive sales of small, isolated parcels might lead to pricing beyond the capability of the owners of property adjacent to those parcels. If owners of adjacent or surrounding property could not purchase the isolated parcels, land use conflicts might develop.

- RFDs and RFAs can be found in Appendix 33.

4.6.1 Impacts Common to All Alternatives

The management actions under any alternative would influence the location of ROWs and other authorized facilities. The limitations and restrictions placed on development of ROWs and facilities would depend on the locations of sensitive resources and the potential environmental impacts to those resources from realty actions.

Protection measures for cultural resources eligible for listing on the NRHP generally include avoidance of cultural properties or other mitigation measures designed to reduce impacts to cultural property settings where the setting contributes to the NRHP eligibility. These mitigation measures would modify the location, height, and color of facilities, or in very rare cases, may prohibit lands and realty actions that would otherwise adversely affect the cultural resources. Avoidance of cultural properties would occasionally require installation of facilities in areas that are more difficult to develop or reclaim, which would potentially increase impacts to other resources.

Land tenure adjustments would benefit the overall management of the public land through consolidation or disposal of isolated parcels. Land tenure adjustments identified in the Great Divide RMP (BLM 1990a) would be pursued as appropriate. Acquiring state in-holdings in wild horse herd management areas (HMA), WSAs, etc., would consolidate management and reduce fragmented surface ownership within these areas.

4.6.2 Impacts Under Alternative 1: Continuation of Existing Management

The protection of the visual setting of cultural properties (where the visual setting contributes to NRHP eligibility) would be achieved through avoidance or other mitigation measures (Appendix 5). In very rare cases, lands and realty actions would be precluded, especially those involving higher profile structures such as power lines, communication sites, and wind energy developments. To maintain the visual settings, ROWs and facilities would be redesigned to minimize impacts to the contributing setting.

Approximately 61,010 acres of BLM-administered public lands meet the FLPMA disposal criteria and would be available for consideration for disposal (Maps 2-22 through 2-25 and Appendix 7). The ability to sell or exchange land and to issue R&PP leases would benefit both communities and industry by allowing for needed community and economic expansion. The sale or exchange of isolated tracts would result in the disposal of lands that are difficult to manage, thereby improving the management of public lands within the RMPPA.

Areas with important resource values would be avoided where possible in planning for new facility placement, which could increase the length of linear facilities, facility location. If it becomes necessary for facilities (i.e., linear ROW) to be placed within avoidance areas, special design characteristics would be required to minimize disturbance to important resource values.

Existing and future mineral leasing, exploration, and development would preclude the ability to sell or exchange public land parcels. The duration of the impact would be directly related to whether the site presents any mineral production and for how long the production continues. Minerals management actions, because they are so numerous in specific parts of the RMPPA, would potentially affect the location of subsequent ROWs.

Intensive surface management of energy development and exploration within one-quarter of a mile of the incorporated boundaries of all cities (1,630 total acres) could limit the ROW actions in these areas. However, the limitation would maintain the availability for potential community expansion.

Recreation sites would preclude operation of the public land laws, including sale. There would be a minimal impact on the lands and realty program from recreation management. This is due primarily to the small acreage required for recreation sites, which can easily be avoided during placement of ROWs and facilities.

Impacts from all SMAs and the management actions designed to protect the values of the SMAs influence the location of ROWs, easements, and other authorizations. Location of ROWs and easements would be precluded within some SMAs (8,105 acres); however, in most cases, sufficient opportunity would exist to locate linear facilities outside of these areas.

VRM classifications would impact the location, route, height, and color of new ROW facilities. Projects would need to be designed to meet the objectives of the established VRM class for the project area (Map 2-51). Most ROW facilities would be compatible with VRM Classes III and IV. Any ROWs or facilities proposed within VRM II would be designed to meet the objectives of that class. The area of VRM Class II would be 359,610 acres.

Management actions for watershed areas aimed at avoiding wetland/riparian areas would result in restrictions and/or relocation of ROWs. The presence of sensitive wetland/riparian areas would potentially limit or even exclude some land disposals. Management actions related to protecting soils, such as avoidance of steep slopes or erosive soils, would influence ROW locations and method of construction.

Mitigation measures (e.g., seasonal restrictions) to protect wildlife resources and threatened and endangered species and Critical habitats would impact lands and realty actions by restricting the timing of surface disturbing and other disruptive activities.

Summary

Under Alternative 1, it is anticipated that there would be no reduction in ROW authorizations and development activities, although there would be the need to protect other sensitive resources and habitats, which would greatly influence the location, opportunity, and timing of ROWs and other land and realty authorized facilities. Protection of sensitive resources would have minimal influence on the ability to sell or exchange public lands to meet community expansion needs. Therefore, no significant impacts would occur to the lands and realty program under this alternative.

4.6.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from cultural resource management actions would be the same as those under Alternative 1.

Impacts from lands and realty management would be the same as those in Alternative 1, except the area identified as potentially suitable for disposal would be reduced to 46,230 acres and proposed withdrawals would be increased slightly by 730 acres to 8,390 acres (see Table 2-2 for a list of proposed withdrawals).

Impacts as a result of utility and transportation systems management in areas with important resource values would be treated the same as those in Alternative 1, except as indicated by avoidance and exclusion areas listed in Table 2-5.

Impacts resulting from minerals management would be greater and would affect more of the RMPPA under this alternative than Alternative 1 because of fewer restrictions on use in the RMPPA and increased development. This alternative would provide the most opportunity for mineral development and production, allowing more areas to be open for all types of mineral development, which would increase land use. This would impact lands and realty management by increasing the demand for ROW authorizations.

Intensively managing energy development and exploration within one-quarter of a mile of the incorporated boundaries of all cities (1,500 total acres) would restrict the location and routes of proposed ROWs.

Impacts resulting from SMA management would be the same as those under Alternative 1, except there would be fewer restrictions on ROWs within proposed and existing SMAs. A total of 8,825 acres would be avoided, if possible, for ROW and facility placement. Influences by these SMAs on the lands and realty management program include possible height restrictions, color requirements, location of facility, and preferred route (see Table 2-2 Proposed Withdrawals).

Impacts resulting from recreation management would be the same as those in Alternative 1.VRM management would result in fewer restrictions and more opportunities for ROW authorizations under this alternative because of reduction in VRM Class II acreage (233,950 total acres).

Summary

Under Alternative 2, it is anticipated that there would be no reduction in ROW authorizations and development activities in relation to Alternative 1. The potential exists that there would be an increase in

ROW authorizations and development activities because of fewer restrictions in existing and potential SMAs and reduced VRM Class II area. Impacts to land tenure adjustments would be the same as under Alternative 1. No significant impacts would occur to lands and realty management activities under this alternative.

4.6.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts from cultural resource management actions would be similar to those of Alternative 1, except that preclusion of development within one-quarter of a mile, or the visual horizon, of historic properties where setting contributes to NRHP eligibility would restrict the locations of new ROWs. This would influence the location of lands and realty actions allowed to occur within the RMPPA.

No specific tracts of land would be considered for disposal. Proposed withdrawals from operation of the public land laws would increase to 272,350 acres as a result of an increase in SMAs (Table 2-2). This would influence the location, route, height, and color of proposed ROWs and facilities within proposed withdrawal areas.

Impacts resulting from minerals management would be the same as those of Alternative 1, except there would be less mineral development, resulting in fewer ROW actions. NSO requirements within one-half of a mile of incorporated boundaries of all cities (4,500 total acres) would restrict ROW actions in these limited areas.

Developed and undeveloped recreation sites (9,600 acres) and the surrounding ½-mile area (an additional 15,800 acres) would be open to oil and gas leasing with an NSO stipulation, which would preclude the placement of ROWs and easements on an additional 7,870 acres (compared to Alternatives 1 and 2); however, because these sites are relatively small, there would be sufficient opportunity outside of these areas for placement of ROWs and easements.

Impacts resulting from SMA management would be similar to those under Alternative 1, except there would be less opportunity for ROWs because of more restrictive management actions required to protect sensitive resource values in many of the SMAs. Areas designated as SMAs would encompass 402,280 acres. Many of the SMAs would be closed to the operation of the public land laws (Table 2-2), and no new oil and gas leases would be allowed in the Chain Lakes ACEC, Sand Hills ACEC, Jep Canyon wildlife habitat management area, Laramie Plains Lake ACEC, Shirley Mountain Bat Cave ACEC, and Rawlins OHV SRMA. The increase in closures and areas where no new oil and gas leases would be allowed would reduce the number of acres where ROW actions could be permitted. Not allowing ROWs or facilities within one-quarter of a mile of the contributing portions of historic trails would influence the ROWs location, route, height, and aboveground color.

Impacts resulting from VRM management would be the same as those of Alternative 1, except changes in VRM class (Map 2-49) would result in more restrictions on ROW actions because of a significant increase in VRM Class II acreage (941,810 acres). Designation of VRM Class II would not result in preclusion of lands and realty actions, but rather would result in implementation of mitigation measures, including reducing the height of structures, painting structures to match the existing environment, and/or redesigning or relocating facilities, that would allow ROWs and facilities to blend better into the surrounding landscape.

Impacts resulting from water quality, watershed, and soils management would be the same as those of Alternative 1, except management of the Encampment River Watershed would not allow new permanent roads or structures in this area.

Impacts resulting from wildlife and fish management would be the same as those under Alternative 1; however, management actions, such as increased timing restrictions and greater avoidance distances (see Table 2-10), would preclude construction during a greater part of the year.

The presence of special status and sensitive wildlife species and habitats could preclude land disposal.

Summary

A slight reduction in ROW authorizations and development activities could occur under this alternative. The presence of special status and sensitive wildlife species and habitats could preclude land disposal. Also, the additional VRM Class II areas would restrict or, in some cases, preclude lands and realty actions such as higher profile structures (e.g., power lines, communication sites, and wind energy development).

4.6.5 Impacts Under Alternative 4: Preferred Alternative

A total of 46,230 acres (same acreage as proposed under Alternative 2) would be identified as suitable for disposal (Appendix 7). Existing closures to operation of public land laws and locatable mineral entry would total 1,582,260 acres, with an additional proposed closure area of 34,024 acres. The ability to sell or exchange land and issue R&PP leases/patents would benefit communities and industry by allowing for needed community and economic expansion. Sale or exchange of isolated tracts would result in the disposal of land that is difficult to manage, thereby improving the lands and realty program management.

Impacts resulting from recreation management would be the same as those in Alternative 1.

Impacts resulting from lands and realty management would be similar to those identified under Alternative 1. However, the withdrawals proposed under this alternative would increase from 7,660 acres (Alternative 1) to 14,450 acres. The location, route, color, and height of proposed ROWs and facilities would be influenced by this increase of withdrawals.

Impacts resulting from VRM management would be the same as those of Alternative 1, except the designated acreage of VRM Class II would increase to 590,530 acres (Table 2-9). This would influence the type, location, route, height, and color of more ROWs and facilities, as compared to Alternative 1.

Impacts resulting from water quality, watershed, and soils management would be the same as those of Alternative 3.

Summary

It is anticipated that there would be little reduction in ROW authorizations and development activities under Alternative 4, except that the type, location, route, height, and color of more ROWs and facilities would be influenced.

4.7 Livestock Grazing

This section describes potential impacts on livestock grazing from management actions for other resource programs. Existing conditions concerning livestock grazing management are described in Section 3.7.

Significance Criteria

Impacts on livestock grazing activities would be considered potentially significant if the following were to occur:

- Resource management actions cause a reduction in forage that results in a greater than 10 percent permanent reduction in animal unit months (AUM) available for livestock grazing within the RMPPA or a given allotment.
- Resource management actions reduce or eliminate the opportunity to run the livestock of choice.

Methods of Analysis

Environmental impacts associated with the management alternatives are caused by land use activities within the RMPPA. Impacts on livestock grazing activities are generally the result of activities that affect management of forage levels for individual grazing allotments. Impact analyses and conclusions are based on interdisciplinary team knowledge of resources and the project area, review of existing literature, and information provided by specialists within BLM or other agencies. Effects are quantified where possible. In the absence of quantifiable data, best professional judgment was used. Certain assumptions are made concerning the level of land use activity, resource condition, and resource response on which to determine potential impacts.

The analysis is based on the following assumptions:

- Livestock grazing would occur throughout the entire RMPPA.
- Anticipated grazing use would be similar to the recent 10-year average (1991–2000) of 273,938 AUMs (allowing for year-to-year fluctuations).
- The type of grazing use would be expected to remain about the same: cattle would use 246,540 AUMs (90 percent of the total), sheep would use 24,650 AUMs (9 percent of the total), and other types of livestock would collectively use 2,740 AUMs (1 percent of the total).
- RFDs and RFAs can be found in Appendix 33.

4.7.1 Impacts Common to All Alternatives

In general, management actions associated with cultural resources affect relatively small localized areas and would not have measurable effects on livestock forage. Even under the most intense management (i.e., excavation), the amount of acreage disturbed would be very small. Fencing of some cultural sites would potentially exclude grazing, causing a loss of available forage. Restrictions on surface disturbing and other disruptive activities near cultural sites would potentially result in modifications or relocation of range improvements, but not preclude them except in rare cases.

Prescribed fires initially displace livestock and in the short term, reducing forage and AUMs. Over the long term, prescribed fire normally improves forage production and availability, which may improve livestock distribution. Prescribed fires can increase watershed yield, which increases stock water and sediment loads. This can accelerate the rate at which stock ponds fill with sediment and lose capacity, which allows peak flows following storm events to damage diversions or other infrastructure downstream.

Deferment of livestock use after a wildland fire allows the establishment of new vegetation and would have a short-term effect on livestock operators by reducing available AUMs and modifying grazing systems. Livestock would use nonburned areas during the recovery period, or there would be temporary reductions in grazing use if other forage was not available. Wildland fires often damage livestock improvements such as fences and corrals, resulting in increased maintenance needs for the livestock operator and the need to herd livestock, and reducing pastures available for use.

Noncommercial forestlands would be managed primarily to sustain forest health objectives for the benefit of other resource values, such as wildlife, watershed, fisheries, and healthy plant communities. Management practices would include removal of encroaching conifers from shrub and aspen stands, thinning of diseased and insect-infested trees, and reducing fuel loads. These practices would result in increased forage and available water for livestock grazing.

Depending on the activity, impacts from lands and realty management actions on livestock grazing are either long term or short term. Short-term impacts are caused by construction of power lines and pipelines, and other construction activities, which temporarily remove forage and displace livestock. Long-term impacts include loss of forage where roads and facilities are constructed, reduced forage palatability because of dust on vegetation, and disturbance and harassment caused by increased levels of human activity. Approximately 5,794 acres could be impacted from short- and long-term lands and realty actions, not including oil and gas development. Management of livestock would be problematic as a result of increased levels of human activity, because of damage to fences, gates left open, and poisonous weed proliferation. All these impacts result in either reduced forage, lower livestock performance, increased mortality, or increased management. Reclamation of short-term disturbances would replace the forage lost because of lands and realty activities. Permanent roads maintained by other entities often benefit livestock management as better access is provided for checking, moving, or providing supplemental feed to livestock.

Road construction issued under ROWs would affect livestock grazing operations by creating surface disturbances, removing vegetation, and disturbing livestock. Land clearing and grading activities necessary for construction would remove vegetation and cause a short-term reduction in the forage base. Construction activities would also generate additional dust deposits on vegetation, which would reduce the overall quality of the affected forage.

Permanent losses of forage would occur as a result of road construction, land disposals and exchanges, and development of wind farms and other facilities. Loss of AUMs would occur when large blocks of land are either disposed to the public or the land exchange is not in the same area as the allotment losing the land.

The effects of livestock grazing management on the livestock grazing program are principally the effects of forage removal by the grazing animals, which may alter the amount, condition, and vigor of the plants being grazed. Pasture and herd rotational grazing practices, as well as other BMPs, are intended to increase livestock dispersal in pastures and reduce the impacts of livestock grazing. These practices often improve the condition of the forage, thereby increasing flexibility in the grazing management program. Other indirect effects on livestock include increased conception rates, higher weaning weights, lower animal veterinary costs, less stress to livestock, and fewer bulls needed for breeding. These practices may also increase the amount of herding and maintenance of improvements required by the livestock operator. Prohibiting domestic sheep and goats within 9 miles of bighorn sheep habitat creates no impact on livestock grazing, because there is currently no domestic sheep use permitted within those areas. However, the flexibility of livestock operations to change or adjust the type of livestock they use would be reduced by not allowing domestic sheep use (if applications are made) in these areas.

Impacts from minerals management on livestock grazing would include short- and long-term impacts. Short-term impacts include temporary removal of forage and displacement of livestock from construction of well pads, pipelines, roads, and other facilities. Long-term impacts include loss of forage where roads and facilities are constructed and reduced forage palatability because of dust on vegetation near roads. All these impacts result in either reduced forage, lower livestock performance, or increased need for management. Reclamation of short-term disturbances would replace the forage lost from construction

activities. Permanent roads often benefit livestock management as better access is provided for checking, moving, or providing supplemental feed to livestock.

The only remaining coal mine in the area is closing and will be reclaimed. The lands will be available for livestock grazing after reclamation has occurred, which would restore AUMs available for livestock use. These reclaimed lands often support higher quality and quantity of forage than existed before the mine.

Oil and gas exploration and development on BLM-administered lands create a network of access roads, pipelines, wells, and other facilities. During the construction of pipelines, livestock could possibly fall into construction trenches, causing injury and death. Produced water from oil and gas activities would be made available for livestock use if water quality were sufficient. This additional water would increase livestock distribution and available forage for livestock, wildlife, and other uses.

OHV use would have a minor effect on livestock grazing activities through direct human disturbance, which causes animal displacement, dust coating of forage from nearby roads, and injury or death to animals caused by vehicle-animal collisions. Incidental damage to range improvements and gates being left open would also affect livestock operations.

In general, management actions associated with paleontological resources affect relatively small localized areas and would not have measurable effects on livestock forage. Even under the most intense management (i.e., excavation), the amount of acreage disturbed would be very small. Fencing of some paleontological sites would potentially exclude grazing, causing a loss of available forage. Restrictions on surface disturbing and other disruptive activities near paleontological sites would potentially result in modifications or relocation of range improvements, but not preclude them except in rare cases.

Recreational activities would have a minor effect on livestock grazing activities through direct human disturbance, which causes animal displacement, dust coating of forage from nearby roads, and injury or death to animals caused by vehicle-animal collisions on roads or highways. Grazing closures in recreational areas result in a small loss of forage. Minor impacts to livestock grazing would result from the temporary removal of vegetation by campers in concentrated areas. Vandalism to range projects and leaving gates open would also have a minor impact on grazing operations. These impacts would likely increase over the life of the plan, because the popularity of outdoor recreational activities is increasing. Education of the public who use these areas and emphasizing the benefits of multiple-use management would mitigate some of these conflicts and may create advocates for traditional uses of BLM lands.

Minimal effects on livestock grazing activities would be anticipated as a result of management actions associated with SMAs. In general, the protections afforded to these areas (i.e., restrictions on surface disturbing and other disruptive activities) would help to maintain and improve vegetation conditions, thereby maintaining or improving forage for livestock.

Transportation and access management actions would serve to improve the transportation network, which would increase the distribution of people within the RMPPA. This would in turn increase the potential for incidental damage to range improvements and general disturbance of livestock.

Vegetation management actions designed to enhance vegetative conditions would directly affect livestock grazing activities by enhancing and increasing forage production and vegetation age and structural diversity, thereby improving livestock distribution and forage utilization. Vegetation treatment areas would receive short-term deferment to allow vegetation to recover. However, enhanced forage availability and production would be realized over the long term with herbaceous vegetation replacing woody shrub species. Vegetation management would also result in grazing management adjustments in the season and duration of use. Livestock adjustments would also be needed to meet a proper function

condition (PFC) rating and the Wyoming Standards for Healthy Rangelands (BLM 1997). Vegetation/fuel treatment can improve vegetation composition in riparian areas and increase available stock water, if the vegetation treatment results in a favorable increase in water yield. Increased sediment loads following prescribed fires may fill stock ponds, thereby reducing capacity.

VRM classifications that restrict surface disturbing and other disruptive activities would indirectly help to maintain forage production levels by reducing the number of surface disturbing and other disruptive activities, which have the potential to eliminate forage and increase the potential for noxious or invasive weeds.

Any project designed to enhance watershed health would enhance vegetation resources by reducing erosion, which would have the indirect effect of increasing forage levels for livestock. However, effects on livestock grazing would result from the need to adjust or modify current livestock management to achieve the Wyoming Standards for Healthy Rangelands (BLM 1997). In addition, grazing restrictions on season and duration of use would result from actions designed to protect and enhance water resources. Protection of water quality and watershed health would in some cases require changes in livestock management, such as deferred or shortened grazing periods, riparian pastures, increased cattle herding, and upland water development.

Some water development projects, such as impoundments, would need to consider changes in hydrology that might affect the timing of natural flows. This would influence where reservoirs are constructed in a watershed. Water improvements within the Platte River Watershed are restricted as a result of downstream water rights, which would influence the design, type, and cost of livestock water improvements. Consideration of these factors may limit some projects or increase the time period for planning. Management actions that result in increased water availability and forage production would indirectly affect livestock through improved livestock distribution and increased weight gain and conception rates.

Soils management considerations would generally result in enhanced vegetative conditions through actions designed to reduce erosion, which would indirectly increase forage levels for livestock. Where the potential for accelerated erosion exists or where soil cover (vegetation and litter) may be improved, changes in the livestock season and duration of use would be required to improve vegetative cover and reduce impacts on soils. Effects on livestock operations would result from the implementation of grazing adjustments designed to protect vegetation and soil resources.

When livestock and wild horses occupy the same area, their needs for space, water, and forage would be competitive. The degree of competition would vary depending on the kinds of livestock and the season of use. The competition would be mitigated through adjustments in season of use and improved distribution of livestock. BLM would continue to monitor vegetation and habitat condition to ensure that a thriving natural ecological balance and the multiple-use relationship that existed in 1971 are maintained. Livestock operation flexibility would be reduced because requests for changes of livestock use would be altered or denied if the requested change conflicted with wild horse management objectives. Livestock and wild horse conflicts could also include damage to fences and the inability of livestock to access certain water sources.

Water developments designed to provide new water sources for wildlife in some situations would result in increased water availability for livestock, which would promote improved distribution of both livestock and wildlife. Large reservoirs capable of supporting fisheries provide a reliable source of water to livestock through drought periods. Protection of springs, seeps, and adjacent riparian areas from grazing animals provides cleaner and more dependable water sources for livestock.

Livestock management adjustments would be considered when wildlife and livestock conflicts arise as a result of competition for water, forage, or cover. In wildlife crucial habitat areas, livestock management adjustments would be implemented to reduce livestock impacts to wildlife. In addition, uneven distribution of big game causes some grazing allotments to receive a disproportionate amount of the total wildlife grazing within the planning area, which could necessitate adjustments in livestock management.

Modification of fences constructed prior to adoption of BLM standards (BLM Manual H-1741-1) may be needed. This may cause the permittees to increase fence maintenance and to ride the area more frequently to ensure livestock remain in the appropriate area, because fences designed for wildlife passage may be less effective in restraining livestock.

Sensitive wildlife habitats (i.e., Greater sage-grouse leks, prairie dog towns, and crucial winter range) would influence the location, timing of construction, and cost of range improvements. Fisheries actions, such as stream restoration and fish reintroduction, have the potential to reduce available forage through the construction of exclosures and riparian pastures. In addition, adjustments in livestock management, such as timing and duration of grazing, might be needed to ensure adequate fish habitat.

4.7.2 Impacts Under Alternative 1: Continuation of Existing Management

The use of fire for resource benefit would increase the size of wildland fires. Larger burned areas would decrease short-term forage availability and increase damage to range improvements. However, over the long term, forage availability and diversity would be increased. Livestock management problems associated with wildland fires (e.g., the need to modify grazing systems) would increase and thereby complicate livestock management over the short term.

Increased understory production occurs following timber harvest because increased sunlight reaches the herbaceous vegetation, which effectively increases available forage for livestock. Additional forage would be available for livestock grazing, which often improves distribution of use across an allotment. This would occur on about 25,000 acres over the long term. Timber harvesting activities require additional temporary roads and cause loud noises that would stress and relocate livestock.

Timber harvesting activities, such as sawing, skidding, and road building, displace livestock and remove forage. Noise associated with these activities stresses livestock, causing them to move away from these areas. Most roads and skid trails would be revegetated by natural processes, which would reestablish forage. Requiring intensive management of commercial timber harvest on 6,700 acres of land on steep slopes, riparian areas, and associated buffer zones would increase soil and vegetation stability on steep slopes and riparian areas, which could maintain or improve forage conditions in these areas.

Approximately 61,010 acres would be suitable for disposal, which if disposed, would reduce federal AUMs. However, most land disposals and land exchanges are on isolated tracts or checkerboard landownership areas. Therefore, the loss of lands and AUMs would be minimal. With the designation of ROW corridors, impacts from lands and realty would be reduced because less livestock forage would be lost to new authorized overlapping ROW actions.

Requiring adjustments to grazing operations to comply with the Wyoming Standards for Healthy Rangelands (BLM 1997) would affect livestock operators. These adjustments would include changes in season or duration of use, use of riparian pastures and exclosures, modifying forage utilization levels, and livestock conversions. New fence construction would decrease management complexity and indirectly help increase pasture and forage productivity.

Establishing the High Savery area as a vacant allotment would result in greater flexibility for the livestock grazing program, especially during drought years and to implement vegetation treatments. Any grazing would be carried out in accordance with the existing MOU.

Surface disturbance from oil and gas development would result in the loss of forage. However, reclamation of short-term disturbances would replace most of this forage. The RFO does not anticipate any permanent loss of AUMs as a result of this development; however, temporary adjustments of active use may be warranted. A total of 16,538 acres of long-term disturbances would result in the loss of approximately 1,860 AUMs. Short-term disturbances of 61,895 acres would result in a loss of approximately 7,020 AUMs. However, the total effect on AUMs would be short term and would be mitigated through the reestablishment of forage through reclamation efforts. In addition, these impacts would occur over a 20-year period and would be distributed across 30 or more allotments; thus, reducing the effects for any one livestock operator.

Mining of other leasable, common variety, and locatable minerals would result in surface disturbance, causing loss of forage and animal stress. Reclamation of these lands usually returns the grazing lands to production levels found prior to development.

Use of vehicles for necessary tasks would minimally decrease forage availability and palatability. OHV closures would total 22,490 acres. Closing areas to OHV use would preserve vegetation and forage in limited areas and reduce the noise and dust that would otherwise disturb cattle.

Treatments would occur on up to 56,000 acres of vegetation over the next 20 years, which would initially remove forage in treated areas but provide additional long-term forage. However, in spite of this existing level of acres treated annually, the seral condition class would remain predominantly late (e.g., dominated by mature to decadent vegetation). Herbaceous cover would continue to be inadequate for watershed protection and exhibit lower vigor and production, which would eventually decrease forage production in areas not treated.

Treatment of only 2,800 acres of invasive weeds per year (56,000 acres over 20 years) (including rangeland treatments and mitigation for surface disturbance) would control and contain the proliferation of invasive weed species and reduce established populations to acceptable levels, thereby maintaining forage production, diversity, and vigor in the treatment areas. Weed-infested areas would remain untreated on approximately 15,000 acres. Infested acreage would continue to result in a decline in forage production and devaluation of animal commodities. Continued proliferation of existing weed species or introduction of new weed species into new areas would continue to lower production and forage vigor. Untreated invasive poisonous plants would continue to injure and kill livestock. Livestock would be temporarily displaced during treatment activities, and grazing would resume after a short period of time. Livestock management flexibility would be reduced over the long term in untreated areas because of the presence of invasive weeds and the reduction of usable forage.

Restrictions in VRM Class II areas (359,610 acres) may change the type, design, and/or location of proposed range improvements but not necessarily preclude development.

Special status plant species management would preclude grazing when exclosures are required to protect habitat. Currently, 15 acres are excluded from grazing to protect Gibbens' beardtongue (*Penstemon gibbensii)*. Management of Special Status Species may require changes in livestock management to improve the production and vigor of these species.

Summary

The introduction and proliferation of noxious and invasive weeds within individual allotments or localized areas would result in a significant loss of AUMs. Compounding this problem is the lack of sufficient weed treatments under this alternative. Similarly, insufficient vegetation treatments are contributing to the continued trend in mature to decadent shrubland and woodland communities, which would result in lower herbaceous production over the long term and ultimately reduced management flexibility.

Surface disturbing and other disruptive activities would reduce the amount of forage available to livestock. However, the long-term loss of approximately 1,860 AUMs from development represents only about one-third of a percent of all federal AUMs in the RMPPA, which would not be considered a major impact.

4.7.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from forest management and OHV management would be the same as those identified in Alternative 1, Section 4.7.2.

Placing emphasis on fire suppression efforts would possibly save forage for livestock grazing that would otherwise burn in wildland fires. Livestock management problems resulting from wildland fires would be less frequent, thereby easing livestock management. Protection of livestock grazing improvements would take precedence over the benefits of natural fire. However, over the long term, forage availability and diversity would potentially decrease, or in the very least not be improved.

Approximately 14,780 fewer acres would meet the FLPMA disposal criteria, and there would be no preferred method of disposal. However, to maintain the forage base for livestock use, exchange would be preferred. If exchange were used, there would be no net loss of livestock forage or AUMs, and administration issues would be decreased because scattered and isolated lands would be consolidated. If sales were used, there would be a loss of forage and AUMs to BLM, although administration issues would still be decreased because checkerboard and isolated lands would no longer need the attention of BLM.

Management actions under this alternative would increase the number of rangeland improvement projects from 45 to 55 projects, with emphasis on reliable water development projects, which would improve grazing distribution and reduce impacts during drought periods. Implementing intensive grazing systems would promote increases in livestock weaning weights, conception rates, and animal health. New fence construction would decrease management complexity and indirectly help increase pasture and forage productivity.

Establishing the High Savery area as a vacant allotment would result in greater flexibility for the livestock grazing program, especially during drought years and to implement vegetation treatments. Any grazing would be carried out in accordance with the existing MOU.

The minerals management program would impact livestock grazing similar to Alternative 1, except more disturbances from oil and gas development would occur. A total of 17,013 acres of long-term disturbances would result in the loss of 1,880 AUMs. Short-term disturbances of 63,649 acres would result in a loss of 7,070 AUMs (50 more AUMs than under Alternative 1); however, the disturbances would be short term and would be mitigated through the reestablishment of forage through reclamation efforts.

An increase in the acreage of vegetation treatments to 24,400 treated acres would result in increased forage availability and production. These benefits would be maintained over a longer period of time because of the larger size of individual treatments. Treatments would also help maintain early seral conditions in aspen stands, which would impact livestock grazing management by creating higher forage production in the upper portions of the watersheds. This would draw livestock into these areas, as forage would be plentiful and other desirable conditions would exist, such as shade and cover. Long-term benefits would include increased available forage and improved livestock distribution in the grazing area.

Approximately 25,786 acres of weeds would be treated annually, which would reduce competition with native plants that are often desirable forage species. In the short term, some infested acreage would continue to result in a decline in forage production and devaluation of animal commodities. However, in the long term, treatments would slow the proliferation of existing weed species and the introduction of new weed species into new areas, until all areas received treatments. Also, treatment of poisonous plants would result in lower livestock injury and death.

The reduction in VRM Class II area (to 233,950 total acres) would allow greater flexibility in type, design, and/or location of proposed range improvements. However, reduced acreage in VRM Class II would potentially result in additional surface disturbing and other disruptive activities that would reduce forage available for livestock.

The removal of timing stipulations for big game crucial winter range, delineated big game parturition areas, raptor nest areas, and Greater sage-grouse and sharp-tailed grouse winter concentration areas would potentially allow for year-round construction of range improvements in these areas. The reduced distance stipulation and a more flexible timing stipulation for protection of nesting raptors would allow additional flexibility for construction of range improvements. However, the reduced restrictions on surface disturbing and other disruptive activities from elimination of wildlife timing stipulations and reduced NSO stipulations would result in decreased forage for livestock and increase the potential for noxious and invasive weed proliferation.

Summary

Long-term forage quality and quantity would be improved overall, as a result of substantial increases in both vegetation and weed treatments. The reduction and elimination of wildlife mitigation measures affecting range improvements would increase flexibility in livestock management. Increased surface disturbing and other disruptive activities would increase long-term AUM loss to 1,880 AUMs, which would result in a greater loss of forage, but would still be less than 1 percent of total AUMs for the RMPPA.

4.7.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts from fire and fuels management would be similar to those under Alternative 1, except that more acres of wildland fire would be allowed to burn for resource benefit. This would result in more areas requiring rest from livestock grazing to allow recovery of vegetation following a wildland fire, which would reduce the flexibility of short-term management. In some instances, fencing would be burned, which would require additional herding and fence maintenance in the short term.

Forest management actions would impact livestock grazing management by allowing natural succession to occur while managing for healthy forests, which would increase forage in most areas. Forage quality and quantity would be reduced where noncommercial conifer tree species are encroaching into old clear cuts, open conifer woodlands, dry meadows, and rangeland areas.

Impacts from lands and realty management would be similar to those identified in Alternative 1, except lands would not be considered for disposal. Thus, the loss of AUMs for livestock grazing from the possible disposal of lands would not occur. However, as private lands associated with checkerboard and isolated BLM-administered public lands are subdivided and sold, the grazing privileges associated with these public lands would no longer be accessible for grazing use.

Livestock operators would incur some additional management and complexity to meet DPC objectives. The emphasis of range improvement projects would shift to fence modifications and small-scale water developments, which would result in fewer new projects to benefit livestock and to help resolve grazing issues and meet objectives. Development of large-scale water projects in the Muddy Creek drainage would not be allowed, which would reduce the flexibility of management during periods of drought. Conversions of cattle or domestic sheep to bison would not be allowed in identified areas of blocked public lands for public safety. There are currently no bison permitted in these areas; however, one request has been made to run bison and cattle in this area. Restricting the type of livestock that managers can run in these areas would reduce the flexibility of livestock operations.

Establishing the Chain Lakes, High Savery, and Pennock areas (and other areas as they become available) as vacant allotments would result in greater flexibility for the livestock grazing program, especially during drought years and to implement vegetation treatments. Any grazing would be carried out in accordance with existing MOUs or management plans. This alternative would also increase the need for sheep herding where BLM standard fence is not adequate to control sheep.

The minerals management program would have similar impacts on livestock grazing as under Alternative 1, except fewer disturbances from oil and gas development would occur. Under this alternative a total of 15,489 acres of long-term disturbances would result in the loss of 1,730 AUMs. Short-term disturbances of 56,505 acres would result in a loss of 6,220 AUMs (800 fewer AUMs than under Alternative 1). However, the total effect on the number of AUMs would be short term and would be mitigated through the reestablishment of forage through reclamation efforts. In addition, development would occur over a 20-year period; therefore, forage losses would be spread incrementally over the planning period. However, reclamation of short-term disturbances would replace most of this forage. The RFO does not anticipate any permanent loss of AUMs as a result of this development; however, temporary adjustments of active use may be warranted.

OHV closures would increase to 71,450 acres, which is about 3 times the area under Alternative 1. Closing additional areas to OHV use would further preserve vegetation and forage in these areas and reduce the noise and dust that would otherwise disturb livestock.

Preservation of naturalness in the Adobe Town fringe areas (31,510 total acres) and the west end of the Ferris Mountains (5,270 total acres) would prevent construction of grazing improvements that would cause surface disturbance, thereby increasing the difficulty in managing livestock. Using the historic JO Ranch buildings in the Sand Hills ACEC as an interpretive site would increase public visitation and alter management of the ranch. Access to gathering and shipping facilities at the JO Ranch would potentially be denied to the livestock operators of the adjoining allotment, which would require construction of new facilities at another location.

Managing riparian areas to meet DPC. Management actions would increase woody plant structure and provide shade for grazing animals, as well as promote perennial grasses and sedges, which are desirable forage for cattle. Where livestock grazing inhibits riparian areas from meeting DPC, management changes would be needed. These changes could include altered season or duration of use or temporarily removing livestock from some riparian areas. In addition, livestock improvements, such as offsite water developments and fencing, may be required.

A fivefold increase in the number and acres treated by vegetation treatments to 11,800 acres per year would occur under this alternative with an emphasis on small, mosaic pattern of treatments, which would result in increased forage availability and production and better distribution of grazing use. However, the increase in acres treated by vegetation treatments would also reduce management flexibility and increase operational cost to the livestock operator because treatments would be smaller and more frequent and subsequent deferment would be required.

Weed treatments would occur on 28,542 acres annually for noxious and invasive weeds, which would result in a long-term reduction of most invasive weeds found in grazing allotments. This would reduce the effect weeds have on livestock management and production. Increased emphasis on weed management in native, weed-free areas would maintain the usefulness of these communities for livestock management.

The large increase in VRM Class II acres (to 941,810 total acres) for the protection of historic trails would affect proposed range improvements needed for livestock management. Range improvements would have to be moved or altered if they happen to fall into the expanded viewsheds. However, mitigation should enable most fence and water improvement projects to proceed. These actions may also increase construction and/or maintenance costs to livestock operators. Construction activities from other resource programs would also have to be mitigated, which would potentially result in a reduction in the amount of forage lost as compared to Alternative 1.

Prohibiting surface occupancy near 100-year flood plains and within 500 feet of perennial waters, and 100 feet from an inner gorge of an ephemeral stream would modify the locations of surface disturbing and other disruptive projects such as pits and reservoirs. This would increase the planning effort required for needed adjustments to grazing management. Prohibiting water developments over 1-acre feet of depletion in the Colorado River drainage would potentially reduce distribution or timing of livestock use when smaller, less reliable sources of water dry up or require development of different sources of reliable water (e.g., wells).

Provisions to protect municipal water sources in the Encampment River Watershed would result in more intensive grazing management in this area. However, these impacts would be minimal.

Actions identified as necessary to preserve the New World Iberian Genotype in the Lost Creek HMA could constrain future livestock management options within one allotment. These actions could include increases in the AML (approximately 165 adult wild horses), modification of existing or limiting new range improvements, and adjustments in existing livestock permits.

Prohibiting USDA Wildlife Services from animal damage control activities on the RMPPA would result in a reduction or elimination of sheep operations on public lands in 17 allotments because of unacceptable livestock loss by predation. This could result in an inability to use up to 20,000 to 30,000 AUMs for sheep. There would also be an increase in the loss of cattle to predation, especially during calving.

Range improvement construction would have increased limitations as a result of increased wildlife stipulations, which would result in slightly less flexibility in these areas, increased fence maintenance, and increased livestock herding as a result of placement of improvements in less desirable locations. In addition, livestock water developments would not be allowed if there were no associated wildlife benefits, water developments in big game crucial winter range would be prohibited, and new fences in migration corridors would not be allowed. These limitations would prevent some proposed improvements from being constructed and reduce management flexibility.

The reintroduction of Colorado River cutthroat trout (CRCT) and other native cold and warm water fish species could cause changes in livestock management in areas where these species would be reintroduced. Management and planning changes would include altering grazing season and duration of use, as well as construction of fenced exclosures.

Summary

The inability to use up to 20,000 to 30,000 AUMs for sheep as a result of lack of predator control would be a significant impact on up to 17 grazing allotments.

Long-term forage quality and quantity would be improved overall, as a result of substantial increases in both vegetation and weed treatments. Loss of forage use due to surface disturbing and other disruptive activities would be reduced from the level in Alternative 1 because of reclamation activities, weed control, and restrictions on surface disturbing and other disruptive activities from VRM Class II designations and wildlife management actions.

4.7.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from lands and realty management and wild horse management on livestock grazing would be the same as under Alternative 1.

Impacts from fire and fuels management would be similar to those under Alternative 1, except fuel treatments would increase four to eight times, resulting in an overall shift in plant communities to more early- and mid-seral conditions.

Forest management actions under this alternative would impact livestock grazing management by eliminating from commercial timber harvest 6,700 acres of land on steep slopes, riparian areas, and associated buffer zones. This would further increase soil and vegetation stability on steep slopes and riparian areas, which could maintain or improve forage conditions in these areas. Timber harvesting activities require additional temporary roads and cause loud noises that would stress and relocate livestock.

Managing to meet DPC objectives would positively impact livestock grazing by providing shade in riparian areas within woody communities. However, there would be a reduction in forage availability and production. Where livestock grazing inhibits riparian areas from meeting DPC, management changes would be needed. These changes would include altered season or duration of use or temporarily removing livestock from some riparian areas.

Establishment of the Chain Lakes, High Savery Dam, and Pennock areas (and other areas as they become available) as vacant allotments would result in greater flexibility for the livestock grazing program, especially during drought years and to implement vegetation treatments. Any grazing would be carried out in accordance with existing MOUs or management plans. This alternative would also increase the need for sheep herding where BLM standard fence is not adequate to control sheep.

Impacts resulting from minerals management on livestock grazing would be less than those of Alternative 1. A total of 15,472 acres of long-term disturbance would result in the loss of 1,730 AUMs. Short-term disturbances of 57,819 acres would result in a loss of 6,430 AUMs (about 590 AUMs fewer than Alternative 1). However, the total effect on the number of AUMs would be short term and would be mitigated by the reestablishment of forage through reclamation efforts. This development and forage loss would be spread over the 20-year planning period. The RFO does not anticipate any permanent loss of AUMs as a result of this development; however, temporary adjustments of active use may be warranted.

OHV closures would increase to 33,500 acres, which is about 50 percent more area than under Alternative 1. Closing areas to OHV use would preserve vegetation and forage in limited areas and reduce the noise and dust that would otherwise disturb cattle.

Preservation of naturalness in the west end of the Ferris Mountains (5,270 total acres) would result in more restrictions for construction of grazing improvements that would cause surface disturbance, thereby increasing the difficulty in managing livestock.

In addition to impacts common to all from SMAs, development of an interpretive program for the historic JO Ranch in the Sand Hills ACEC would increase public visitation and may alter management of the rangeland for livestock grazing on those lands in close proximity to the JO Ranch headquarters. Access to gathering and shipping facilities at the JO Ranch would potentially be denied to the livestock operators of the adjoining allotment, which would require construction of new facilities at another location.

Vegetation treatments would increase to 16,400 acres and would emphasize meeting multiple-use objectives while providing for the protection of Special Status Species. In addition, meeting the DPC objectives would require additional management from livestock operators.

Treatment of 25,023 acres of weeds annually with an emphasis on outbreaks in native, weed-free areas would reduce competition with native plants. Some infested acreage would continue to result in a decline in forage production and devaluation of animal commodities. Treatments would target the introduction of new weed species into new areas, until all areas received treatments.

VRM Class II areas (589,530 total acres) would be slightly reduced, which would increase the flexibility in type, design, and location of proposed range improvements. However, the reduction in VRM Class II acreage would also increase the potential for surface disturbing and other disruptive activities that have the potential to eliminate healthy forage and introduce invasive and noxious weeds.

Management actions for the Encampment River Watershed would result in more intensive grazing management in this area to protect municipal water sources. However, these impacts would be minimal.

The reintroduction of CRCT and other native cold and warm water fish species could result in changes in livestock management in areas where these species are reintroduced. Management and planning changes would include altering grazing season and duration of use, as well as using riparian pastures and exclosures.

Summary

Long-term forage quality and quantity would be improved overall, as a result of substantial increases in both vegetation and weed treatments. However, these 5,000 to 7,000 acres would remain untreated, which would not slow the proliferation of existing weed patches.

Loss of forage use as a result of surface disturbing and other disruptive activities would be reduced from the level in Alternative 1 because of reclamation activities, weed control, and restrictions on surface disturbing and other disruptive activities resulting from VRM Class II designations and wildlife management actions.

4.8 MINERALS

This section presents potential impacts on minerals management from management actions for other resource programs. Existing conditions concerning minerals are described in Section 3.8. Impacts to

minerals are organized as follows: (1) leasable minerals, (2) locatable minerals, and (3) salable minerals. The location of oil and gas fields is presented on Map 3-5.

Significance Criteria

Impacts to minerals would be considered significant if either of the following were to occur:

- Management actions cause a substantial reduction in federal leasing and development activities
- Management actions cause a substantial reduction in the development of locatable and salable minerals.

Methods of Analysis

Impact analysis and conclusions are based on interdisciplinary team knowledge of resources and the project area, review of existing literature, and information provided by other agencies. Effects are quantified where possible. Spatial analysis was conducted using ESRI's ArcGIS Desktop 8.x computer software. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or are described in qualitative terms, if appropriate.

The analysis is based on the following assumptions:

- Oil and gas leasing and drilling would occur throughout the entire RMPPA, except where restricted.
- The number of oil and gas wells proposed under each alternative that would be drilled over the next 20 years includes 8,945 wells under Alternative 1; 9,198 wells under Alternative 2; 8,632 wells under Alternative 3; and 8,822 wells under Alternative 4 (Appendix 33).
- No substantial development potential is foreseen for locatable minerals.
- No reasonably foreseeable coal development is anticipated other than on existing leases in the Carbon Basin (see Section 4.20, Cumulative Impact Analysis). Reclamation will continue in the Hanna Basin from existing coal mining.
- Demand for salable minerals over the next 20 years would follow the rate of resource development in a given area.
- Area closures and surface use restrictions, including timing limitations stipulations (TLS), NSO, CSU, and no-lease restrictions, can be retroactively applied to existing valid oil and gas leases or other existing and valid use authorizations only through site-specific post-lease actions (e.g., APDs and ROWs) that are supported by project-specific NEPA analysis. Surface disturbing and other disruptive activities could still occur at existing authorized facilities, which could result in wildlife disturbance; degradation of visual quality, recreation values, and wilderness values; soil erosion; loss of livestock and wildlife forage; and loss of wildlife cover.
- RFDs and RFAs can be found in Appendix 33.

4.8.1 Impacts Common to All Alternatives

Leaseable Minerals—Oil and Gas

Protection measures for cultural resources eligible for listing on the NRHP generally include avoidance or other mitigation actions. These protective measures restrict, or in rare cases, prohibit oil and gas development that would otherwise adversely affect the cultural resources. If the NRHP-eligible cultural resource sites were small, access roads, drill pads, pipelines, and other ancillary facilities would be relocated to avoid adverse impacts. Avoidance measures occasionally require installation of facilities in areas that are more difficult to develop or reclaim which would potentially increase impacts to other resources.

Impacts to the visual setting of cultural resources, where the visual setting contributes to NRHP eligibility, would be intensively mitigated through avoidance or other restrictive actions. This would influence oil and gas developments that occur within the setting of historic properties by requiring mitigation measures as outlined in Appendix 5.

Wildland fires are expected to have a minimal and indirect impact on the development and production of oil and gas resources. Fire management within the RMPPA would concentrate fire suppression in areas with high resource or human value, including oil and gas developments. Fire management would benefit oil and gas production facilities by reducing fire danger.

Commercial forest management is expected to have negligible impact on oil and gas development and production activities because most commercial forestlands occur in low hydrocarbon potential areas.

Livestock grazing would have minimal impact on oil and gas development and production because grazing does not directly impact oil and gas operations. Oil and gas exploration and development within grazing allotments would require operators to abide by mitigation that would be specified in lease stipulations or the conditions of approval for those operations. Mitigation measures within grazing allotments would include providing for the upkeep and repair of fences and gates, preventing erosion, controlling invasive weeds, minimizing forage loss, and instituting measures to prevent loss or injury to livestock.

Oil and gas production would result in irreversible and irretrievable loss of the resources that are produced. Market fluctuations and increased costs associated with exploration, development, and operations may result in premature abandonment of individual wells that would decrease recoverability of the resource and could result in an irretrievable loss of the resource.

Development of other mineral resources could preclude oil and gas development over both the short term and long term. For example, natural gas exploration may target coal formations that could be mined. During the planning period, conflicts may arise between prior rights, such as coal leases and mines, and potential oil and gas lessees; however, the potential for this conflict is minimal. Development of locatable and salable minerals would have negligible or no impact on oil and gas exploration and production.

The impact of paleontological resource protection on oil and gas exploration and development is expected to be minimal. If important scientific fossils were discovered during an inventory conducted prior to surface disturbing activities, the resource would be managed according to BLM procedures. Avoidance of important paleontological resources would be accomplished in a manner similar to cultural resources, such as the relocation of access roads, drill pads, pipelines, and other ancillary facilities, which may require delays in developing the resource.

The impact of the management of WSAs on minerals management is expected to be minimal. WSAs (67,730 acres) are closed to federal mineral leasing (Map 2-6), which would preclude new oil and gas leasing and development. Approximately 27,050 acres of the WSAs have a moderate hydrocarbon potential and approximately 37,100 acres have a low hydrocarbon potential (Table 2-6).

Surface disturbing and other disruptive activities would be intensively managed in habitat for special status plant species (see Appendix 10), which could result in the relocation of locatable mineral facilities.

Surface disturbing and other disruptive activities would be intensively managed in all raptor concentration areas (RCA) (40,980 acres) and within the identified hibernaculum for the Preble's meadow jumping mouse from August 16 to May 14, which could, in some cases, result in the relocation of oil and gas facilities outside these areas. Surface disturbing and other disruptive activities would be prohibited in mountain plover habitat (1,468,990 subsurface acres) from April 10 to July 10, which would delay oil and gas development and exploration during this time and potentially require the location of facilities outside this area.

Leasable Minerals—Coal

Fire management actions would likely have minimal impact on reclamation activities at Hanna Basin. Fire occurrences would have the potential to consume vegetation and would increase the potential for soil erosion and the need for enhanced erosion control mechanisms. Coal reclamation would be delayed or impaired if wildland fires ignite coal resources.

Surface disturbing and other disruptive activities would be intensively managed in habitat for special status plant species (see Appendix 10), which could result in the relocation of locatable mineral facilities.

Locatable Minerals

Protection measures for cultural resources eligible for listing on the NRHP generally include avoidance or other mitigation actions. These protective measures restrict, or in rare cases, prohibit locatable minerals development that would otherwise adversely affect the cultural resources. If the NRHP-eligible cultural resource sites were small, access roads, drill pads, pipelines, and other ancillary facilities would be relocated to avoid adverse impacts. Avoidance measures occasionally require installation of processing facilities in areas that are more difficult to develop or reclaim, which would potentially increase impacts to other resources.

Impacts to the visual setting of cultural resources, where the visual setting contributes to NRHP eligibility, would be intensively mitigated through avoidance or other restrictive actions (Appendix 5). This would influence developments that occur within the setting of historic properties by requiring mitigation measures as outlined in Appendix 5.

To the extent forested surface may be present in locatable mineral mining areas, the resource is typically harvested in advance of mine development. Harvesting would have minimal indirect impact on the development of locatable minerals.

Lands and realty management actions would be minimal because mineral development occurs under the provisions of the 1872 Mining Law and the 43 CFR-3800, surface management regulations. Existing withdrawals of approximately 1,570,583 acres would limit the land available for locatable mineral entry.

If important scientific fossils were discovered during an inventory, the resource would be managed according to BLM procedures. Avoidance of important paleontological resources would be accomplished

in a manner similar to cultural resources, such as the relocation of mineral development facilities, which may require delays in developing the resource.

Surface disturbing and other disruptive activities would be intensively managed in habitat for special status plant species (see Appendix 10), which could result in the relocation of locatable mineral facilities.

Wildlife management actions that prohibit surface disturbing and other disruptive activities near threatened and endangered species habitat would directly limit the placement of locatable mineral developments.

Salable Minerals

Protection measures for cultural resources eligible for listing on the NRHP generally include avoidance or other mitigation actions. These protective measures restrict, and if necessary, prohibit salable mineral development that would otherwise adversely affect the cultural resources. If the NRHP-eligible cultural resource sites were small, access roads, drill pads, pipelines, and other ancillary facilities would be relocated to avoid adverse impacts. Avoidance measures occasionally require installation of facilities in areas that are more difficult to develop or reclaim, which would potentially increase impacts to other resources.

Impacts to the visual setting of cultural resources, where the visual setting contributes to NRHP eligibility, would be intensively mitigated through avoidance or other restrictive actions (Appendix 5). This would influence developments that occur within the setting of historic properties by requiring mitigation measures as outlined in Appendix 5.

Few lands and realty management actions would affect the availability of salable minerals. In the case of land sales or exchange, mineral materials would be transferred from federal ownership. In many instances, ROWs (roads, power lines, pipelines) would be placed to avoid mineral material sites or would result in only a minor loss of availability of mineral material. In some cases, ROWs or surface facilities could be relocated to allow access to salable minerals.

Development of minerals (i.e., oil and gas) would have immediate and localized impact on the development of salable minerals through the provision of construction materials for road and infrastructure development. In actuality, development of the other resources (i.e., oil and gas) would typically drive the demand for salable mineral resources.

Impacts from paleontological resource management actions on the development of salable mineral deposits would include avoidance or specific areas or the relocation of projects if paleontological resources were identified.

Surface disturbing and other disruptive activities would be intensively managed in all RCAs (40,980 acres) and within the identified hibernaculum for the Preble's meadow jumping mouse from August 16 to May 14, which would result in the location of facilities outside these areas. Surface disturbing and other disruptive activities would be prohibited in mountain plover habitat (1,468,990 subsurface acres) from April 10 to July 10, which would result in the location of facilities outside this area. Surface disturbing and other disruptive activities would be intensively managed in habitat for special status plant species (see Appendix 10), which could result in the relocation of locatable mineral facilities.

4.8.2 Impacts Under Alternative 1: Continuation of Existing Management

Leasable Minerals—Oil and Gas

The avoidance area established for surface disturbing activities within one-quarter of a mile of a cultural property, or the visual horizon, whichever is closer, would restrict oil and gas development that would otherwise adversely affect the cultural resources. If the NRHP-eligible cultural resource sites were small, access roads, drill pads, pipelines, and other ancillary facilities would be relocated to avoid adverse impacts. This avoidance measure could require installation of facilities in areas that are more difficult to develop or reclaim, or that are located farther from the mineral resource, which would potentially increase operating expenses.

Avoiding placement of new facilities, including linear ROWs, in areas identified in Chapter 2, Table 2-5, such as WSAs, ACECs, VRM Class II areas, and steep slopes, would directly influence the placement of oil and gas facilities, including well pads and pipelines. In most cases, the facility would be relocated outside the avoidance area. If the location cannot be avoided, the site would require BMPs, mitigation, siting, or design conditions of approval (Appendix 13) attached to the Application for Permit to Drill (APD). These mitigations would be applied based on a site-specific analysis on a project level. This management action would limit the location but not the number of oil and gas well pads within these areas.

Intensive management of oil and gas activities within one-quarter of a mile of incorporated boundaries of all cities (1,630 acres) could limit oil and gas production in these limited areas. Existing leases in these areas would be intensively managed to reduce noise, smell, and dust related to development activities.

Closing 66,120 acres to oil and gas leasing (i.e., lands classified as Oil and Gas Classification D, Map 2-35) would preclude new oil and gas leasing and development.

Developed and undeveloped recreation sites (10,400 acres) would be open to oil and gas leasing with a NSO stipulation and the surrounding ¼-mile area (an additional 7,930 acres) would be intensively managed, which could require directional drilling to access resources under larger recreation sites or result in location of facilities outside the closed area. Approximately 95 percent of these sites are within low hydrocarbon potential areas (Table 2-6).

SMAs provide management for unique natural, historic, scenic, or recreational resources and in all but one case are open to oil and gas exploration (with the exception of WSAs). The impact of SMA designations (Maps 2-7, 2-10, and 2-14), other than WSAs, on oil and gas exploration and production would depend on the special management designations, management actions, and hydrocarbon potential (Table 2-6). Restrictions or stipulations necessary to manage SMAs may lead to a reduction in the time available to drill and complete oil and gas wells and construct ancillary facilities; they may also result in the relocation of wells pads, access roads, pipelines, and ancillary facilities.

The Como Bluff ACEC (1,690 acres) would be open to oil and gas leasing with a controlled surface use (CSU) stipulation, which would directly influence the placement of oil and gas facilities (Map 2-7).

The Sand Hills ACEC (7,960 acres), Jep Canyon ACEC (13,810 acres), Chain Lakes wildlife habitat management area (30,470 acres), Wick-Beumee wildlife habitat management area (280 acres), Shirley Mountain Caves SRMA (24,400 acres), Laramie Plains Lakes area (1,600 acres), Upper Muddy Creek Watershed/Grizzly area (70,780 acres), and White-Tailed Prairie Dog areas, would be open to oil and gas leasing with intensive management of surface disturbing and other disruptive activities. These management actions would result in location of facilities outside these areas (Map 2-7 and Map 2-10).

The Stratton Sagebrush Steppe Research Area ACEC (5,530 acres) would be open to oil and gas leasing with an NSO stipulation, which could require directional drilling and result in the relocation of oil and gas facilities.

An area within one-quarter of a mile, or the visual horizon, of the Cherokee and Overland trails would be open to oil and gas leasing and an avoidance area for surface disturbing and other disruptive activities. In most cases, the facility would be relocated outside of the avoidance area. If the location cannot be avoided, mitigation requirements could be attached to the APD.

The North Platte River SRMA (5,060 acres, including one-quarter of a mile either side of the river) would be open to oil and gas leasing with intensive management of surface disturbing and other disruptive activities, which would result in location of facilities outside the SRMA (Map 2-14).

Vegetation management impacts on oil and gas exploration and development would be minor and related to restoration of native species and/or avoidance of sensitive, threatened, and endangered plant species. Known habitat for threatened, endangered, proposed, and candidate species; and BLM Wyoming state sensitive plant species would be open to oil and gas leasing with intensive management, which could result in the relocation of oil and gas facilities.

In VRM Class II areas (359,610 acres), VRM objectives would influence the location of development as well as the size and coloration of facilities.

Avoiding surface disturbing activities in areas such as identified 100-year flood plains; areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas; and areas 100 feet from the inner gorge of ephemeral streams would directly impact oil and gas development. In most cases, the well pad or facility would be relocated outside the avoidance area. If the location cannot be avoided, the site would require BMPs, mitigation, siting, or design conditions of approval (Appendix 13) attached to the APD. These mitigations would be applied based on a site-specific analysis on a project level. This management action would limit the location but not the number of oil and well pads.

Water quality and watershed management actions place restrictions on the locations and methods for surface discharge of produced water, the placement of facilities, and the location and design of roads and well pads (Table 2-5). Surface discharge of produced water that meets state standards for water quality would be allowed in the Colorado River Basin, North Platte River Basin, and Great Divide Basin.

Seasonal restrictions for raptor nest sites, amphibian habitat, bald eagle communal roosts, prairie dog towns/complexes, and sage-grouse leks would restrict the time available to complete exploration and development activities. Where seasonal restrictions severely limit the time available to complete activities, relocation of surface facilities may be required. Approximately 3,494,490 subsurface acres would have seasonal restrictions, with 685,250 acres (20 percent) of the 3,494,490 acres identified as high hydrocarbon potential, 945,010 acres (27 percent) with moderate hydrocarbon potential, and 1,864,230 acres (53 percent) with low hydrocarbon potential (Table 2-6). Exceptions to seasonal restrictions would in some cases allow development activities to occur (Appendix 9. For deep wells that may take 6 or more months to drill, complete, and install production facilities, exceptions or phased operations would be necessary. Normal depth wells may require drilling and completion operations to be interrupted, and these activities would be completed in phases to accommodate the seasonal restrictions.

Locatable Minerals

Approximately 8,105 acres would be closed to locatable mineral entry in addition to the 1,582,260 acres of existing withdrawals, which would directly limit the amount of land available for locatable mineral

entry. Lands and realty management actions would not preclude locatable mineral development. ROWs would be relocated if locatable mineral exploration or development occurs.

Developed recreation sites (2,680 acres) would be closed to locatable mineral entry, which would limit the development of locatable minerals in these areas.

Identified blowout penstemon habitat would be open to locatable mineral entry, but would be intensively managed, which could result in the relocation of facilities.

Salable Minerals

The development of salable minerals is a discretionary action. Cultural resource management actions and vegetation management actions that protect special status plant species would require the relocation of salable mineral facilities.

Impacts from water quality, watershed, and soils management actions on salable minerals development would include shifting the locations of facilities and surface disturbing activities outside of protected resource areas (Table 2-5). Some salable mineral deposits would be unavailable where avoidance areas preclude development or where development could not be adequately mitigated. Loss of salable mineral development is likely to be minimal because the deposits selected for mining are generally located outside of floodplains.

Wildlife and fish management actions that restrict surface disturbing and other disruptive activities would result in the relocation of the activity or the use of alternate materials.

Summary

Leasable Minerals

Implementation of restrictions, such as NSO, CSU, and timing restrictions, would limit oil and gas development and activities. Approximately 8,945 wells would be developed during the planning period.

Locatable Minerals

Closing 8,105 acres to locatable mineral entry would limit the land available for locatable mineral development.

Salable Minerals

Approximately 8,105 acres would be closed to salable mineral disposals, which would limit the acreage available for disposals.

4.8.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Leasable Minerals—Oil and Gas

Management actions under Alternative 2 are less restrictive regarding surface disturbing and other disruptive activities, including oil and gas developments, as compared to other alternatives. These management actions would allow for greater development of oil and gas resources. Table 2-6, Alternative 2 shows the acres of hydrocarbon potential that would be affected by seasonal limitations.

Impacts from cultural resource management; recreation management; vegetation management; and water quality, watershed, and soils management would be the same as those of Alternative 1.

Impacts from avoiding placement of new facilities, including linear ROWs, in areas identified in Table 2-5, would be the same as those found in Alternative 1, except there are fewer acres of avoidance areas in Alternative 2.

Intensive management of oil and gas activities within one-quarter of a mile of incorporated boundaries of all cities (1,500 acres) could limit oil and gas production in these limited areas. Existing leases in these areas would be intensively managed to reduce noise, smell, and dust related to development activities.

Closing 66,610 acres to new oil and gas leasing (Map 2-36) would preclude new oil and gas leasing and development.

Impacts from SMA management actions discussed in Alternative 1 are also applicable to Alternative 2 (e.g., management of the North Platte River area would result in the relocation of oil and gas facilities from this area), except that the SMA management actions for Alternative 2 (Map 2-11 and Map 2-15) are less restrictive on oil and gas development than those for Alternative 1. Alternative 2 would provide for the greatest development of oil and gas resources as compared to other alternatives because less acreage would be subject to intensive oil and gas restrictions.

The Como Bluff area (1,690 acres) would be open to oil and gas leasing with a controlled surface use stipulation, which would directly influence the placement of oil and gas facilities.

The Sand Hills area (7,960 acres), Jep Canyon area (13,810 acres), Chain Lakes wildlife habitat management area (30,470 acres), Wick-Beumee wildlife habitat management area (280 acres), Shirley Mountain Caves (24,400 acres), Laramie Plains area (1,600 acres), Upper Muddy Creek Watershed/Grizzly wildlife habitat management area (70,780 acres), and White-Tailed Prairie Dog areas, would be open with intensive management of surface disturbing and other disruptive activities. These management actions would result in the relocation of oil and gas facilities from these areas.

The Stratton Sagebrush Steppe Research Area ACEC (5,530 acres) would be open to oil and gas leasing and operators would be required to submit a management plan to describe how activities would affect research objectives. This management action could require the implementation of BMPs and mitigation measures to reduce impacts to the research area.

An area within one-quarter of a mile, or the visual horizon, of the Cherokee and Overland trails would be open to oil and gas leasing and an avoidance area for surface disturbing activities. In most cases, the facility would be relocated outside of the avoidance area. If the location cannot be avoided, mitigation requirements could be attached to the APD.

The North Platte River area (5,060 acres, including one-quarter of a mile either side of the river) would be open with intensive management of surface disturbing and other disruptive activities, which would result in the relocation of oil and gas facilities from this area.

The Rawlins OHV SRMA (480 acres) would be closed to oil and gas leasing, which would preclude new oil and gas development (Map 2-15).

In VRM Class II areas (233,950 acres), VRM objectives would influence location of development as well as size and coloration of facilities.

Proposed management actions to protect wildlife would impact oil and gas exploration and production as described under Alternative 1. Wildlife protection measures would be less restrictive, resulting in a lower magnitude and intensity of impact. Approximately 1,106,310 subsurface acres would have seasonal restrictions, with 172,410 acres (16 percent) of the 1,106,310 acres identified as high hydrocarbon potential, 349,310 acres (31 percent) with moderate hydrocarbon potential, and 584,590 acres (53 percent) with low hydrocarbon potential (Table 2-6).

Actions designed to protect wildlife would restrict the time and location of oil and gas development. Seasonal restrictions, such as prohibiting surface disturbing activities and other disruptive activities within one-half of a mile of raptor nests, would shorten the time period and land available for oil and gas development. Where seasonal restrictions severely limit the time available to complete activities, relocation of surface facilities may be required.

Locatable Minerals

Impacts from cultural resource management, recreation management, and vegetation management would be the same as those of Alternative 1.

Approximately 8,825 acres, or 720 acres more than Alternative 1, would be closed to locatable mineral entry, which would directly limit the development of locatable minerals.

The Shirley Mountain Caves area (240 acres) and Rawlins OHV SRMA (480 acres) would be closed to locatable mineral entry, which would directly limit the development of locatable minerals in this area.

Salable Minerals

Impacts from cultural resource management; recreation management; vegetation management; and water quality, watershed, and soils management actions would be the same as those of Alternative 1. Management actions under Alternative 2 are less restrictive on surface disturbing and other disruptive activities, including salable mineral activities, as compared to other alternatives; therefore more area would be open for mineral material disposals.

The Shirley Mountain Caves area (240 acres) and Rawlins OHV SRMA (480 acres) would be closed to mineral material disposals, which would directly limit the development of salable minerals. If alternate deposits exist, localized prohibition of mining may result in shifting the resource development activity to another location.

Wildlife and fish management actions that restrict surface disturbing and other disruptive activities would result in the relocation of the activity. Because authorization of mineral material sites is a discretionary action, it is anticipated that authorizations within sensitive habitats would be denied and alternative deposits or sites would be considered for development.

Summary

Leasable Minerals

More acres would be available for oil and gas leasing. In addition, fewer restrictions on surface disturbing and other disruptive activities would allow for more time to develop wells and construct facilities and may result in an increase of leasing and drilling activities. Approximately 9,198 wells, or 3 percent more wells than Alternative 1, would be developed during the planning period.

Locatable Minerals

Closing approximately 8,825 acres to locatable mineral development would limit the land available for development.

Salable Minerals

Approximately 8,825 acres would be closed to salable mineral disposals, which would limit the acreage available for disposals.

4.8.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Leasable Minerals—Oil and Gas

Management actions under this alternative would be the most restrictive to oil and gas development as compared to other alternatives.

Not allowing surface disturbing and other disruptive activities within one-quarter of a mile of a cultural property, or the visual horizon, whichever is closer would restrict oil and gas development that would otherwise adversely affect the cultural resources. If the NRHP-eligible cultural resource sites were small, access roads, drill pads, pipelines, and other ancillary facilities would be relocated to avoid adverse impacts. Not allowing surface disturbing and other disruptive activities in these areas could require installation of facilities in areas that are more difficult to develop or reclaim, which would potentially increase operating expenses.

Requiring NSO within one-half of a mile of incorporated boundaries of all cities (4,500 acres) would impact development activities by requiring directional drilling to reach mineral deposits or by precluding drilling where directional drilling is not a viable option. Existing leases in these areas would be intensively managed to reduce noise, smell, and dust related to development activities.

WSAs, ACECs, VRM Class II areas, steep slopes, and other areas identified in Table 2-5, would be closed to new facility placement, including linear ROWs. Closing these areas to facility placement would require directional drilling to reach mineral deposits or preclude drilling where directional drilling is not a viable option. This management action would limit the location and number of oil and gas well pads within these areas.

Approximately 120,360 acres would be closed to new oil and gas leasing (i.e., lands classified as Oil and Gas Classification D, Map 2-37).

Developed and undeveloped recreation sites (9,660 acres) and the surrounding ½-mile area (an additional 15,800 acres) would be open to oil and gas leasing with an NSO stipulation, which could require directional drilling to access resources under larger recreation sites or result in location of facilities outside the NSO area. This is approximately 8,600 acres more than Alternative 1.

The west end of the Ferris Mountains (5,270 acres) and the Adobe Town fringe areas (31,510 acres) would be closed to oil and gas leasing, which would preclude new oil and gas leasing and development.

Impacts from SMA management actions would be similar to those impacts identified in Alternative 1, except that the SMA management actions for Alternative 3 (Map 2-8, Map 2-12 and Map 2-16) are more restrictive and would constitute a major impact on oil and gas exploration and development. Alternative

3 management actions would be a major impact because more acreage would be subject to intensive oil and gas restrictions.

The Como Bluff ACEC (1,690 acres), Historic Trails ACEC, and Upper Muddy Creek Watershed/Grizzly ACEC (70,780 acres) would be open to oil and gas leasing with an NSO stipulation, which could require directional drilling and result in the relocation of oil and gas facilities.

The Sand Hills ACEC (12,700 acres), Jep Canyon wildlife habitat management area (13,810 acres), Stratton Sagebrush Steppe Research Area ACEC (5,530 acres), Chain Lakes ACEC (30,470 acres), Wick-Beumee wildlife habitat management area (280 acres), Shirley Mountain Bat Cave ACEC (520 acres), and Laramie Plains Lakes ACEC (1,600 acres), would be closed to new oil and gas leasing, which would preclude new oil and gas leasing and development.

The White-Tailed Prairie Dog ACEC would be open to oil and gas leasing consistent with the habitat conservation measures outlined in the biological assessment, such that white-tailed prairie dog towns greater than 200 acres would be avoided. In most cases, facilities would be relocated outside the avoidance area. If the location cannot be avoided, the site would be assessed and mapped at the project level.

The North Platte River SRMA (12,740 acres, including one-half of a mile either side of the river) and Rawlins OHV SRMA (480 acres) would be closed to oil and gas leasing, which would preclude new oil and gas development (Map 2-16).

Known habitat for threatened, endangered, proposed, and candidate species and BLM Wyoming state sensitive plant species would be open to oil and gas leasing with an NSO stipulation, which could require directional drilling and result in the relocation of oil and gas facilities.

In VRM Class II areas (941,810 acres), VRM objectives would influence the location of development as well as the size and coloration of facilities. This increased VRM Class II acreage would require intensive management of surface disturbance.

Water resource restrictions on produced water disposal options in the Colorado River basin would impact the location of CBNG developments, and economic constraints could limit the ability to develop these natural gas resources.

Only State of Wyoming-authorized water discharges of produced water that meets specific BLM land use objectives would be allowed in the North Platte River and Great Divide Basins, which is more restrictive than Alternative 1. Restrictions on water disposal options would impact the location and number of developments of natural gas reservoirs located in coal formations, and economic constraints could limit the ability to develop these resources.

Not allowing surface disturbing activities in identified 100-year flood plains; areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas; and areas 100 feet from the inner gorge of ephemeral channels would directly impact oil and gas development. This management action would limit the location and number of oil and gas developments in these areas.

Actions designed to protect wildlife would restrict the timing and location of oil and gas development. NSO stipulations on raptor nests, big game parturition areas, threatened and endangered species habitat, and Greater sage-grouse and sharp-tailed grouse leks would impact development activities by requiring directional drilling to reach mineral deposits or by precluding drilling where directional drilling is not a viable option. Prohibitions on oil and gas development within 50 meters of prairie dog towns, within one-

quarter of a mile of sage-grouse leks, and in crucial winter range for sensitive species; closure of RCAs to leasing; and avoidance of sage-grouse leks (up to 4 miles of leks) within Atlantic Rim would also restrict development opportunities and thereby reduce the number of wells ultimately developed over the planning period. In addition, seasonal restrictions (e.g., nighttime prohibitions within one-quarter of a mile of Greater sage-grouse/sharp-tailed grouse leks from March 1 to May 15) would further impact minerals management activities. Proposed projects that are planned in areas containing big game species, raptors, and grouse habitat would have only a 2-month window for development; however, the presence of all of these habitats occurring on one proposed project area is not common. However, the wildlife program has modified the raptor seasonal timing stipulations to better reflect the biological needs of individual species, which has in some cases reduced the length of timing restrictions for proposed projects. Approximately 4,392,460 subsurface acres would have seasonal restrictions, with 880,090 acres (20 percent) of the 4,392,460 acres identified as high hydrocarbon potential, 1,234,730 acres (28 percent) with moderate hydrocarbon potential, and 2,276,640 acres (52 percent) with low hydrocarbon potential (Table 2-6).

Locatable Minerals

This alternative, when compared with the other alternatives, would restrict the greatest amount of locatable minerals development. Management actions would close 402,280 acres to locatable mineral entry. This is 394,170 more acres than Alternative 1. These management actions would directly impact development of locatable minerals in these areas.

Developed and undeveloped recreation sites (9,660 acres) would be closed to locatable mineral entry, and withdrawals would be pursued, which would directly limit the development of locatable minerals in these areas.

The west end of the Ferris Mountains (5,270 acres) and the Adobe Town fringe areas (31,510 acres) would be closed to locatable mineral entry, which would directly limit the lands available for locatable mineral development.

Impacts from SMA management actions would be similar to those impacts identified in Alternative 1, except that the SMA management actions for Alternative 3 are more restrictive for locatable mineral activity than those for other alternatives. The restrictions would limit areas available for locatable mineral development.

The Como Bluff ACEC (1,690 acres), Sand Hills ACEC (7,960 acres), Jep Canyon wildlife habitat management area (13,810 acres), Shamrock Hills raptor concentration area (18,400 acres), Chain Lakes ACEC (30,470 acres), Laramie Peak ACEC (18,940 acres), Red Rim-Daley ACEC (15,980 acres), Pennock Mountain wildlife habitat management area, Wick-Beumee wildlife habitat management area (280 acres), Shirley Mountain Bat Cave area (520 acres), Laramie Plains Lakes ACEC (1,600 acres), Historic Trails ACEC, Blowout Penstemon ACEC (4,020 acres), Upper Muddy Creek Watershed/Grizzly ACEC (70,780 acres), White-Tailed Prairie Dog ACEC, High Savery Dam ACEC (530 acres), Continental Divide National Scenic Trail SRMA, North Platte River SRMA (12,740 acres including the ½ mile area either side of the river), and Rawlins OHV SRMA (480 acres), would be closed to locatable mineral entry, which would directly limit the development of locatable minerals in these areas.

Salable Minerals

Management actions under Alternative 3 are more restrictive on surface disturbing and other disruptive activities, including salable mineral activities.

Impacts from cultural resource management, SMA management, and vegetation management would be the same as those found in Alternative 1.

Developed and undeveloped recreation sites (9,660 acres) would be closed to salable mineral development, and the surrounding ½-mile area (15,800 additional acres) would be intensively managed, which would directly limit the development of salable minerals in these areas and could result in the location of facilities outside the closed area.

The west end of the Ferris Mountains (5,270 acres) and the Adobe Town fringe areas (31,510 acres) would be closed to salable mineral development, which would directly limit the development of salable minerals in these areas and could result in the location of facilities outside the closed area.

The Como Bluff ACEC (1,690 acres), Sand Hills ACEC (7,960 acres), Jep Canyon wildlife habitat management area (13,810 acres), Shamrock Hills raptor concentration area (18,400 acres), Chain Lakes ACEC (30,470 acres), Laramie Peak ACEC (18,940 acres), Red Rim-Daley ACEC (15,980 acres), Pennock Mountain wildlife habitat management area, Wick-Beumee wildlife habitat management area (280 acres), Shirley Mountain Bat Cave area (520 acres), Laramie Plains Lakes ACEC (1,600 acres), Historic Trails ACEC, Blowout Penstemon ACEC (4,020 acres), Upper Muddy Creek Watershed/Grizzly ACEC (70,780 acres), White-Tailed Prairie Dog ACEC, High Savery Dam ACEC (530 acres), Continental Divide National Scenic Trail SRMA, North Platte River SRMA (12,740 acres including the ½ mile area either side of the river), and Rawlins OHV SRMA (480 acres), would be closed to mineral material disposals, which would directly limit the development of salable minerals. If alternate deposits exist, localized prohibition of mining may result in shifting the resource development activity to another location.

Water quality, watershed, and soils management actions on salable minerals development would result in shifting the locations of facilities and surface disturbing activities outside of protected resource areas (Table 2-5). Some salable mineral deposits would be unavailable where avoidance areas preclude development or development could not be adequately mitigated. Because some salable minerals operations produce water before and during mining, management of those resources would be impacted by water disposal restrictions.

Wildlife and fish management actions that restrict surface disturbing and other disruptive activities would result in the relocation of the activity or the use of alternate materials.

Summary

Leasable Minerals

Fewer acres would be available for oil and gas leasing. An increase in restrictions on surface disturbing and other disruptive activities would limit the time available to develop wells and construct ancillary facilities and may also result in greater costs associated with maximizing resource extraction. Implementation of this alternative may result in a decrease in leasing and drilling activities in the planning area. Approximately 8,632 wells, or 4 percent fewer wells than Alternative 1, would be developed during the planning period.

Locatable Minerals

Closing approximately 402,280 acres to locatable mineral development would limit the area available for development.

Salable Minerals

Approximately 402,280 acres would be closed to salable mineral disposals, which would limit the acreage available for disposals.

4.8.5 Impacts Under Alternative 4: Preferred Alternative

Leasable Minerals—Oil and Gas

Impacts from cultural resource management actions would be the same as those of Alternative 3.

Impacts from avoiding placement of new facilities, including linear ROWs, in areas identified in Table 2-5 would be the same as those found in Alternative 1.

Impacts from lands and realty management actions would be the same as Alternative 1, except no surface occupancy would be allowed within one-quarter of a mile of incorporated boundaries of all cities (1,630 acres). This management action would require directional drilling to reach mineral deposits or preclude drilling where directional drilling is not a viable option. Existing leases in these areas would be intensively managed to reduce noise, smell, and dust related to development activities.

Closing 76,950 acres to new oil and gas leasing (Map 2-38) would preclude new oil and gas leasing and development.

Developed and undeveloped recreation sites (9,660 acres) and the surrounding ¼-mile area (an additional 7,930 acres) would be open to oil and gas leasing with an NSO stipulation, which would require directional drilling to access resources under larger recreation sites or result in location of facilities outside the closed area. Approximately 95 percent of these sites are within low hydrocarbon potential areas (Table 2-6).

The west end of the Ferris Mountains (5,300 acres) would be closed to oil and gas leasing, which would preclude new oil and gas leasing and development.

Impacts from SMA management actions would be similar to those impacts identified in Alternative 1. The SMA management actions for Alternative 4 (Maps 2-9, 2-13, and 2-17) would be less restrictive than those of Alternative 3 and more restrictive than those for Alternative 2.

The Como Bluff national natural landmark (NNL), Sand Hills ACEC (7,960 acres), Jep Canyon wildlife habitat management area (13,810 acres), Chain Lakes area (30,470 acres), Wick-Beumee wildlife habitat management area (280 acres), Shirley Mountain Bat Cave ACEC (240 acres), Laramie Plains Lakes wildlife habitat management area (1,600 acres), Upper Muddy Creek Watershed/Grizzly fish habitat management area (70,780 acres), and White-Tailed Prairie Dog areas would be open to oil and gas leasing with intensive management of surface disturbing and other disruptive activates.

The area within one-quarter of a mile, or the visual horizon, of the Historic Trails Cherokee and Overland trails area would be open to oil and gas leasing with an NSO stipulation, which could require directional drilling and result in the relocation of oil and gas facilities.

The Stratton Sagebrush Steppe research area (5,530 acres) would be closed to new oil and gas leasing, which would preclude new oil and gas leasing and development.

North Platte River SRMA (5,060 acres, including the ¼-mile area on either side of the river) would be open to oil and gas leasing with intensive management of surface disturbing and other disruptive activates (Map 2-17).

The Rawlins OHV SRMA (480 acres) would be closed to new oil and gas leasing, which would preclude new oil and gas leasing and development (Map 2-17).

Known habitat for threatened, endangered, proposed, and candidate species would be open to oil and gas leasing with an NSO stipulation, which could require directional drilling and result in the relocation of oil and gas facilities. BLM Wyoming state sensitive plant species and blowout penstemon habitat would be open to oil and gas leasing with intensive management, which could result in the relocation of oil and gas facilities.

In VRM Class II areas (589,530 acres), VRM objectives would influence location of development as well as size and coloration of facilities. Water quality, watershed, and soils management actions would not allow the surface discharge of produced water in the Colorado River Basin. Water disposal options would affect the location of CBNG developments, and economic constraints could limit the ability to develop these natural resources. If surface discharges were allowed in the Colorado River Basin, water may need to be treated or impounded in off-channel reservoirs to limit salt loading in this basin. It is not known if the economics of these options would be better than injection. Exploratory projects in the Colorado River Basin are currently producing high volumes of produced water and using injection for water disposal. These projects have shown to be economically viable under current prices for natural gas but may not be where economics are marginal or consistent with changes in natural gas prices. This economic situation is expected to hold true in the future for most development. With these assumptions, impacts from water disposal options alone would not be expected to be significant under this alternative.

Surface discharge of produced water that meets state standards for water quality would be allowed in the North Platte River Basin and Great Divide Basin. Water disposal options would affect the location of CBNG developments, and economic constraints could limit the ability to develop these natural resources.

Avoiding surface disturbing activities in identified 100-year flood plains; areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas; and areas within 100 feet of the inner gorge of ephemeral streams would directly impact oil and gas development. In most cases, the well pad or facility would be relocated outside of the avoidance areas. If the location cannot be avoided, the site would require BMPs, mitigation, siting, or design conditions of approval (Appendices 13 and 27) attached to the APD. These mitigations would be applied based on a site-specific analysis on a project-level basis. This management action would limit the location but not the number of oil and gas well pads within these areas.

Impacts from wildlife and fish management actions would be similar to those of Alternative 1. There would be additional impacts to minerals management activities from NSO stipulations on raptor nests and Greater sage grouse/sharp-tailed grouse leks. In addition, activity is not permitted at night within one-quarter of a mile of a Greater sage-grouse/sharp-tailed grouse lek from March 1 to May 15, which could impact minerals management activities. Proposed projects that are planned in areas containing big game species, raptors, and grouse habitat would have only a 2-month window for development; however, the presence of all of these habitats occurring on one proposed project area is not common. Raptor seasonal timing stipulations were modified to better reflect the biological needs of individual species, which has in some cases reduced the length of timing restrictions for proposed projects. Approximately 3,517,990 subsurface acres would have seasonal restrictions, with 689,860 acres (20 percent) of the 3,517,990 acres identified as high hydrocarbon potential, 959,080 acres (27 percent) with moderate hydrocarbon potential, and 1,869,050 acres (53 percent) with low hydrocarbon potential (Table 2-6).

Proposals for conducting year-long surface disturbing and other disruptive activities, including oil and gas drilling in big game winter range, sage-grouse seasonal use areas, and other seasonally sensitive habitats would be considered and surface disturbing and other disruptive activities in big game crucial winter range would require the use of BMPs (Appendix 15). This would potentially allow for yearlong oil and gas activities in areas limited by seasonal limitations.

Locatable Minerals

Impacts from SMA management would be the same as those found in Alternative 1.

Management actions would close approximately 28,724 acres to locatable mineral entry, approximately 20,619 more acres than Alternative 1. These management actions would directly impact development of locatable minerals in these areas.

Developed and undeveloped recreation sites (9,960 acres) would be closed to locatable mineral entry and withdrawals would be pursued, which would directly limit the development of locatable minerals in these areas.

The west end of the Ferris Mountains (5,300 acres) would be closed to locatable mineral entry, which would directly limit the lands available for locatable mineral development.

The Shirley Mountain Bat Cave area (240 acres), portions of the Cherokee and Overland trails area, Blowout Penstemon ACEC (4,020 acres), High Savery Dam area (530 acres), Continental Divide National Scenic Trail SRMA, North Platte River SRMA (5,060 acres including the ¼-mile area either side of the river), and Rawlins OHV area (480 acres), would be closed to locatable mineral entry, which would directly limit the development of locatable minerals in these areas.

ACEC management actions would require plans of operations regardless of the acreage. The requirement would have minor to moderate impacts on the development of locatable minerals in these areas.

Identified blowout penstemon habitat would be closed to locatable mineral entry, which would limit areas available for locatable mineral development.

Salable Minerals

Impacts from cultural resource management; vegetation management; and water quality, watershed, and soils management would be the same as those found in Alternative 1.

Developed and undeveloped recreation sites (9,960 acres) would be closed to salable mineral development, and the surrounding ¼-mile area (7,930 additional acres) would be intensively managed, which would directly limit the development of salable minerals in these areas and could result in the location of facilities outside the closed area.

The west end of the Ferris Mountains (5,300 acres) would be closed to salable mineral development, which would directly limit the development of salable minerals in this area and could result in development of alternate deposits.

The Shirley Mountain Bat Cave area (240 acres), portions of the Cherokee and Overland trails area, Blowout Penstemon ACEC (4,020 acres), High Savery Dam area (530 acres), Continental Divide National Scenic Trail SRMA, North Platte River SRMA (5,060 acres including the ¼ mile area either side of the river), and Rawlins OHV area (480 acres), would be closed to mineral material disposals, which

would directly limit the development of salable minerals. If alternate deposits exist, localized prohibition of mining may result in shifting the resource development activity to another location.

Wildlife and fish management actions that restrict surface disturbing activities would result in the relocation of the activity or the use of alternate materials.

Summary

Leasable Minerals

There would be a slight decrease in the number of acres available for oil and gas leasing compared to Alternative 1. An increase in restrictions on surface disturbing and other disruptive activities would result in instances where less time is available to develop wells and construct facilities; this may also result in greater costs associated with maximizing resource extraction. Implementation of this alternative may result in a decrease in leasing and drilling activities in the planning area. Approximately 8,822 wells, or 1 percent fewer wells than Alternative 1, would be developed during the planning period.

Locatable Minerals

Closing approximately 14,465 acres to locatable mineral development would limit the area available for development.

Salable Minerals

Approximately 14,465 acres would be closed to salable mineral disposals, which would limit the acreage available for disposals in leased areas and would require that surface disturbance and facilities be intensively mitigated to retain VRM II visual qualities, which would improve the recreational experience.

4.9 Off-Highway Vehicle Management

This section describes potential impacts to OHV management and use from management actions for other resource programs. Existing conditions concerning recreation resources are described in Section 3.9.

Significance Criteria

Impacts to OHV management would be considered significant if either of the following were to occur:

- Management actions result in long-term elimination or reduction of recreational OHV use in any area or compromise public health and safety.
- Increases in OHV activity create substantial risks to public health and safety.

Methods of Analysis

Impact analysis and conclusions are based on interdisciplinary team knowledge of the planning area and resources therein and review of existing literature. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate.

The analysis is based on the following assumptions:

- OHV use will continue to increase as the popularity and availability of OHVs increase.
- The incidence of resource damage and conflicts between OHVs and nonmotorized recreationists will increase with increasing OHV use.
- Proliferation of unauthorized trails and associated resource degradation will continue to occur beyond the ability of RFO to prevent or eliminate the problem.
- All restrictions apply to all permitted activities, but not necessarily to all casual use.
- Reclamation will be done and roads closed where necessary to mitigate impacts.
- RFDs and RFAs can be found in Appendix 33.

4.9.1 Impacts Common to All Alternatives

Cultural resources attract recreational OHV users to the RMPPA. This is evident from visitors interested in following the historic trails and visiting historic sites associated with the trails. Actions to protect cultural resources such as fencing, signing, physical barriers, or other methods of restricting access to sensitive cultural properties may preclude OHV use in some areas. Acreages within these areas would be minimal.

Fire management actions that affect the degree of wildland fire within the RMPPA would impact OHV use, as burn areas are not desirable OHV destinations. Trails established by fire management actions could become established two-tracks, creating new access to areas.

Windpower development in the RMPPA would negatively impact the OHV experience for some people by creating new visual impairments on the horizon. OHV access within these developments may be limited because of mixed land ownership patterns or road closures for public safety.

Fencing associated with livestock grazing may alter OHV travel patterns and interfere with access to potential OHV use areas. Livestock management actions would impact OHV users by creating new and maintaining existing roads and vehicle routes. Gates would be installed on new fences, where necessary, to provide adequate crossing on two-tracks or roads.

Mineral development would open new areas to OHV use. Increased traffic associated with mineral development would pose a hazard to OHV users, particularly on narrow roads that may not accommodate passing vehicles. Development associated with oil and gas facilities would degrade the scenic quality of areas surrounding development, resulting in many OHV users seeking alternate routes to avoid industrialized areas (i.e., the improved roads associated with development and the related impacts on the scenery from oil and gas facilities, equipment, vehicles, and personnel do not provide the rustic experience OHV users are typically seeking). Therefore development does not necessarily equate to an improvement in desirable OHV opportunities.

Excessive OHV use or use of over-the-snow vehicles could affect future OHV and over-the-snow vehicle users by forcing the closure of certain areas because of resource damage. In addition, increases in OHV use in certain areas could result in impacts to public safety.

Recreation use areas within the RMPPA would potentially increase OHV use, because some recreation attractions are unreachable without the use of OHVs. Recreation management actions would reduce OHV use opportunities through OHV closures in certain recreation areas to avoid user conflicts. For

example, the Encampment River Trail (Map 2-5) is closed to OHV use because OHV use would be in direct conflict with the primitive recreation resource values along the trail.

Some SMAs are popular OHV destinations in the RMPPA, whereas others restrict OHV use. The Ferris Mountains WSA (21,880 acres Map 2-5) would be closed to OHV use, along with the walk-in fishing area at High Savory Reservoir. The Pennock Mountain crucial elk winter range, Wick-Beumee wildlife habitat area, and Encampment River Canyon crucial bighorn winter range would be closed seasonally. Other SMAs do not have additional OHV restrictions (Map 2-10).

Any development of the transportation network within the RMPPA would affect OHV activities. Impacts would result from both road closures and the construction of new roads associated with development activities. Road closures and restricted access would limit OHV use in some areas; but the construction of new roads associated with mineral development would open new areas to OHV use. The improved roads associated with development and the related impacts on the scenery from oil and gas facilities, equipment, vehicles, and personnel do not provide the rustic experience OHV users typically seek. Therefore development would not necessarily equate to an improvement in desirable OHV opportunities.

Consolidation of public lands, particularly within the checkerboard area where public land is fragmented, would impact OHV use by increasing land available for OHV activities if legal public access is present.

Vegetative manipulation projects would impact OHV use by increasing restrictions in areas undergoing treatment, and limiting OHV use in these areas. Areas with sensitive and threatened or endangered species could be closed to OHV users, which would cause minimal impacts to OHV use.

Changes in VRM classes could impact OHV use. If an area were downgraded from Class II to Class III, the probability of surface disturbing development and associated roads would increase. If an area were upgraded to Class II, the probability of newly authorized roads would decrease. Watershed protection and restoration areas would potentially restrict the location of parking lots and roads or may lead to restrictive management of OHVs in sensitive areas. Source water and wellhead protection areas could restrict the location or development of future OHV use areas.

In some instances, soil characteristics, such as high clay or sand content, make an area particularly attractive to OHV enthusiasts. Soil management actions to protect sensitive soils and reduce unacceptable erosion levels may require seasonal restrictions or road closures, which would restrict OHV use in these areas.

4.9.2 Impacts Under Alternative 1: Continuation of Existing Management

In forested areas, such as the Shirley Mountains (Map 2-5), roads created for timber harvesting, firewood gathering, and similar activities would sometimes be available for OHV use. OHV use on logging roads would prevent natural reclamation of the roads, thus retaining them as OHV vehicle routes. These actions impact OHV use by changing the recreational OHV setting that many users seek; however, an expanded network of roads and vehicle routes would be created.

Development under minerals and transportation and access management would potentially impact OHV use in localized areas. The construction of facilities—including towers, fences, oil and gas development, wind turbines, and ROWs for pipelines, transmission lines, and communication lines—would alter the recreational OHV experience.

OHV use in the RMPPA increases during hunting season. OHV use on muddy two-tracks and roads would potentially create ruts that are hazardous to other drivers. Hunters often engage in this activity

because of the limited hunting seasons. Excessive damage could lead to temporary closure of these roads for rehabilitation, which would cause short-term impacts to OHV use.

Most OHV users would be satisfied with the abundance of two-tracks available throughout the RMPPA. The creation of unauthorized two-tracks would potentially impact all OHV users if areas were closed for rehabilitation from excessive resource damage. After a two-track has been pioneered, it is commonly considered existing by other OHV users and will remain a vehicle route unless it is signed as closed and/or rehabilitated. Under this alternative, two-track proliferation would continue and associated closures would impact OHV users.

Education and the distribution of OHV maps and user information would inform the public about proper OHV use and OHV regulations. Increased law enforcement presence could also serve to encourage proper OHV user behavior.

Creation of the 480-acre OHV area at Hogback Lake would have a positive, long-term impact on OHV management by providing OHV users with a designated OHV area. Creation of this area would help protect surrounding areas from new disturbance by concentrating OHV use within the OHV area. In particular, the OHV area would provide BLM with a forum for educating the OHV community regarding proper riding ethics and regulations.

Seasonal wildlife stipulations could decrease OHV use, particularly over-the-snow vehicles, because of a loss of opportunities in these areas during closure periods.

Summary

Short-term impacts would not be likely to limit OHV use. Resource development in the long term would increase traffic on roads and vehicle routes and potential use conflicts. Long-term impacts to OHV use would likely occur in sensitive resource areas as a result of road closures and restrictions.

Development of resources would impact OHV use in localized areas by altering travel patterns. Roads constructed for minerals development create conflicts between commercial vehicles and OHV users. These roads would open new areas to OHV use; however, the improved roads associated with development and the related impacts on the scenery from oil and gas facilities, equipment, vehicles, and personnel would not provide the experience OHV users usually seek.

4.9.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts to OHV management from forest management, lands and realty management, minerals management, OHV management, and recreation would be the same as those identified in Alternative 1.

Designation of the 480-acre OHV area located at Hogback Lake as a SRMA would have positive, long-term impacts on OHV management by providing OHV users with a designated open OHV use area. Creation of this SRMA would help to protect surrounding areas and other resources from new disturbance by concentrating OHV use within the SRMA. The SRMA would provide a forum for educating the OHV community regarding proper riding ethics and regulations.

Summary

Short-term impacts would be unlikely to limit OHV use. Accelerated resource development in the long-term would increase traffic on roads and vehicle routes and potential use conflicts. Long-term impacts to OHV use would likely occur in sensitive resource areas as a result of road closures and restrictions.

Accelerated development of resources would impact OHV use in localized areas by further altering travel patterns and access to OHV areas. Roads constructed for minerals development would create conflicts between OHV users and the commercial vehicles for which they were intended.

4.9.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts resulting from forest management and minerals management would be similar to those identified in Alternative 1. An emphasis placed on the protection of forest resources would limit vehicular traffic associated with timber harvest activities and reduce conflicts between OHV use and other vehicles.

Impacts resulting from OHV management would be similar to those identified in Alternative 1. However, OHV use to retrieve big game kills and to access camping sites would be limited to designated or existing roads and vehicle routes, which would reduce proliferation of new two-tracks.

The Dune Ponds Cooperative Management Area would be closed to OHV use, which would eliminate the only off-road open play area in the RMPPA. This would cause some OHV users to travel to open areas outside the RMPPA.

Under this alternative, road densities would not be allowed to exceed levels that diminish or adversely affect other resources or resource values. This action could impact OHV use by closing areas to OHV use to rehabilitate roads and vehicle routes that exceed these levels.

The following SMA management actions would impact OHV management:

- Adobe Town WSA would be closed to OHV use (about 34,230 acres). These roads provide very little access to the WSA, so their closure would not seriously impact OHV use of the area, which primarily involves the use of boundary roads. Boundary roads would remain open.
- The Prospect Mountain (1,150 acres), Encampment River Canyon (4,470 acres), and Bennett Mountains (5,950 acres) WSAs would be closed to all types of motorized vehicle use. This would impact OHV use because of reduced opportunities in these areas. None of the routes extends more than three-quarters of a mile into the WSA, and thus does not provide a substantial OHV experience. Closure of these three WSAs would collectively be a reduction of approximately 4 miles of vehicle routes.
- Land tenure adjustments associated with actions specific to each SMA, including acquisition of lands, easements, or exchange, would impact OHV use by providing improved access where federal land is acquired. Access would be lost to disposed federal land, limiting OHV use in these areas.
- Vehicles used for authorized activities would be prohibited from driving off existing roads for necessary tasks in some SMAs.

- Big game seasonal closures to motor vehicle use would be implemented in the Sand Hills ACEC and proposed JO expansion (12,700 acres), which would cause a minimal impact on OHV use from a loss of opportunity in this area.
- The Sand Hills ACEC and proposed JO expansion (12,700 acres) and the Jep Canyon ACEC/wildlife habitat management area (13,810 acres on BLM-administered land) would be closed to over-the-snow vehicles, which would protect sensitive wildlife resources in the area; however, this would impact OHV use because of reduced opportunities for recreational winter OHV use in this area.
- Closures of specific roads and vehicle routes within the Upper Muddy Creek Watershed/Grizzly potential ACEC (70,780 acres) and White-Tailed Prairie Dog potential ACEC (undeterminable acreage located within eight specific complexes) would reduce the number of roads and vehicle routes available for OHV use in this area.
- Seasonal closures to motor vehicles would be implemented as needed in the Upper Muddy Creek Watershed/Grizzly potential ACEC, which would cause temporary impacts to OHV use from a loss of opportunities during seasonal closures.
- The creation of the Rawlins OHV SRMA would have the same impacts as those identified under Alternative 2, except OHV use would be limited to designated roads and vehicle routes. There would be no open off-road OHV areas in the RMPPA. The "limited to designated" classification would enhance public safety and prevent resource degradation within the OHV area. This action would reduce the opportunity for an open OHV experience within the SRMA and throughout the RMPPA.

OHV and over-the-snow vehicle use would be closed in specific big game crucial winter range, as they are identified, thereby reducing winter OHV opportunities.

Summary

This alternative provides the greatest protection to resources that enhance the recreational OHV experience. However, because of these protections, many areas restrict or preclude OHV use, thus reducing OHV opportunities in the RMPPA. Based on the anticipated amount of roads and vehicle routes that would remain available to OHV use within the RMPPA, these impacts would be minor.

Impacts would occur to OHV users seeking open, unconfined OHV opportunities under this alternative because of the closure of the Dune Ponds Cooperative Management Area to OHV use. The Rawlins OHV area would be limited to designated roads and vehicle routes; therefore, there would be no open off-road play area in the RMPPA.

4.9.5 Impacts Under Alternative 4: Preferred Alternative

Impacts to OHV management from forest management, lands and realty management, minerals management, and wildlife and fish management would be the same as those identified in Alternative 1.

Impacts resulting from OHV management would be similar to those identified in Alternative 1, except that OHV use to retrieve big game kills and access camping sites would be allowed only within 300 feet of designated or existing roads and vehicle routes, which would reduce proliferation of new two-tracks, while still providing for limited game retrieval and camping opportunities.

The following SMA management actions would impact OHV management:

- The Prospect Mountain (1,150 acres), Encampment River Canyon (4,470 acres), and Bennett Mountains (5,960 acres) WSAs would be closed to all types of motorized vehicle use. Under this alternative, closure of these three WSAs would cumulatively be a reduction of approximately 4 miles of vehicle routes. This would result in a negligible reduction in OHV opportunities.
- Land tenure adjustments associated with actions specific to each SMA, including acquisition of lands, easements, or exchange, would impact OHV use by providing improved access where federal land is acquired.
- Big game seasonal closures to motor vehicle use would be implemented in the Sand Hills ACEC and Proposed JO Ranch Expansion (12,700 acres), which would cause minimal, short-term impacts to OHV use from a loss of opportunity in this area.
- The Sand Hills ACEC and proposed JO expansion (12,700 acres) and the Jep Canyon ACEC/wildlife habitat management area (13,810 acres on BLM-administered land) would be closed to over-the-snow vehicles, to protect sensitive wildlife resources in the area. This would impact OHV use because of reduced opportunities for winter OHV use in this area.
- Vehicles used for authorized activities would be prohibited from driving off existing roads for necessary tasks in some SMAs.
- Closures of specific roads and vehicle routes within the Upper Muddy Creek wildlife hhabitat management area (70,780 acres) would reduce the number of roads and vehicle routes available for OHV use, which would cause minimal, short-term impacts to OHV use from a loss of opportunity in this area.
- OHV and over-the-snow vehicle use would be closed in specific big game crucial winter range, as they are identified, reducing winter OHV opportunities.

Summary

Short-term restrictions would have minimal impact on OHV management. Resource development in the long term would increase traffic on roads and vehicle routes and potential use conflicts. To preserve some important resource values, OHV use would be limited or precluded in some areas. However, based on the anticipated amount of roads and vehicle routes that would remain available to OHV use within the RMPPA, these impacts would be minor.

4.10 PALEONTOLOGY

This section presents potential impacts to paleontological resources and their management from management actions of other resource programs. Existing conditions regarding paleontology are described in Section 3.10.

Significance Criteria

Impacts to paleontological resources would be considered significant if the following were to occur:

- An action or development causes substantial direct or indirect damage or destruction to important paleontological resources.

Methods of Analysis

The analysis of environmental impacts is based on interdisciplinary team knowledge of resources and the project area, review of existing literature, spatial analysis using ESRI's ArcGIS Desktop 8.x computer software, and information provided by other agencies and institutions. Effects are quantified where possible. In cases where quantitative data is not readily available, best professional judgment is used to describe impacts. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate. The analysis is based on the following assumptions:

- Significant fossils may be expected throughout the Cretaceous and Tertiary units exposed in the RMPPA.
- Inventories required prior to surface disturbance in high-probability areas would result in the identification and evaluation of previously undiscovered resources, which BLM would then manage accordingly.
- Surface disturbing and other disruptive activities could dislocate or damage paleontological resources that were not discovered prior to surface disturbance (i.e., unanticipated discoveries). Destruction of these resources would result in a loss of scientific information and preclude interpretation of the resource values to the public.

4.10.1 Impacts Common to All Alternatives

Cultural resource management actions would protect paleontological resources from impacts related to surface disturbing and other disruptive activities. Restricting surface disturbing and other disruptive activities within one-quarter of a mile of cultural properties (if the setting contributes to NRHP eligibility) would lessen the potential for such activities to dislocate or damage paleontological resources that were not discovered prior to surface disturbance.

Surface disturbing and other disruptive activities associated with wildland fire suppression (e.g., construction of fire lines, bulldozing access roads, and general movement of heavy equipment), post-fire rehabilitation, forest management (e.g., forest health enhancement measures, harvesting of minor wood products, and commercial timber harvest), lands and realty management (e.g., roads, pipelines, power lines), minerals management (e.g., well pads, roads, pipelines), and transportation and access management have the potential to damage or dislocate paleontological resources that were not discovered prior to surface disturbance. Destruction of these resources would result in a loss of scientific information and preclude interpretation of the resource values to the public. However, surface disturbance could also result in discoveries of previously unknown paleontological resources. The standard assessment and recordation procedures conducted prior to surface disturbing activities would serve to reduce the potential for adverse impacts and increase the database of known paleontological resources. Activities associated with lands and realty management would disturb approximately 5,790 acres (excluding minerals development) over the planning period.

Range improvements would increase erosion during construction and from livestock concentrations around water developments and trailing along fence lines, which in specific locations could negatively impact paleontological resources. Range improvements would be designed with full consideration of paleontological resources, thus impacts would be minimized to acceptable levels.

OHV use on improved roads would have negligible effects on paleontological resources. However, the majority of unimproved two-track roads and vehicle routes within the RMPPA have not been inventoried for paleontological resources, increasing the potential for unmitigated impacts. Frequent use of these

roads and vehicle routes would potentially damage paleontological resources that become exposed. The proliferation of unauthorized trails would decrease vegetative cover and increase erosion, leading to potential exposure, deterioration, and/or destruction of paleontological resources.

Paleontological resource management would emphasize protection of important scientific values. Paleontological resources would continue to be identified and studied through the promotion and facilitation of research by qualified individuals. Vertebrate fossils collection would be allowed via the Paleontological Resources Use Permit, ensuring the protection of fossil resources and any information gathered during the recovery process.

Protections afforded to SMAs (i.e., restrictions on surface disturbing or other disruptive activities) would protect paleontological resources located in these areas. ROW exclusion requirements and NSO stipulations would provide the greatest level of protection by prohibiting surface disturbing and other disruptive activities. However, restrictions on surface disturbing and other disruptive activities could also result in fewer identified, documented, and recorded paleontological resources because fewer paleontological resource assessments would be required. SRMA management that encourages recreation and development of facilities would impact paleontological resources directly through ground-disturbing activities and indirectly through the larger presence of human activity and corresponding potential increases in incidental or purposeful disturbance of paleontological resources. Direct impacts from BLM permitted surface disturbing and other disruptive actions would be mitigated by resource inventories, evaluations, avoidance, and data recovery procedures.

Restrictions on surface disturbing and other disruptive activities in VRM Class I areas (i.e., prohibition of surface disturbance) and Class II areas (i.e., retaining existing character of landscape) would protect paleontological resources in these areas by reducing the potential for damage to undocumented resources. However, restrictions on surface disturbing and other disruptive activities could also result in fewer identified, documented, and recorded paleontological resources because fewer paleontological resource assessments would be required.

Restrictions on surface disturbing and other disruptive activities in big game, waterfowl, amphibian, and federally listed species habitat would protect paleontological resources in these areas by reducing the potential for damage to undocumented resources.

4.10.2 Impacts Under Alternative 1: Continuation of Existing Management

Pursuing land acquisitions to preserve cultural resources would increase the amount of land under federal jurisdiction, which would provide protection, under federal management policies, to paleontological resources located in these areas.

Approximately 61,000 acres would be considered for disposal under the lands and realty management program. Land disposal would place undiscovered paleontological resources outside of federal jurisdiction and thereby eliminate protection under federal management policies. Inventories and evaluations for paleontological resources are required before land disposal, which would ensure adequate data recovery and documentation of paleontological resources discovered during inventories. BLM may retain lands containing scientifically significant paleontological resources, providing protection under federal management policies. However, the potential exists to dispose of lands containing paleontological resources that were not discovered during inventories.

Withdrawals would be pursued on approximately 14,450 acres, which would result in closure of these areas to locatable mineral entry and future disposal actions. This would provide additional protection to paleontological resources located in these areas by reducing surface disturbing and other disruptive

activities and eliminating the possibility of placing undiscovered paleontological resources outside of federal jurisdiction. Requiring that construction of new facilities and routes avoid areas with important resource values would also serve to lessen the impacts from surface disturbance.

Construction of livestock range improvements would impact approximately 900 acres over the 20-year planning period, which could damage or dislocate paleontological resources in these areas that were not discovered prior to surface disturbance. Designing livestock grazing systems to improve or maintain desired range conditions would maintain vegetative cover and soil stability and thereby prevent exposure and deterioration of paleontological resources.

It is anticipated that 8,945 oil and gas wells would be drilled over the 20-year planning period, disturbing approximately 61,900 acres of land (including all related facilities and pipelines). This would result in surface disturbance and potential damage to paleontological resources that were not discovered prior to surface disturbance. Destruction of these resources would result in a loss of scientific information and preclude interpretation of the resource values to the public. The standard assessment and recordation procedures conducted prior to surface disturbing and other disruptive activities would serve to reduce the potential for adverse impacts and increase the database of known paleontological resources.

Although impacts to paleontological resources could occur from recreation activities, certain recreation areas would be managed to limit surface disturbance. Implementing an NSO stipulation for oil and gas development activities in developed and undeveloped recreation sites (9,660 acres) and intensively managing such activity within one-quarter of a mile of these sites (7,930 acres) would limit surface disturbance and thereby help prevent damage to paleontological resources located in these areas. Closing developed recreation sites (2,680 acres) to locatable mineral entries and mineral material disposals would provide further protection from surface disturbing and other disruptive activities. In addition, surface disturbing and other disruptive activities would be intensively managed in the west end of the Ferris Mountains and the Adobe Town fringe areas, which would reduce the potential for dislocation and damage of paleontological resources in these areas.

Surface use restrictions associated with the White-Tailed Prairie Dog area would indirectly protect paleontological resources located in these areas by reducing the potential for unanticipated discoveries and subsequent loss of scientific information. Intensive management would potentially restrict the amount and size of surface disturbance, decreasing the potential for damage to paleontological resources in these areas.

The area within one-quarter of a mile, or the visual horizon, of the Cherokee and Overland trails would be an avoidance area for surface disturbing activities. In most cases, proposed facilities would be relocated outside of the avoidance area. If the location cannot be avoided, mitigation requirements would be required to reduce the potential for impacts to paleontological resources.

Transportation and access management would impact paleontological resources by pursuing new access areas (Table 2-8) and consolidating public lands to increase recreational opportunities in these new areas. This would increase the potential for unauthorized collection of paleontological data; however, such impacts would be minimal. Facilitating use of these areas would also result in increased surface disturbing recreational activity and loss of vegetative cover, which would increase the potential for exposure and deterioration of paleontological resources.

Under Alternative 1, approximately 359,610 acres would be designated as VRM Class II, which could provide additional protection to paleontological resources located in these areas. Surface disturbing and other disruptive activities may be restricted in these areas because only a low level of change to the

characteristic landscape is allowed in VRM Class II areas. Therefore, some development activities may not occur, thereby reducing the potential for damage to paleontological resources.

Requiring that surface disturbing activities avoid identified 100-year flood plains; areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas; and areas within 100 feet of the inner gorge of ephemeral channels would provide additional protection to paleontological resources. This would reduce the potential for surface disturbing activities to dislocate or damage undocumented resources.

Avoidance or intensive management of surface disturbing and other disruptive activities in sensitive wildlife habitats would provide additional protection to paleontological resources located in these areas by reducing the potential for such activities to dislocate or damage undocumented resources. Paleontological resources would be completely protected in active raptor nests areas (19,230 acres) where surface disturbing and other disruptive activities are prohibited.

Summary

An anticipated 69,489 acres would be disturbed as a result of lands and realty management, livestock management, and minerals management activities. This disturbance would potentially result in dislocation, damage, or destruction of paleontological resources that were not discovered prior to surface disturbance (i.e., unanticipated discoveries).

As a result of VRM Class I areas, SMAs, and NSO stipulations, 79,560 acres would be protected from surface disturbing and other disruptive activities. These management actions would provide the greatest indirect protection to paleontological resources by eliminating the potential for surface disturbing and other disruptive activities in these areas. In addition, actions associated with water quality, watershed, and soils management, and wildlife and fisheries management would also provide indirect protection to paleontological resources through avoidance and intensive mitigation of surface disturbing and other disruptive activities.

4.10.3 Impacts Under Alternative 2: Emphasis on Development of Resources

The impacts to paleontological resources from recreation management; transportation and access management; and water quality, watershed, and soils management would be the same as those identified in Alternative 1.

Impacts to paleontological resources from cultural resource management would be similar to those identified in Alternative 1. However, land acquisitions to preserve and protect select cultural properties would not be as actively pursued, increasing the potential for damage to paleontological resources located on lands that would have been acquired under Alternative 1.

Impacts to paleontological resources from lands and realty management would be similar to those identified in Alternative 1, except an additional 730 acres would be pursued for withdrawal. This would result in closure of these areas to locatable mineral entry and future disposal actions, thereby providing additional protection to paleontological resources located in these areas by reducing surface disturbing and other disruptive activities and eliminating the possibility of placing undiscovered paleontological resources outside of federal jurisdiction. Furthermore, an additional 14,780 acres would be precluded from disposal actions. This would further reduce the amount of land that could be removed from federal jurisdiction and therefore the number of paleontological resources that could be exempt from federal management policies.

It is anticipated that 1,140 acres would be disturbed through construction of livestock range improvements. Although the increase in surface disturbance is minimal (240 acres) compared to Alternative 1, it would slightly increase the potential for damage to undocumented resources.

Impacts to paleontological resources from oil and gas management would be similar to those impacts identified in Alternative 1, except that more acreage would be open to oil and gas leasing with fewer restrictions from other programs. Areas closed to leasing or otherwise restricted from development, surface disturbing and other disruptive activities, or surface occupancy would be reduced. Overall, approximately 9,198 wells would be drilled over the next 20 years disturbing approximately 63,650 acres (including all related facilities and pipelines). The increase in disturbed acres would slightly increase the potential for inadvertent damage to previously unknown resources, as well as the potential for identification of paleontological resources.

Under Alternative 2, approximately 125,660 fewer acres would be designated as VRM Class II than under Alternative 1. This could result in increased surface disturbing and other disruptive activities on these lands, which would in turn increase the potential for damage to paleontological resources, as well as the potential for identification of undocumented resources.

Impacts to paleontological resources from wildlife and fisheries management would be similar to those identified in Alternative 1, except that restrictions on surface disturbing and other disruptive activities would be reduced in sensitive wildlife habitat areas. As a result, increased surface disturbance would occur over a larger area, thereby increasing the potential for damage to paleontological resources.

Summary

Under Alternative 2, impacts to paleontological resources would be similar to those impacts identified in Alternative 1. However, a slightly greater number of acres would be disturbed, potentially impacting an increased number of paleontological resources. It is anticipated that 98,793 acres would be disturbed as a result of lands and realty management, livestock management, and minerals management activities. This disturbance would potentially result in dislocation, damage, or destruction of paleontological resources that were not discovered prior to surface disturbance.

Approximately 77,270 acres would be protected from surface disturbing and other disruptive activities as a result of VRM Class I areas, SMAs, and NSO stipulations. These management actions would provide the greatest indirect protection to paleontological resources by eliminating the potential for surface disturbing activities in these areas. In addition, there would be less indirect protection to paleontological resources because of the reduction of restrictions included in management actions for other resource programs.

4.10.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

The impacts to paleontological resources from transportation and access management would be the same as those identified in Alternative 1.

Impacts to paleontological resources from cultural resource management would be similar to those identified in Alternative 1. However, prohibiting surface disturbing and other disruptive activities within one-quarter of a mile of historic properties where the setting contributes to the NRHP eligibility would indirectly protect all of the paleontological resources within those areas. This would ensure the preservation of the scientific information associated with those resources.

Impacts to paleontological resources from lands and realty management would decrease, as compared to Alternative 1. Under Alternative 3, no lands would be available for disposal and approximately 272,350 acres would be withdrawn from mineral location. Retaining all lands under federal jurisdiction would maintain protections associated with federal management policies. The withdrawal of 272,350 acres would result in closure of these areas to locatable mineral development and future disposal actions. This would provide additional protection to paleontological resources located in these areas by reducing surface disturbing and other disruptive activities and eliminating the possibility of placing undiscovered cultural resources outside of federal jurisdiction.

Impacts to paleontological resources from livestock grazing management would decrease, as compared to Alternative 1. The emphasis on small-scale as opposed to large-scale water developments would result in the disturbance of 480 fewer acres over the 20-year planning period. The decrease in disturbed acres would decrease the potential for inadvertent damage to previously unknown resources, as well as the potential for identification of paleontological resources.

Impacts to paleontological resources from oil and gas development on would be similar to those identified in Alternative 1, except that less acreage would be open to oil and gas leasing with greater constraints from other programs. Areas closed to leasing or otherwise restricted from development, surface disturbing activities, or surface occupancy would be increased. Paleontological resources occurring in these areas would therefore be subjected to fewer impacts. Overall, approximately 8,632 wells would be drilled over the next 20 years, disturbing approximately 56,500 acres (including all related facilities and pipelines). The decrease in disturbed acres would decrease the potential for inadvertent damage to previously unknown resources, as well as the potential for identification of paleontological resources.

Impacts to paleontological resources from recreation management would be similar to Alternative 1, except developed and undeveloped recreation sites (9,660 acres) and the surrounding ½-mile area (15,800 acres) would be subject to NSO stipulations. In addition, the Adobe Town fringe area (31,510 acres) would be closed to new oil and gas leasing, and surface disturbing and other disruptive activities on existing leases would be intensively managed to preserve naturalness in the area. These actions would serve to reduce the potential for damage to paleontological resources in these areas by limiting the level of surface disturbing and other disruptive activities.

Impacts to paleontological resources from SMAs would be similar to those identified in Alternative 1, except management of surface disturbance within SMAs would be more restrictive. Surface disturbance associated with new oil and gas leases would be prohibited in the Como Bluff ACEC (1,690 acres). Surface disturbing and other disruptive activities would be prohibited within 164 feet of white-tail prairie dog towns within the White-Tail Prairie Dog ACEC. These actions would increase protection of paleontological resources by reducing the level of surface disturbance that would be allowed within these areas.

The Historic Trails ACEC would be expanded to include the Rawlins to Baggs and Rawlins to Fort Washakie Freight Roads, increasing the ACEC acreage by about 25,000 acres. Surface disturbing and other disruptive activities would be prohibited within the ACEC, which would reduce the potential for damage to paleontological resources located in these areas.

Impacts to paleontological resources from VRM management would be similar to Alternative 1, except an additional 582,200 acres would be designated as VRM Class II. This could result in decreased surface disturbing and other disruptive activities on these lands, which would in turn decrease the potential for damage to paleontological resources, as well as the potential for identification of undocumented resources.

Impacts to paleontological resources from water quality, watershed, and soils management would be similar to those impacts identified in Alternative 1, except surface disturbing activities would be prohibited in identified 100-year flood plains; areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas; and areas within 100 feet of the inner gorge of ephemeral channels. This would eliminate the potential for damage to paleontological resources in these areas from surface disturbing activities, as well as the potential for identification of undocumented resources.

Impacts to paleontological resources from wildlife and fisheries management would be similar to those identified in Alternative 1, except that restrictions on surface disturbances would increase in sensitive wildlife habitat areas. The amount of area with surface disturbance prohibitions would increase to include active raptor nest areas, big game parturition areas, and Greater and sharp-tailed sage-grouse leks (plus a ¼-mile buffer); and a greater number of areas would be avoidance areas for surface disturbing and other disruptive activities under this alternative. This would eliminate or reduce (depending on restrictions) the potential for damage to paleontological resources from surface disturbing and other disruptive activities, as well as the potential for identification of undocumented resources.

Summary

Impacts to paleontological resources would be similar to those impacts identified in Alternative 1. However, fewer acres would be disturbed, potentially impacting fewer paleontological resources. It is anticipated that 92,719 acres would be disturbed as a result of lands and realty management, livestock management, and minerals management activities. This disturbance would potentially result in dislocation, damage, or destruction of paleontological resources that were not discovered prior to surface disturbance.

As a result of VRM Class I areas, SMAs, and NSO stipulations, 425,280 acres would be protected from surface disturbing and other disruptive activities. These management actions would provide the greatest indirect protection to paleontological resources by eliminating the potential for surface disturbing and other disruptive activities in these areas. In addition, there would be more indirect protection to paleontological resources from the increase of restrictions included in management actions for other resource programs.

4.10.5 Impacts Under Alternative 4: Preferred Alternative

Impacts to paleontological resources from cultural resource management would be the same as those identified in Alternative 3.

Impacts to paleontological resources from fire and fuels management; livestock grazing management; transportation and access management; and water quality, watershed, and soils management would be the same as those identified in Alternative 1.

Impacts to paleontological resources from lands and realty management would be similar to those identified in Alternative 1, except an additional 6,790 acres would be pursued for withdrawal. This would result in closure of these areas to locatable mineral entry and future disposal actions, thereby providing additional protection to paleontological resources located in these areas by reducing surface disturbing and other disruptive activities and eliminating the possibility of placing undiscovered paleontological resources outside of federal jurisdiction. Furthermore, an additional 14,780 acres would be precluded from disposal actions. This would further reduce the amount of land that could be removed from federal jurisdiction and therefore the number of paleontological resources that could be exempt from federal management policies.

Impacts to paleontological resources from oil and gas development would be similar to those identified in Alternative 1, except that less acreage would be open to oil and gas leasing with greater constraints from other programs. Areas closed to leasing or otherwise restricted from development, surface disturbing and other disruptive activities, or surface occupancy would be increased. Paleontological resources occurring in these areas would therefore be subjected to fewer impacts. Overall, approximately 8,822 wells would be drilled over the next 20 years, disturbing approximately 57,820 acres (including all related facilities and pipelines). The decrease in disturbed acres would decrease the potential for inadvertent damage to previously unknown resources, as well as the potential for identification of paleontological resources.

Impacts to paleontological resources from recreation management would be similar to those identified in Alternative 1, except developed and undeveloped recreation sites (9,660 acres) and the surrounding ¼-mile area (7,930 acres) would be subject to NSO stipulations. Surface disturbing and other disruptive activities within the Adobe Town fringe areas (31,510 acres) would also be intensively managed. These actions would reduce the potential for damage to paleontological resources in these areas by limiting the level of surface disturbing and other disruptive activities.

Impacts to paleontological resources from management of SMAs would be similar to those identified in Alternative 1, except surface disturbing activities would be prohibited within one-quarter of a mile, or the visual horizon, of the Cherokee and Overland trails. These actions would increase protection to paleontological resources by reducing the level of surface disturbance that would be allowed within these areas.

Impacts to paleontological resources from VRM management would be similar to Alternative 1, except an additional 230,810 acres would be designated as VRM Class II. This could result in decreased surface disturbing and other disruptive activities on these lands, which would in turn decrease the potential for damage to paleontological resources, as well as the potential for identification of undocumented resources.

Impacts to paleontological resources from wildlife and fisheries management would be similar to those identified in Alternative 1, except that restrictions on surface disturbances would increase in sensitive wildlife habitat areas. The amount of area with surface disturbance prohibitions would increase to include active raptor nest areas and Greater and sharp-tailed sage-grouse leks (plus a ¼-mile buffer); and a greater number of areas would be avoidance areas for surface disturbing and other disruptive activities under this alternative. This would eliminate or reduce (depending on restrictions) the potential for damage to paleontological resources in these areas from surface disturbing and other disruptive activities, as well as the potential for identification of undocumented resources.

Summary

Impacts to paleontological resources would be similar to those impacts identified in Alternative 1. However, fewer acres would be disturbed, potentially impacting fewer paleontological resources. It is anticipated that 87,583 acres would be disturbed as a result of lands and realty management, and minerals management activities. This disturbance would potentially result in dislocation, damage, or destruction of paleontological resources that were not discovered prior to surface disturbance.

As a result of VRM Class I areas, SMAs, and NSO stipulations, 225,830 acres would be protected from surface disturbing and other disruptive activities. These management actions would provide the greatest indirect protection to paleontological resources by eliminating the potential for surface disturbing and other disruptive activities in these areas. In addition, there would be more indirect protection to paleontological resources from the increase of restrictions included in management actions for other resource programs.

4.11 Recreation Resources

This section presents potential impacts to recreation resources from other management actions. Recreational uses or public lands administered by BLM within the RMPPA include hunting, fishing, floating, camping, hiking, rock climbing, horseback riding, OHV use, rock hounding, photography, wildlife viewing, and antler gathering. Existing conditions concerning recreation resources are described in Section 3.11.

OHV management is discussed in Section 4.9 of this document; however, based on the level of recreational OHV use in the RMPPA, some references to OHV use have been included in this section. For specific impacts to OHV use, refer to Section 4.9.

Significance Criteria

Impacts to recreation would be considered significant if any of the following were to occur:

- Management actions result in long-term elimination or reduction of recreation use in any area or compromise public health and safety.
- Intensity of development is incompatible with the stated objectives of SRMAs.
- Increases in recreational activity create substantial risks to public health and safety or resource damage.

Methods of Analysis

Impact analysis and conclusions are based on interdisciplinary team knowledge of resources and the planning area and review of existing literature. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate.

The analysis is based on the following assumptions:

- Traditional recreational uses within the RMPPA will continue, and an anticipated increase will occur in fishing, floating, camping, OHV use, and new technology-based recreation activities. Based on Wyoming Game and Fish data, hunting is expected to gradually decrease.
- The incidence of resource damage and conflicts between recreationists involved in motorized and nonmotorized activities will increase with increasing use of public lands.
- Proliferation of unauthorized trails and the associated resource degradation will continue to occur beyond the capacity of BLM RFO to prevent the problem.
- Restrictions apply to permitted activities, but not necessarily to casual use.
- In some areas where resources have been damaged by recreational activities, sites would be closed and reclaimed.
- RFDs and RFAs can be found in Appendix 33.

4.11.1 Impacts Common to All Alternatives

Management actions for cultural resources would restrict or preclude the development of recreational facilities and opportunities in localized areas. Management actions involving interpretive programs, signage, markers, and other elements for historic trails, other historic sites, and important prehistoric sites would enhance recreational experiences and increase public awareness.

Temporary closures during wildland fire incidents would prevent recreational use, which would cause short-term impacts to recreational opportunities in these areas. Generally, areas where wildland fires have occurred would temporarily be undesirable places to recreate, until they were revegetated. These impacts would be minor.

Windpower development in the RMPPA would impact the recreational experience for some people by creating new visual impairments on the horizon. Access within these developments may limit recreational opportunities because of mixed land ownership patterns or road closures for public safety.

Land consolidation is important to improving access in the checkerboard, intermingled lands, and the North Platte River. Increased access to the North Platte River would expand the recreational opportunities within the RMPPA and enhance a visitor's perception of solitude by further dispersing river users. Land exchange would facilitate increased public access to other desired recreation resources.

Livestock management actions would include the implementation of the Wyoming Standards for Healthy Rangelands (BLM 1997), this requires meeting standards for vegetation health, wildlife habitat, and riparian habitat, which would reduce impacts to recreation by maintaining hunting, fishing, and wildlife viewing opportunities. Fencing associated with livestock grazing may alter recreational access and use patterns. Installation of adequate signing and gating would help prevent conflicts and trespass. Water development projects for livestock would provide sources of nonpotable water in areas where no other water would be available along recreational trails. Livestock grazing and range improvement projects would change recreational experiences for some individuals.

The network of roads, well pads, and other facilities, in combination with heavy equipment and truck traffic associated with minerals management activities, has an impact on recreation uses. The associated displacement of some wildlife species and degradation of scenic quality make these areas less desirable for recreation activities. Common variety and locatable mineral development and the associated surface disturbance impacts on recreation would generally be localized and short term.

OHV use enhances recreational opportunities by facilitating access to recreation areas inaccessible to ordinary street vehicles. Some direct, short-term effects from OHV-produced noise and decreased air quality would diminish the recreational experience for other recreationists who seek solitude and natural settings for camping, hiking, and related recreational activities.

Constructing a 480-acre designated play area for OHV use at Hogback Lake, near Rawlins, would provide OHV enthusiasts a fenced area for skill development without conflicts with recreationalists involved in nonmotorized activities. Concentrating OHV use to the fenced area would help reduce the proliferation of new illegal routes in the Washakie Basin and provide BLM with a forum to educate the public on rider ethics and regulations.

Congestion in recreation areas and conflicts between various recreationists, such as motorized and nonmotorized, would affect the quality of the recreational experience.

Special Recreation Permits (SRP) are required for commercial uses, competitive events, organized groups, and some special area uses, per 43 CFR 2930. The RFO administers approximately 55 SRPs. Of these, approximately 75 percent are for outfitting hunting, 20 percent are for floating/fishing, and 5 percent are for other recreational activities such as wild horse viewing and horseback riding. The majority of these outfitters provide day use service only. If unacceptable adverse impacts were to occur from outfitter uses, or from a substantial increase in issued permits, BLM would reduce the number of permits issued, reducing the opportunity for guided recreation opportunities.

Special protections and enhancements in SMAs may increase visitation, particularly if their attributes are publicized. WSAs serve as an attractive location for recreation users seeking primitive recreational opportunities, as do certain wildlife-related SMAs that would benefit hunting, fishing, and wildlife viewing opportunities. SRMAs are designated to protect certain unique characteristics for the purpose of recreation, thus providing a significant benefit to recreationists.

The improvement of the transportation network for the RMPPA would facilitate access to recreational areas. Recreational activities would be impacted by both road closures and the development of roads associated with mineral development and other resource uses.

Source water and wellhead protection areas would restrict the location or development of future recreational facilities. Management actions associated with protecting water quality, watershed, and soils susceptible to erosion could also dictate the design and use of recreational facilities and the types of recreational activities allowed in some areas, which could impact recreation opportunities and experiences in certain areas.

Protecting water sources for campground facilities would enhance recreational opportunities by providing safe drinking water. Water and watershed activities indirectly protect existing flow conditions that affect floaters and fishermen. Protecting water quality and fish habitat conditions would protect or improve game fisheries, thereby improving fishing opportunities. Some water development projects, such as reservoirs, may add new opportunities for fishing or camping.

Protection of sensitive soils could restrict or exclude recreational activities such as camping, OHV use, and horseback riding, reducing recreation opportunities in these areas.

4.11.2 Impacts Under Alternative 1: Continuation of Existing Management

Timber harvesting (approximately 25,900 acres would be available for commercial timber harvest) would displace recreationists, causing long-term impacts from a loss of recreational opportunities in forested areas. Timber harvesting would potentially improve habitat conditions for some desirable game species of interest to recreationists, which would impact hunting and wildlife viewing opportunities in these areas.

Access acquisitions and land tenure adjustments through exchange would facilitate greater access to recreational areas and reduce conflicts between recreationists and landowners within the RMPPA. This action, combined with the continued protection of existing recreation resources by the establishment of ROW avoidance areas and exclusion areas, could result in an increase in available recreational opportunities.

Livestock management actions would impact recreation by creating new and maintaining existing roads and vehicle routes, which would increase easily accessible areas. New fences would have appropriate gates installed unless a specific area's recreation management would benefit from a road or trail closure, for the protection of resource values and/or public safety concerns. Conversions from cattle or sheep to

domestic bison would occur in areas, which potentially would cause risk to recreationists from bison in block federal ownership.

The minerals management program would alter the recreational setting by creating increases in site-specific noise levels, artificial illumination from night drilling operations, traffic volume, and road density. Alteration of wildlife habitats would potentially reduce wildlife viewing and hunting opportunities.

Increased road densities and route proliferation would impact recreation by degrading the recreation experience for those desiring natural settings, such as recreationalists involved in nonmotorized activity. Increased road densities result in a greater potential for motorized/nonmotorized conflicts.

Mineral activity and potential surface disturbance occurring in the Adobe town fringe areas (31,510 acres) and the west end of the Ferris Mountains (5,270 acres) would cause long-term impacts from a loss of opportunity for recreationists seeking a primitive and unconfined recreation experience in these areas.

Allowing motorized access only on designated roads in the Adobe Town WSA would reduce the impacts of motorized travel and route proliferation within the WSA. Existing routes extend no further than three-quarters of a mile into the WSA, so closure would not significantly reduce access to the interior.

The Jep Canyon ACEC/Jep Canyon wildlife habitat management area and the Shamrock Hills ACEC would be open to locatable mineral entry under CFR 3809, which would affect recreation management by causing impacts to wildlife of recreational value.

Protection of the High Savery Dam and reservoir site, developing part of the site as a recreational fishery, and closing the area to OHV use would enhance and protect fishing opportunities in the area.

The Encampment River WSR designation would protect the river corridor in the event that Congress releases the WSA from wilderness consideration. The WSR designation would preserve the recreational experience along the river corridor.

Short-term impacts from vegetation treatments would cause recreationists to be displaced from denuded areas to other more desirable areas until revegetation occurs. The long-term effects of the vegetative treatments would enhance the recreational experience by improving the aesthetics of an area. Closures during prescribed burns would temporarily prohibit recreational use, but management of vegetative resources through fire and prescribed burns would often improve range conditions and wildlife habitat to the benefit of recreationists, especially for hunters and wildlife observers.

VRM restrictions and considerations on surface disturbing and other disruptive activities protect the viewshed and aesthetic quality of an area, which would benefit recreationists. VRM classes within the RMPPA are depicted in Table 2-9.

The size and health of wild horse herds would directly affect the recreational experience of wild horse viewing. If herds are too large, the overall health of the herd declines, and though viewers may easily find the herds, they would be in poor condition. If the herds were too small, they would be in excellent condition, but would be difficult for recreational viewers to find. The proposed management would reduce the potential for either of these impacts.

The protection and improvement of wildlife and fish habitat would directly benefit recreation resources and would potentially increase recreational visitation associated with fishing, hunting, and nonconsumptive wildlife uses.

Summary

Indirect impacts to recreation would occur because of reduction in, or impacts to, wildlife and fisheries habitat, which would reduce recreational opportunities, such as hunting and wildlife viewing in some areas.

Increased road densities and route proliferation would impact recreation by altering the recreation experience for those desiring natural settings, such as recreationists involved in nonmotorized activities. Increased road densities result in a greater potential for motorized/nonmotorized conflicts and increase access in some areas.

4.11.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts on recreation resources from OHV management, recreation management, SMAs, and wild horse management would be the same as those identified in Alternative 1.

Impacts on recreation from timber harvest activities would be similar to those identified in Alternative 1. The design of timber sales to maximize commercial timber harvest could, for the short term, temporarily impair improvement of habitat conditions for some desirable game species of interest to recreationists, which would impact hunting and wildlife viewing opportunities in these areas.

Impacts from lands and realty management action would be similar to those identified in Alternative 1. Utility/transportation systems would be developed outside the areas listed in Table 2-5. Impacts from these developments would create changes in the outdoor recreational experience by altering access patterns and temporarily displacing wildlife-related recreational opportunities. However, with the designation of ROW corridors (Alternative 2), these impacts would be reduced.

Impacts from livestock management would be similar to those identified in Alternative 1.

The minerals management program would have similar impact on recreation management to those of Alternative 1, except impacts to recreation opportunities resulting from oil and gas development activity would be increased.

Acquiring legal access only when opportunities arise, as opposed to being actively pursued, would reduce the potential to expand recreational opportunities in certain areas.

The effects of vegetation management would be greater and occur over more of the area under this alternative than Alternative 1, because of the effect that vegetative treatments have on recreational experiences. Vegetation treatments would be larger and fewer in number, which would enhance commodity production in localized areas. These short-term impacts would cause recreationists to be displaced until revegetation occurs.

VRM Class II acreage would be reduced around Seminoe and Pathfinder Reservoirs and eliminated in the Shirley Mountains and the area of the RMPPA with a checkerboard land ownership pattern. The total reduction in VRM Class II acreage under this alternative would be 125,660 acres. Changing checkerboard land pattern areas to VRM Class III would have minimal effect on recreationists, because they do not have legal public access to these areas and development is uncontrolled on the private sections, which makes visual management impossible. The recreation experience in the other downgraded VRM areas, which do not meet the criteria for VRM Class II, would be affected only if development were to occur.

Under Alternative 2, Class IV acreage would be increased by 224,150 acres, most of which is already visually impacted by development. Therefore, the change in VRM class would not affect the recreational experience.

The wildlife and fish management program would have impacts similar to those of Alternative 1.

Summary

Similar to Alternative 1, indirect impacts to recreation would occur because of reduction in, or impacts on, wildlife and fisheries habitat, which would reduce recreational opportunities, such as hunting and wildlife viewing in some areas.

Also similar to Alternative 1, increased road densities and route proliferation would impact recreation by altering the recreation experience for those desiring natural settings, such as recreationists involved in nonmotorized activities. Increased road densities result in a greater potential for motorized/nonmotorized conflicts and increase access in some areas.

Increased mineral development activities would displace recreationists. Forest and vegetation management activities would displace recreationists in timber harvesting areas.

4.11.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts on recreation resources from vegetation management would be the same as those identified in Alternative 1.

Actions under this alternative would benefit recreationists because of improved forest health. No commercial timber harvesting would be permitted, which could have negative and positive impacts. The increase in the construction of temporary logging roads would not occur, reducing impacts on recreationists seeking more primitive recreation opportunities. Improved forest health would benefit wildlife in forested areas, which would improve hunting and wildlife viewing opportunities.

This alternative would provide the most protection to recreation areas, primarily because withdrawal areas from mineral leasing would include recreation sites (approximately 1,696 acres), historic sites (approximately 79,446 acres) and habitat management areas (approximately 130,086 acres). Withdrawals in these areas would facilitate protection of recreation resources and other resources that are important to recreation, such as historic trails and stage stations that are attractions to recreationists, and wildlife habitat management areas that would improve hunting and wildlife viewing opportunities. Exchange for nonfederal lands in SMAs would be considered to enable land consolidation within these areas. Impacts from designated ROW corridors would be the same as those under Alternative 2.

Impacts resulting from management of livestock grazing would be similar to those under Alternative 1, except grazing systems and range improvements would be implemented to enhance wildlife, watershed, and riparian values. These systems and improvements would have indirect, long-term impacts on recreation through improvement of these natural resources, for instance improving water quality for water-based recreation activities and improving wildlife habitat, which would benefit hunting and wildlife observation. Conversions from livestock to domestic bison would not occur in areas of blocked federal surface land ownership, which reduce the potential risk to recreationists from bison.

This alternative would provide the most protection to recreation from conflicting mineral development activities because restrictions would reduce activity, and a greater amount of area would be subject to

NSO stipulations or closed to mineral leasing. This would have a long-term impact on recreation because these areas would be available to recreational use, and fewer conflicts would occur.

Mineral leases that are issued would include stipulations that would protect visual resources, wildlife areas, historic trails, SRMAs, and other areas that have important recreation values. Recreation resources including wildlife habitat and riparian areas would have long-term protection.

Limitations on dispersed camping and big game retrieval using vehicles would protect the scenic value of some areas but would also limit some camping opportunities and could make big game retrieval more difficult for some hunters. Other resources would be protected from excessive disturbance, road/route/trail proliferation, and human encroachment. This would help reduce the conflicts between motorized and nonmotorized recreationists.

Preservation of the naturalness in the Adobe Town fringe areas (31,510 total acres) and the west end of the Ferris Mountains (5,270 total acres) would provide outstanding opportunities for continued primitive and unconfined recreation.

This alternative would provide the most protection to SMAs. The protections that would be afforded to SMAs would benefit recreation, primarily because a greater amount of area within the SMAs would be subject to surface disturbance restrictions, withdrawals from mineral development, and active pursuits of land tenure adjustments. These actions would have long-term impacts as a result of the reduced probability of user conflicts and enhanced recreational opportunities.

Encampment River Wild and Scenic River designation would protect the river corridor in the event that Congress releases the WSA from wilderness consideration. The WSR designation would preserve the recreational experience along the river corridor.

Areas surrounding the Continental Divide National Scenic Trail would be classified as an area of high importance for pursuing legal access. This would provide greater access to recreational opportunities and would benefit recreationists.

This alternative would provide the most protection for watersheds, riparian areas, and water quality. These actions would provide long-term benefits to recreation, especially water-based recreation activities and improved wildlife habitat, which would benefit hunting, camping, and wildlife viewing.

VRM Class II acreage would be reduced around Seminoe and Pathfinder Reservoirs and eliminated in the Shirley Mountains and the area with checkerboard land ownership patterns. VRM Class II acreage would be increased by 582,200 acres with the historic trail viewshed (for contributing segments) and lands with wilderness characteristics that are adjacent to the Adobe Town fringe areas (31,510 acres) and the west end of the Ferris Mountain (5,270 acres) WSA. The viewshed around the Ferris Mountains (79,700 acres), the JO Ranch area (1,400 acres), and the North Platte River SRMA (12,740 acres) would also be designated as VRM Class II areas. This significant increase in Class II VRM acreage (totaling 941,810 acres) would protect a far greater portion of the RMPPA from visual intrusions, which would enhance the experience for various recreational activities.

VRM Class II areas would be increased by 582,200 acres compared with Alternative 1. The bulk of this increase would be along historic trails and around the Ferris Mountain and Adobe Town WSAs. Although a portion of this new Class II area is in existing minerals development areas, most of it is in relatively undeveloped areas of the RMPPA. VRM Class II designation in leased areas would require that surface disturbance and facilities be intensively mitigated to retain VRM II visual qualities, which would improve the recreational experience.

The wild horse management program would have impacts similar to those under Alternative 1. The size and health of the herd would affect the wild horse viewing experience.

Wildlife management actions would affect recreation management through increased restrictions (e.g., NSO requirements and timing restrictions) on surface disturbing activities in wildlife habitat. As a result, wildlife habitat would be improved under this alternative, thereby improving the overall recreation experience.

Summary

No significant impacts on recreation management would be likely to occur under this alternative. Upgraded VRM classifications would help protect the visual integrity in the long term. Improved forest, fire, minerals, livestock, water quality, and wild horse management would enhance wildlife viewing opportunities in the long term.

Closures to mineral leasing; prohibitions on surface occupancy; and withdrawals at recreation sites, historic sites, and habitat management areas would protect resources important to recreation.

The limitations to designated or existing roads for retrieval of big game kills and camping access would reduce road proliferation, soil disturbance, human encroachment, and motorized/nonmotorized conflicts, all of which would benefit recreation. OHV designations would improve recreation experiences by reducing excessive disturbance and habitat loss.

Preservation of the naturalness in the Adobe Town fringe areas and west Ferris Mountains would prevent degradation of these primitive recreation opportunities.

The increase in the number of SMAs would provide recreationists with more areas that are protected from development and provide benefits through enhanced management of special resources.

Changes in VRM designations would enhance mitigation of impacts on scenic resources in areas converted from VRM Class III to VRM Class II. The overall increase in VRM Class II designations in visually sensitive areas would help preserve the quality of recreational experiences in the RMPPA.

4.11.5 Impacts Under Alternative 4: Preferred Alternative

Impacts on recreation resources from lands and realty, vegetation management, and wild horse management would be the same as those identified under Alternative 1.

Impacts on recreation from forest management would be similar to those identified under Alternative 1, except that 19,200 acres would be available for commercial timber harvest, as opposed to 25,900 acres. This would reduce displacement of forest recreationists and the decrease in recreational opportunities in forested areas.

Impacts from livestock management would be similar to those identified under Alternative 1. Conversions from livestock to domestic bison would not occur in areas of blocked federal surface land ownership, which would remove the potential risk to recreationists from bison.

Impacts resulting from minerals management would be similar to those under Alternative 1, except that stipulations applied to mineral activities by various other resource programs would result in reduced surface disturbing activities that, in turn, would further protect visual resources, wildlife areas, historic trails, SRMAs, and other areas that have important recreation values.

Off-road travel would be restricted to no more than 300 feet from designated or existing roads and vehicle routes for the purpose of game kill retrieval or access to primitive campsites. This would increase the difficulty of game retrieval and access to new potential campsites. Most heavily used campsites already have adequate vehicular access. In addition, reducing off-road travel opportunities and the potential for road/route/trail proliferation would do more to maintain the primitive naturalness appreciated by some recreationists.

Preservation of the naturalness in the west end of the Ferris Mountains (5,270 total acres) would provide outstanding opportunities for continued primitive and unconfined recreation.

Impacts resulting from SMAs would be similar to those under Alternative 1, except that the protections that would be afforded to SMAs would also benefit recreation, primarily because a greater area within the SMAs would be subject to restrictions on surface disturbing activity, increased withdrawals from mineral development, and active pursuits of land tenure adjustments. These actions would have long-term impacts as a result of enhanced recreational opportunities and a reduced probability of user conflicts.

Protections afforded to and improvements proposed for the JO Ranch would benefit recreationists, as would interpretive programs that would be developed for the area.

Actions that would enhance wildlife and fisheries habitat would benefit related recreational activities. Also, protections to the visual setting would serve to maintain the recreational experience.

The Encampment River Wild and Scenic River designation would protect the river corridor in the event that Congress releases the WSA from wilderness consideration. The WSR designation would preserve the recreational experience along the river corridor.

Areas surrounding the Continental Divide National Scenic Trail, and several other recreation sites, would be classified as an area of high importance for pursuing legal access. This would provide greater access to recreational opportunities and benefit recreationists.

VRM Class II acreage would be reduced around the Seminoe and Pathfinder Reservoirs and eliminated in the Shirley Mountains and the area with checkerboard land ownership patterns. The lands exhibiting wilderness characteristics that are adjacent to the Adobe Town WSA would be VRM Class II, which would preserve the visual horizon from key observation points within the WSA but would not preclude properly mitigated development other than large linear facilities such as transportation routes. The area is almost entirely leased, so development is probable. Development would degrade naturalness in the area, but VRM Class II management would reduce the impacts related to development.

The lands exhibiting wilderness characteristics that lie adjacent to the Ferris Mountain WSA would be VRM Class II, which would preserve the visual horizon from key observation points within the WSA. However, this area is not leased except that for the very southern portion, so impacts related to development would be unlikely to occur in areas adjacent to the WSA.

Under this alternative, impacts resulting from wildlife and fisheries management would benefit recreation because wildlife and fisheries habitats would be protected and enhanced, thereby improving wildlife- and fisheries-based recreation opportunities.

Many SMAs are so designated on the basis of important wildlife and fisheries habitats. Therefore, management actions for SMAs would enhance wildlife and fisheries habitat and would benefit related recreational activities.

Summary

No significant impacts are likely to occur to recreation management under this alternative.

Monitoring road densities would help preserve the recreational experience for recreationists seeking natural settings and would limit the likelihood of motorized/nonmotorized user conflicts.

4.12 SOCIOECONOMICS

Socioeconomic impacts would occur with the implementation of any of the alternatives. Potential impacts include changes in employment and income; changes in tax revenue for local, state, and federal government entities; and changes in demand for housing and government services. In addition, management actions could alter the attitudes and opinions concerning use of public lands. Many of the impacts predicted under Alternatives 2, 3, and 4 would also occur under Alternative 1. This is because some level of development of mineral resources is occurring, and would continue to occur, under Alternative 1. Thus, current impacts would be perpetuated into the future.

The pace and timing of mineral development activities depend on various factors beyond the management decisions of BLM. These factors include national and international energy demand and prices, production factors within the RMPPA, and the business strategies of operators. Because the pace of development in the RMPPA is unknown, a relatively constant rate of development is assumed for this analysis. Therefore, actual impacts could vary if the rate of production changed over the study period.

This section describes potential impacts on socioeconomics from management actions. Existing conditions concerning socioeconomics are described in Section 3.12.

Significance Criteria

Impacts on socioeconomic resources would be considered potentially significant if any of the following occurred:

- Changes in total employment in Albany, Carbon, Laramie, and Sweetwater counties exceeded an increase or decrease of 1 percent of the trend.
- Changes in local tax revenues exceeded an increase or decrease of 15 percent of the trend.

See Appendix 35 for more details on significance criteria.

Methods of Analysis

The potential economic impacts of alternatives associated with the RMPPA were estimated using the IMPLAN (IMPLAN 2000) computer model. IMPLAN is a regional economic impact model that provides a mathematical account of the flow of dollars and commodities through a region's economy. This model provides estimates of how a given amount of a particular economic activity translates into jobs and income in the region.

All data used with the IMPLAN model were adjusted for inflation before calculations were performed. Once the calculations were complete, dollar values were converted to constant 2002 dollars for the 20-year study period (2004–2023) and discounted using a 7-percent real discount rate as recommended by the Office of Management and Budget (OMB 2003). (OMB recommends using a real discount rate of 7

percent for constant-dollar benefit-cost analysis, which approximates the marginal pretax rate of return on an average investment in the private sector in recent years.)

The IMPLAN model requires a series of inputs and assumptions specific to the study area. This includes the value of production resulting from land uses within the RMPPA under each alternative. Information from BLM staff regarding current uses and how these uses might change under each alternative provided a physical, quantitative measure of the inputs necessary for the economic impact analysis (e.g., number of gas wells, AUMs, recreational visitor days). Table 4-3 summarizes the primary data and sources used to estimate physical inputs for the IMPLAN model.

Table 4-3. Primary Inputs for Socioeconomic Analysis

Use	Primary Data Inputs	Data Source
Oil and Gas Exploration and Development	(1) Historical production, (2) historical and forecasted prices, (3) development cost estimates, (4) reasonably foreseeable development scenario	(1) WY Geological Survey (2) U.S. Department of Energy (3) Interviews with local oil and gas companies (4) BLM
Grazing	(1) Historical AUMs for cattle and sheep within RMPPA and (2) historical cattle and sheep prices (1996–2001)	(1) BLM (2) WY Agriculture Statistics
Recreation	(1) Estimated recreational visitor days per recreational activity and (2) estimated recreational expenditures per activity	(1) BLM RMIS Database, WY Game and Fish (2) WY Game and Fish, WY Tourism Board, Colorado Off-Highway Vehicle Coalition

The estimated inputs and prices were used to evaluate the potential sales from uses within the RMPPA under each alternative. This is the direct sales estimate that serves as the input into the IMPLAN model to obtain an estimate of total economic impact of each alternative (changes in direct, indirect, and induced income and employment).

Changes in employment and income cause other socioeconomic impacts, such as changes in population, which can lead to other community impacts on housing, infrastructure, government services, and quality of life issues. The changes in employment and income have been used to qualitatively assess other impacts in the socioeconomic region of influence (ROI).

Mineral production in the study area is the largest source of tax revenue for government entities within the study area. The analysis will assess any changes in tax revenues related to changes in oil, gas, and coal development within the RMPPA.

The analysis is based on the following assumptions:

- Economic benefits to the socioeconomic ROI would accrue from BLM-influenced activities, such as oil and gas development, livestock grazing, and recreation.
- Employment and income would continue to be a driver of economic and population growth in the ROI.
- Housing supply and costs, and community infrastructure and services, might serve as constraints to population growth in the RMPPA vicinity.

- Tax revenues derived from activities on BLM lands would continue to have fiscal implications for communities within the ROI.
- Activities and resources available in and around the RMPPA would continue to be important to the quality of life of current and future residents.
- An estimate of future oil and gas exploration and development was taken from the Reasonably Foreseeable Development Report.
- An estimate of coal exploration and development was taken from the Reasonably Foreseeable Development Report.
- The 5-year historic average was used as a basis for the grazing assumptions used under each alternative.
- Recreational use, by alternative, was estimated from the data in the BLM RMIS database and the Wyoming Game and Fish Department.
- The assessment of mineral tax revenues relied on production and assessed value estimates and effective tax rates provided by the Wyoming Department of Revenue, Mineral Tax Division.

Environmental Justice

Executive Order (EO) 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations, requires identifying and addressing disproportionately high and adverse human health and environmental impacts of federal programs, policies, and activities on minority or low-income populations. To evaluate potential environmental justice impacts, guidance obtained from other federal agencies was reviewed, including—

- EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," February 11, 1994, *Federal Register,* at 7630
- U.S. Environmental Protection Agency, *Interim Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analysis, Office of Federal Activities*, September 30, 1997
- Council on Environmental Quality, *Environmental Justice: Guidance Under the National Environmental Policy Act,* Executive Office of the President, December 1997.

The following five-step method was used to evaluate potential environmental justice impacts associated with land management actions proposed by BLM.

Step 1 Identify potential minority or low-income populations within the ROI.

Step 2 Identify a broad range of potential environmental and human health effects that could affect minority or low-income populations, including safety, traffic, air quality, noise, cultural resources, hazardous waste sites and hazardous materials transport, natural resources, land use, and socioeconomics.

Step 3 Assess whether the potential impacts on minority and low-income populations would be high and adverse.

Step 4 Conduct extended outreach to minority and low-income populations that would experience potential high and adverse effects.

Step 5 Evaluate mitigation measures that would be used to minimize adverse impacts on minority and low-income populations.

Relevant census data for counties within the ROI, including Albany, Carbon, Laramie, and Sweetwater counties, as well as for the state of Wyoming, were collected for this analysis. This includes—

- Total population
- Percentage of population of minority status (e.g., black or African American, Hispanic or Latino, Asian American, American Indian or Alaskan Native, and Native Hawaiian and other Pacific Islander)
- Percentage of population of low-income status using annual statistical thresholds from the Bureau of the Census Current Population Reports
- Percentage of population of minority status for the entire state of Wyoming
- Percentage of population of low-income status in the entire state of Wyoming using annual statistical thresholds from the Bureau of the Census Current Population Reports.

The data listed above were then used to determine whether the populations residing within the counties in the ROI constitute an "environmental justice population" that meets any of the following criteria:

- At least one-half of the population is of minority status
- At least one-half of the population is of low-income status
- The percentage of the population that is of minority status is at least 10 percentage points higher than that for the entire state of Wyoming
- The percentage of the population that is of low-income status is at least 10 percentage points higher than that for the entire state of Wyoming.

4.12.1 Impacts Under Alternative 1: Continuation of Existing Management

Continuation of current management activities on BLM-administered lands would perpetuate impacts in the area that are all ready occurring. For instance, continued development and operation of oil and gas wells within the RMPPA would require goods and services to be purchased from various local and regional contractors and vendors. Expenditures associated with these activities, in addition to employee and contractor spending would generate economic benefits in terms of employment and income.

Continuing current management prescriptions would also cause dissatisfaction among individuals and groups that are displaced by development activities. Some hunters and recreationists might be temporarily displaced by increases in well drilling and field development. In addition, some individuals and groups might sustain long-term impacts through loss of open landscapes and solitude related to development activities.

Impacts on Regional Employment

Management actions under the Alternative 1 would continue to influence employment in the regional economy during the study period. Under Alternative 1, activities within the RMPPA are estimated to support as many as 3,300 jobs per year over the planning period (see Figure 4-26). Most of the employment would be focused on continued oil and gas operations. However, recreation activities and

grazing operations also generate employment within the study area. Total employment supported by activities in the RMPPA represents approximately 3 percent of the workforce in the four-county study area.

Although the RMPPA supports a rather small percentage of total employment in the region, the impact of this employment varies throughout the study area. For instance, activities within the RMPPA are not as crucial to employment in the eastern portion of the study area, which includes the larger populations centers and diverse economies, as they are to employment in the western portions of the study area where economies are more rural in nature.

Activities in the RMPPA would have a particularly great impact on Carbon and Sweetwater counties, whose economies are more closely aligned with mineral production industries. These counties have experienced a steady decline in employment throughout much of the past decade because of declines in coal and trona production, as well as reductions in oil and gas development. However, recent trends have indicated that employment opportunities are again on the rise with the recent increase in oil and gas development throughout the region. Thus, proposed development on BLM-administered lands would be an important economic driver for western portions of the study area under this alternative.

Impacts on Regional Income

Land uses on BLM-administered lands would continue to be an important source of income for residents living near the RMPPA. Potential impacts on total earnings are summarized in Figure 4-27. Under Alternative 1, activities within the RMPPA would generate more than $1.3 billion in earnings over the study period. On average, activities on BLM-administered lands are estimated to provide more than $100 million in earnings per year. This equates to approximately 10 percent of total annual earnings in the study area. Earnings would be generated from continued oil and gas operations, businesses that support recreational activities, and grazing operations. Earning from uses of BLM-administered lands would be most important to western portions of the study area, which are more tied to mineral development, grazing, and recreational industries than are areas in the eastern portion of the study area.

Impacts on Tax Revenues

Given the importance of mineral tax revenues to local and state government entities in Wyoming, the analysis also considered changes in potential mineral revenues under each alternative. The results, summarized in Table 4-4, show the present value of total mineral revenues received as a result of gas production from 2004 through 2023. This includes federal mineral royalties, state severance taxes, and ad valorem taxes on production collected by the counties.

Table 4-4. Total Estimated Mineral Tax Royalties and Taxes from RMPPA (2001$)

Alternative	Ad Valorem	Severance	Federal Royalties	Total Mineral Revenues
Alternative 1	$587,031,762	$548,321,057	$931,694,096	$2,067,046,914
Alternative 2	$625,914,908	$584,640,127	$993,948,432	$2,204,503,467
Alternative 3	$509,939,333	$476,312,343	$808,181,208	$1,794,432,883
Preferred Alternative	$578,940,074	$540,762,960	$918,891,892	$2,038,594,925

[a] Total amount for 20-year study period.

[b] This table summarizes the net present value of estimated mineral royalties and taxes by alternative. Royalties and taxes have been discounted using a real discount rate of 7 percent, as recommended by OMB.

Although local government entities do benefit from the mineral tax revenues collected on oil and gas production within RMPPA, the greatest impact would be attributed to changes in the ad valorem taxes that are collected by the counties. This is because local governments within the study area only receive a percentage of federal royalties and severance taxes collected on production originating on public lands. Figure 4-28 shows the ad valorem taxes resulting each year from potential oil and gas production in the RMPPA; Figure 4-28 indicates that ad valorem taxes would be greatest for each alternative in 2010, when oil and gas production is predicted to be at its highest level.

Activities in the RMPPA under Alternative 1 would continue to generate tax revenues for local government entities. The majority of these tax revenues would be associated with oil and gas operations, which are expected to generate more than $2 billion in mineral tax revenues over the study period. Grazing and recreational activities would also generate tax revenues to government entities resulting from activities in the RMPPA.

Impacts on Population

Any population change that could be associated with implementation of alternatives under consideration in the EIS would likely be linked to employment changes. Activities within the RMPPA would continue to support as much as 3 percent of total employment in the entire four-county study area. Many of the jobs would be located in western portions of the study area and would affect communities such as Rock Springs and Rawlins, smaller communities, and unincorporated areas. Although the population has continued to fall in Sweetwater and Carbon counties, there are now indications that a reversal of this trend might be occurring. Development activities, such as those expected to occur under Alternative 1 on BLM-administered lands, would help reverse the recent losses in population in western regions of the study area. Any increases in population are expected to be concentrated in Rock Springs and to some extent in Rawlins because of the concentration of oil and gas services companies in these two communities. However, other communities, such as Baggs and Wamsutter, as well as some unincorporated areas, might also experience changes in population. Although any increase in population would be expected to be absorbed in Rock Springs and Rawlins, small rural communities and unincorporated areas might not be able to easily absorb the population fluctuations that are expected to result from increases in employment opportunities.

Impacts on Community Services

Activities within the RMPPA could affect local government services in various ways. For instance, changes in demand for government services (e.g., roads, utilities, schools) could vary with changes in population tied to the RMPPA. As discussed above, some population changes are already occurring in parts of the study area. Several communities within the study area, including the communities of Hanna, Medicine Bow, and Encampment, are planning for these changes by making improvements to infrastructure. However, some smaller communities and unincorporated areas in the western portions of the study area might not be able to fully absorb such changes in population.

Larger communities, such as Rock Springs and Rawlins, have sufficient excess capacity in infrastructure to absorb significant increases in population. An example is associated with schools in Sweetwater County. School enrollment levels in much of Sweetwater County declined for most of the 1990s. As a result, districts within the county closed seven schools. Recently, enrollment has begun to increase with changes in population, which is benefiting these school districts. Management actions that provide employment opportunities in the study area might help stabilize populations in western portions of the study area, which could be important to the demand for government services.

Management of the RMPPA could also affect services through changes in tax receipts. The discussions above summarized the projected change in local governments' ad valorem tax receipts, related to oil and gas development over the 20-year study period. Under this alternative, ad valorem taxes are expected to increase over time with increased oil and gas production. This increase should have a positive impact on the local government services supported by the ad valorem tax receipts. Other types of tax receipts are not expected to be significantly affected by management activities within the RMPPA.

Changes in recreation activities could also have some impacts on local government services through changes in demand. However, significant changes in demand for recreational activities are not expected under this alternative.

Impacts on Custom, Culture, and Social Trends

Along with fish, wildlife, vegetation, and physical environment, people are an integral part of ecosystems. Lifestyles, attitudes, beliefs, values, social structure, culture, and population characteristics affect, and are affected by, land management actions, such as those by BLM within the RMPPA. In addition, RMPPA lands and BLM management of these lands have emotional meanings to many people. Residents within the RMPPA have long held opinions that there is a need to balance conservation of natural resources with the economic viability of resource-based industries. For this reason, residents generally support the development of minerals and energy as long as these activities do not damage wildlife habitat or degrade the quality of recreational experiences. Under this alternative, these attitudes and opinions would generally remain the same: some local residents would support further development activities, whereas others would be dissatisfied if development activities reduced hunting opportunities or degraded recreational activities. Other residents might be dissatisfied if areas within the RMPPA were not left in an undisturbed state.

The management of the RMPPA would not change in substantive ways under this alternative. As a result, changes in population that are occurring in some parts of the study area because of increased oil and gas development might have impacts on custom and culture on a localized basis. For instance, although increased development would generate employment opportunities in the western portions of the study area, it is likely that individuals from outside the area would fill a percentage of those jobs. Employment of workers from outside the area would be attributed to the recent increase in natural gas drilling activity throughout Wyoming and the region, which has caused demand for skilled workers to exceed supply. The employment of workers from outside the area, in turn, could affect the custom and culture of local areas as new persons move into the area.

Environmental Justice

The results of the socioeconomic and environmental impact analysis conducted for this project indicate that persons who reside in and around the RMPPA would sustain some adverse effects from the continued management of the RMPPA. However, any identified socioeconomic or environmental impacts from continued management of the RMPPA by BLM would not be localized or focused primarily on the identified minority or low-income populations. In other words, under any of the alternatives being considered in the EIS, these populations in the study area, as described in Chapter 3, would not be disproportionately affected compared with the general population. In addition, persons of all races and income levels were invited to participate in the public participation process for the EIS, and comments and input into the process from any minority or low-income persons were considered equally with those of all other persons. Therefore, implementation of any of the alternatives would be in compliance with EO 12898.

Summary

Continued management actions within the RMPPA are expected to support jobs and income in the local economy. On average, employment generated from activities within the RMPPA is expected to support approximately 3 percent of total regional employment although most of these employment opportunities would occur in western portions of the study area. These jobs and income levels are more important to western portions of the study area, which are more closely tied to activities within the RMPPA. Continued management actions are expected to contribute to changes in population trends and government services that have already begun to take effect. Under this alternative, existing conditions and social trends would generally remain the same, although some impacts are expected in localized areas in the western portions of the study area. Environmental justice impacts are not expected.

4.12.2 Impacts Under Alternative 2: Emphasis on Development of Resources

Management actions under Alternative 2 are expected to change activities on BLM-administered lands that could have socioeconomic impacts in the study area. Increased development and operation of oil and gas wells within the RMPPA would cause an increase in employment, which would be concentrated in western portions of the study area. Increasing employment would likely cause population pressures in localized areas. In addition, changes in management prescriptions would cause dissatisfaction among persons and groups displaced by development activities. These persons and groups include some hunters and recreationists who might be temporarily displaced by increasing well drilling and field development. Some persons and groups might also experience long-term impacts from a loss of open landscapes and solitude caused by development activities.

Impacts on Regional Employment

Activities within the RMPPA under Alternative 2 are expected to result in increases in employment relative to Alternative 1 (see Figure 4-26). Over the 20-year study period, employment is expected to average 3,484 jobs per year—approximately 183 more jobs than under Alternative 1. Increased employment is expected to result from an increase in oil and gas development. However, employment associated with recreational activities is expected to decline slightly under this alternative as a result of a decline in recreational visitor days. Employment associated with grazing operations is expected to be the same as that under Alternative 1. Changes in employment associated with management of the RMPPA under this alternative are not expected to be significant for the entire four-county study area because changes in average employment would fall within the expected significance threshold. However, increases in employment might have impacts on a localized basis in the western portions of the study area.

Impacts on Regional Income

Increased oil and gas drilling and production under Alternative 2 are expected to result in an increase in regional income in the study area relative to Alternative 1 (see Figure 4-27). Under this alternative, the present value of regional income is expected to exceed $1.4 billion, a 6-percent increase over Alternative 1. However, a reduction in recreational visitor days is expected to decrease income to businesses by as much as $1 million over the study period under this alternative. Income associated with grazing is expected to be the same as under Alternative 1.

Impacts on Tax Revenues

Tax revenues associated with activities in the RMPPA are expected to increase under Alternative 2. This projected increase is mainly attributed to the increase in oil and gas production expected under this alternative. The total present value of mineral tax revenues is expected to exceed $2.2 billion under this alternative. This represents a 6.5-percent increase over Alternative 1. Negative impacts on tax revenues are also expected with the reduction in recreational activities under this alternative. Overall changes in ad valorem taxes are expected to be significant in the later years of the study period. During the last 10 years of the study period, tax revenues are expected to be more than $4 million higher per year than those under Alternative 1 (see Figure 4-28), which exceeds the significance threshold.

Impacts on Population

Activities within the RMPPA under this alternative would increase employment on average by 184 persons per year. The increase in employment would mostly be tied to increased oil and gas development. Recent southwest Wyoming NEPA assessments have assumed that 50 to 55 percent of direct workers would be nonlocal. However, it is likely that local workers would fill most indirect and induced jobs. Under these assumptions, it is possible that the population would increase under this alternative because of additional workers' and their families' moving into the study area to fill needed positions. It is likely that these individuals would move to areas close to where the gas development would occur (western portions of the RMPPA). Communities such as Rawlins and Rock Springs would be able to absorb any increases in population of this magnitude because the current populations in these areas are substantially lower than the peak levels of the 1980s. However, some smaller communities and unincorporated communities might not be able to easily absorb a significant increase in population. Therefore, some localized impacts are possible.

Impacts on Community Services

As discussed above, increases in population are possible under this alternative. It is assumed that increases in population would be tied to employment increases, mainly associated with gas development within the RMPPA. For this reason, it is anticipated that increases in population would occur in western portions of the study area near sites of oil and development. The relatively small increases in employment are not expected to strain community services in western counties or towns, such as Rawlins or Rock Springs. Populations in these areas are now substantially below the peak levels reached in the 1980s; thus, community services were built to handle larger populations. However, if population increases occurred in smaller communities or unincorporated areas, the community services that supported these areas, might be strained. For instance, large drilling programs in the area have recently strained public services in Wamsutter. Although town officials are addressing these needs through increased housing and public facility planning, in the short term increased demand for government services and housing would not be met. A similar situation has occurred in Baggs. Although Baggs can accommodate oil and gas workers on a short-term basis, if additional contractors and employees relocated in Baggs, community services would be strained.

Tax revenues generated are expected to increase significantly over time under this alternative with increased oil and gas production. This increase should have a positive impact on local government services supported by ad valorem tax receipts. This effect is especially important to Sweetwater and Carbon counties, where most of the oil and gas production would be located. Impacts on other types of tax receipts are not expected to be significant under this alternative. However, increases in tax revenues might not be beneficial to smaller communities in the study area that receive little direct tax revenue associated with oil and gas production. For these areas, it would be more difficult to adjust to changes in demand for government services that might occur with increases in population.

Impacts on Custom, Culture, and Social Trends

The management of the RMPPA would likely cause a change in population trends in the western portion of the study area. Impacts on custom and culture are possible as some areas of the RMPPA are industrialized to support more oil and gas operations. Communities such as Rock Springs and Rawlins have developed around mineral extraction industries and would likely support these activities. However, other communities, which have been more agriculturally based, would experience changes in custom and culture as the population changed to support this alternative activity. Population changes would likely bring new individuals to the area who might have different opinions and values from current residents. This could lead to changes in overall social trends in localized areas.

In addition, increased oil and gas development is expected to have localized negative impacts on wildlife resources within the RMPPA. These negative impacts could be detrimental to certain groups of persons within the study area. For instance, a decline in recreational activities is expected under this alternative with the increase in oil and gas development. This could have negative effects on lifestyles within the study area.

Environmental Justice

The identified minority or low-income populations would not be disproportionately affected under this alternative compared with other segments of the general population in the area.

Summary

Although increased oil and gas development is expected to have positive impacts in the form of increased employment, earnings, and mineral tax revenues, negative impacts could occur to certain lifestyles with a decline in wildlife resources. In addition, changes in population could lead to greater demands on government services in certain parts of the study area. Changes in management under this alternative might have localized impacts on population trends, whereas increases in ad valorem taxes are expected to be significant toward the later part of the study period, which could affect government services. Under this alternative, some existing conditions and social trends are expected to be affected, but environmental justice impacts are not expected.

4.12.3 Impacts Under Alternative 3: Emphasis on Protection of Resources

Management actions under Alternative 3 are expected to change activities on BLM-administered lands, which could have socioeconomic impacts in the study area. Decreased oil and gas development within the RMPPA would cause a decrease in employment, which would be concentrated in western portions of the study area. Decreasing employment would likely cause the population to fall in communities such as those most tied to oil and gas development. In addition, changes in management prescriptions would likely benefit certain lifestyles. Some hunters and recreationists might experience long-term benefits from the protection of wildlife, open landscapes, and solitude from development activities.

Impacts on Regional Employment

Under Alternative 3, management actions within the RMPPA are expected to cause a decrease in regional employment relative to Alternative 1. Over the 20-year study period, employment is expected to average 3,044 jobs per year—approximately 258 fewer jobs than the average per year expected under Alternative 1 (see Figure 4-26). A decline in future potential employment is expected under this alternative as a result of restrictions on oil and gas development. However, some increases in employment would occur

with expansion of recreational activities. Employment associated with grazing operations is expected to be the same as that under Alternative 1. Changes in overall employment are not expected to be significant because these changes fall within the estimated significant thresholds. However, there might be some localized impacts in communities that depend more heavily on RMPPA activities for employment opportunities.

Impacts on Regional Income

Regional income under Alternative 3 is expected to decline in the study area relative to Alternative 1. Under this alternative, potential regional income is expected to exceed $1.2 billion, an 8-percent decline from Alternative 1 (see Figure 4-27). However, an increase in recreational visitor days under this alternative is expected to increase income to the businesses that support these activities. Income associated with grazing is expected to be the same as that under Alternative 1.

Impacts on Tax Revenues

Tax revenues associated with activities in the RMPPA are expected to decline under Alternative 3 relative to Alternative 1. This expected decline is mainly attributed to the reduction in future oil and gas production expected under this alternative. The total present value of mineral tax revenues is expected to exceed $1.8 billion under this alternative, a 13-percent decline from Alternative 1. Positive effects on tax revenues are also expected with the increase in recreational activities under this alternative although the impacts are not expected to be significant. Changes in tax revenues relative to Alternative 1 are expected to be significant because the changes exceed $4 million in most years of the study period, which is greater than the established significance threshold.

Impacts on Population

Although the decline in employment resulting from this alternative is not expected to have a significant impact on population in the four-county study area, there might be noticeable changes to overall employment in some local areas in the western portions of the study area. Changes would be especially likely in Rock Springs and Rawlins, where there is a concentration of oil and gas services companies. A lack of employment opportunities might lead to further migration of individuals from western portions of the study area, which is similar to the trends during the 1990s and early 2000s for some parts of the study area.

Impacts on Community Services

Tax revenues are expected to decline significantly under this alternative during the study period. This decline would likely have a negative impact on the government services that depend on these ad valorem and severance taxes as a revenue source. Because many oil and gas taxes and royalties are equalized across the state, especially in education, this decline in tax and royalty revenue would affect all tax-receiving entities in the state of Wyoming. This effect would be greatest in Carbon and Sweetwater counties, where ad valorem tax changes have a direct consequence.

In addition, it is likely that western portions of the study area would experience a decline in demand for government services, associated with changes in population. These declines might be similar to trends in the 1990s for parts of the western portions of the study area. For instance, school enrollments in Sweetwater County experienced significant declines in the 1990s, which followed declines in population. In addition, Rock Springs and Rawlins have infrastructures that were built for larger populations, and it is likely that this infrastructure would not be fully used if the population continued to decline.

Other more rural parts of the study area might also experience a change in demand for government services under this alternative. These smaller communities might be better able to absorb changes in population under an alternative with less development opportunities.

Impacts on Custom, Culture, and Social Trends

Under this alternative, custom and culture throughout much of the study area would remain the same. However, impacts are expected in localized areas. For instance, a decrease in development opportunities in RMPPA would affect the employment opportunities for communities in western portions of the study area. This might lead to further migration of individuals from communities, such as Rock Springs and Rawlins, which are highly dependent on mineral extraction industries.

Management actions under this alternative could also have positive impacts on certain lifestyles. Certain population segments would be pleased with the increased protection for wildlife resources, as well as with the protection of undisturbed landscapes that can provide isolation and solitude. Other groups would benefit from less industrialization of the RMPPA and greater dependency on the traditional agricultural uses that have been important to localized areas.

Environmental Justice

The identified minority or low-income populations would not be disproportionately affected under this alternative compared with other segments of the general population in the area.

Summary

Restrictions on oil and gas development are expected to have negative impacts on future potential increases in employment, earnings, and mineral tax revenues in the study area. However, positive impacts could occur to certain lifestyles with increased protection of wildlife resources. Changes in management under this alternative might affect population trends in western portions of the study area, and decreases in future ad valorem taxes are expected to be significant, which could have negative impacts on government services. Under this alternative, environmental justice impacts are not expected.

4.12.4 Impacts Under Alternative 4: Preferred Alternative

Management activities on BLM-administered lands under Alternative 4 would be similar to those described under Alternative 1. Positive economic impacts in the form of employment and earnings are expected with continued oil and gas development in the RMPPA. Proposed management prescriptions would cause dissatisfaction among persons and groups displaced by development activities. Some hunters and recreationists might be temporarily displaced by increased well drilling and field development. In addition, some persons and groups might experience long-term impacts from a loss of open landscapes and solitude as a result of development activities.

Impacts on Regional Employment

Management actions within the RMPPA under Alternative 4 are expected to cause a slight decrease in regional employment relative to Alternative 1. Over the 20-year study period, employment is expected to average 3,261 jobs per year, approximately 41 fewer jobs than the average per year expected under Alternative 1. Slight changes in employment are expected because of restrictions on oil and gas development. Employment tied to recreation and grazing is not expected to vary from that under Alternative 1. Impacts on employment under this alternative are not expected to be significant.

Impacts on Regional Income

Regional income under Alternative 4 is expected to decline slightly in the study area relative to Alternative 1. Under this alternative, regional income is expected to exceed $1.3 billion, a decline of 1 percent from Alternative 1. Regional income attributed to changes in recreation or grazing is not expected to change from Alternative 1.

Impacts on Tax Revenues

Changes in management actions under the Alternative 4 are expected to have a slight impact on tax revenues generated for government entities. The total present value of mineral tax revenues is expected to exceed $2 billion under this alternative, a 1 percent decline from Alternative 1. No impacts on tax revenues are expected to occur with changes in recreation or grazing. Annual changes in ad valorem taxes are expected to be below $1 million per year and are not viewed as having a significant impact on the study area.

Impacts on Population

Changes in regional employment are not expected to have significant impacts on population trends within the study area under this alternative relative to Alternative 1.

Impacts on Community Services

As discussed above, notable changes in population or tax revenues are not expected under this alternative. Therefore, identifiable changes in demand for or supply of government services are not expected to result from this alternative.

Impacts on Custom, Culture, and Social Trends

Although this management alternative supports different priorities and the differences might be identifiable on a localized basis, the social structure and lifestyle conditions and trends within the RMPPA would generally remain the same as those under current conditions.

Environmental Justice

The identified minority or low-income populations would not be disproportionately affected under this alternative compared with other segments of the general population in the area.

Summary

Socioeconomic impacts under Alternative 4 are expected to be very similar to those under Alternative 1. Activities within the RMPPA are expected to support jobs and income in the local economy. These jobs and income levels are more important to western portions of the study area, which are more closely tied to activities within the RMPPA. Management actions are not expected to have significant impacts on population trends or government services. Under this alternative, existing conditions and social trends would generally remain the same, and environmental justice impacts are not expected.

4.13 Special Management Areas

SMAs provide management actions for unique natural, historic, scenic, or recreational resources in the RMPPA. This section presents the impacts that implementation of management actions for other resource programs might have on SMAs.

Significance Criteria

Impacts on SMAs would be considered significant if any of the following occurred:

- A level of development or activity occurred that is incompatible with the SMA objectives and management prescriptions
- An activity or development impaired the suitability of WSAs for preservation as wilderness
- Resources were adversely affected to the point that an SMA no longer meets the criteria for designation
- An activity or development impaired the outstandingly remarkable characteristics of the eligible and suitable WSR segments to the point that the existing conditions in these areas no longer meet the criteria for designation.

Methods of Analysis

Impact analysis and conclusions are based on interdisciplinary team knowledge of resources and the RMPPA and review of existing literature. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate.

The analysis is based on the assumption that WSAs in the RMPPA would continue to be managed under the WSA Interim Management Policy, H-8550-1 until such time as Congress either designates all or portions of the WSAs as wilderness or releases the WSAs, or portions of the WSAs, from any further consideration for wilderness and the lands revert back to general land use management.

The six practical effects of Interim Management Policy for Lands Under Wilderness Review are as follows: (1) lands under wilderness review must be managed so as not to impair their suitability for preservation as wilderness; (2) permitted activities in WSAs are temporary, create no new surface disturbance, and involve no permanent placement of structures; (3) grazing, mining, and mineral leasing uses that existed on the inception of FLPMA (October 21, 1976) might continue in the same manner and degree; (4) lands under wilderness review might not be closed to appropriation under the mining laws to preserve their wilderness character; (5) valid existing rights must be recognized; and (6) all lands must be managed to prevent unnecessary and undue degradation.

RFDs and RFAs can be found in Appendix 33.

4.13.1 Wilderness Study Areas

4.13.1.1 Impacts Common to All Alternatives

The Interim Management Policy (IMP) allows for very little flexibility for management decisions. Hence, the impacts have minimal variation among the alternatives. The IMP for WSAs precludes most

surface disturbing and other disruptive activities, and sets management guidelines aimed at the preservation of wilderness characteristics. The management actions outlined in Table 2-1 for WSAs are supplemental to the guidance found in the IMP.

Management actions that enhance biological or environmental characteristics would improve the wilderness quality and suitability of the WSAs. All such actions would be required to meet nonimpairment criteria before approval to ensure their appropriateness in a WSA.

WSAs are managed as VRM Class I areas in accordance with BLM policy (Instruction Memorandum No. 2000-096). Visual impairments adjacent to WSAs might be allowed if they were in conformance with the appropriate VRM classification for their location. Although these impairments would be visible to a visitor looking out from inside the WSA, they would not be considered an impact that impaired wilderness suitability, even though they might affect the experience of visitors.

The closure of the Ferris Mountain WSA to all types of motorized vehicle use would maintain or enhance the wilderness qualities of the area by preventing associated surface disturbance and preserving a sense of solitude for WSA visitors.

4.13.1.2 Impacts Under Alternative 1: Continuation of Existing Management

In the short term, limited fire and fuels management actions would maintain wilderness characteristics; however, the accumulation of fuels over time, and the failure to reintroduce fire into fire-dependent ecosystems would alter the wilderness characteristics over the long term.

Insufficient acreage of vegetation treatments would allow invasion and proliferation of noxious and invasive weed species beyond current levels. Because noxious and invasive weeds are not part of the native vegetation, their proliferation would compromise the wilderness characteristics found in each WSA. Wildlife and fish habitat and water quality would potentially be compromised by noxious and invasive weed proliferation. Non-native noxious and invasive weeds, such as thistles and saltcedar, would potentially create physical barriers to foot traffic adjacent to waterways and along roads and vehicle routes in the Encampment River WSA. Because opportunities for unconfined and primitive recreation are essential characteristics for wilderness designation, this WSA would be adversely affected.

Summary

Noxious and invasive weeds would result in significant impairment of wilderness characteristics, especially in the Encampment River WSA. Fuels management under this alternative could alter the community structure of fire-dependent ecosystems.

4.13.1.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from fire and fuels management under this alternative would be the same as those under Alternative 1.

Vegetation management actions would control the proliferation of noxious and invasive weed species and improve wilderness characteristics within the WSAs through improvement of wildlife and fish habitat, vegetation condition, and water quality. The Encampment River WSA would especially benefit from weed control because of the population of thistles located adjacent to the Encampment River.

Summary

The level of vegetation treatments conducted under this alternative would decrease the potential for introduction and spread of invasive species within the WSAs.

4.13.1.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Increased use of wildland fire for resource benefit and vegetation treatments would allow wildland fire to play its natural ecological role, resulting in maintenance or improvement of the vegetation resource in WSAs (e.g., habitat productivity, species diversity, disease/pest resistance). Under this alternative, all WSAs would be closed to OHV use, which would allow the revegetation of two-track vehicle routes, reduction in erosion, and decrease in establishment or spread of weed species.

Vegetation management would control the proliferation of noxious and invasive weed species and improve wilderness characteristics within the WSAs through improvement of wildlife and fish habitat, vegetation condition, and water quality. The Encampment River WSA would especially benefit from weed control because of the population of thistles located adjacent to the Encampment River.

VRM Class II designation in the Adobe Town fringe areas (31,510 total acres) and the west end of the Ferris Mountains (5,270 total acres) would reduce the disturbance and disruptive activities affecting the recreation experience within the Adobe Town and Ferris Mountain WSAs.

Summary

Management actions proposed under Alternative 3 would afford the most protection of wilderness characteristics. The wilderness characteristics of the WSAs would be protected and enhanced by closing roads to OHV use, protecting the west end of the Ferris Mountains and Adobe Town fringe areas, and upgrading these areas to VRM Class II.

4.13.1.5 Impacts Under Alternative 4: Preferred Alternative

Impacts under this alternative would be similar to those under Alternative 1, except that the Prospect Mountain (1,150 acres), Encampment River Canyon (4,510 acres), and Bennett Mountains (5,960 acres) WSAs would be closed to OHV use, which would allow the revegetation of two-track vehicle routes, reduction in erosion, and decrease in establishment or spread of weed species. Vegetation and fuels treatments would decrease the probability of large wildland fires that indirectly result in proliferation of invasive species. In addition, vegetation treatments would reduce fragmentation of the vegetation community and improve wildlife population viability over the long term.

Summary

Vegetation, habitat productivity, and species diversity would be protected through OHV restrictions for Prospect Mountain (1,150 acres), Encampment River Canyon (4,510 acres), and Bennett Mountains (5,960 acres). Vegetation and fuels management under this alternative would potentially alter the community structure of fire-dependent ecosystems and the loss of native species.

4.13.2 Como Bluff ACEC/NNL

4.13.2.1 Impacts Common to All Alternatives

Protection of the NRHP-listed Como Bluff cultural resource site provides indirect protection to the unique paleontological resources associated with the ACEC/National Natural Landmark (NNL). Restricting surface disturbing activities within ¼ mile of the cultural property would lessen the potential for such activities to dislocate or damage paleontological resources that were not discovered before surface disturbance.

Surface disturbance associated with fire and fuels management, lands and realty management, livestock grazing management, minerals management, and transportation and access management within the ACEC/NNL has the potential to damage or dislocate paleontological resources that were not discovered before surface disturbance (i.e., unanticipated discovery). Destruction of these resources would result in a loss of scientific information and degradation of the relevant and important values for which this area was designated an ACEC. Impacts on paleontological resources identified in a discovery situation are often greater than impacts on resources that were previously identified (and thereby avoided or subjected to mitigation measures) because damage to the resources might occur before their recordation and evaluation. The standard assessment and recordation procedures conducted before initiation of surface disturbing activities would reduce the potential for adverse impacts and increase the database of known paleontological resources.

The steep terrain associated with the ACEC/NNL would preclude the occurrence of many surface disturbing activities in this area. Moreover, given the relatively small size of the ACEC/NNL, most impacts associated with surface disturbing activities would likely be avoided. If avoidance is not possible, a case-by-case examination of proposed surface disturbing activities would be conducted to determine potential adverse effects and appropriate mitigation measures.

Paleontological resource management would emphasize protection of important scientific values, thereby helping maintain the relevant and important values of the ACEC. Paleontological resources would continue to be identified and studied through promotion and facilitation of research by qualified individuals. Vertebrate fossil collection would be allowed via Paleontological Resources Use Permit, ensuring the protection of fossil resources and any information gathered during the recovery process.

Management actions specifically designed to protect the paleontological resources located in the Como Bluff ACEC/NNL would help maintain the relevant and important values for which the area was designated. Restricting and intensively managing oil and gas development and locatable mineral exploration and development within the area would reduce the potential for unmitigated impacts on paleontological resources.

The majority of the land in the Como Bluff ACEC/NNL is private, and there is no legal public access. The lack of public land ownership within the ACEC boundaries does not allow for any management prescriptions beyond what the NNL designation affords.

4.13.2.2 Impacts Under Alternative 1: Continuation of Existing Management

Intensive management of surface disturbing activities within ¼ mile of the Morrison Formation exposures would ensure the preservation of the paleontological resources.

The majority of the land in the Como Bluff ACEC and NNL is private and there is no legal public access; thus, impacts from BLM management actions would be minimal. Surface disturbing activities resulting

from BLM management actions would have some impact on the area by damaging or dislocating paleontological resources through unanticipated discoveries. However, the relevant and important values of the ACEC would be protected through management actions associated with its designation as an ACEC and NNL. Significant impacts would not be expected to occur because the level of development and activity that would occur in the ACEC/NNL would be compatible with the objectives and management prescriptions for the area.

Summary

Significant impacts would not be expected to occur because the level of development and activity that would occur in the ACEC/NNL would be compatible with the objectives and management prescriptions for the area.

4.13.2.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts would be similar to those under Alternative 1, except that surface disturbing activities resulting from BLM management actions would have some impact on the area by damaging or dislocating paleontological resources through unanticipated discoveries. However, the potential for oil and gas exploration and development is low. The values of the NNL would be protected through management actions associated with its designation as an NNL.

Summary

Significant impacts would not be expected to occur, because the level of development and activity that would occur in the NNL would be compatible with the objectives and management prescriptions for the area.

4.13.2.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Protections to paleontological resources resulting from cultural resource management would increase under this alternative. Prohibiting surface disturbing activities within ¼ mile of historic properties where the setting contributes to the NRHP eligibility would indirectly protect paleontological resources within those areas. This would ensure the preservation of the scientific information associated with those resources.

Public lands in the area would be closed to locatable mineral development and the operation of public land laws, including sale. This would provide additional protection to paleontological resources by reducing impacts associated with surface disturbing activities. Acquisition of adjacent lands or easements to improve public access would be considered and evaluated. Although this would allow more effective management of the ACEC, pursuing new access areas would increase the potential for unauthorized collection of paleontological data; however, such impacts would be minimal. Facilitating use of these areas would also result in increased surface disturbing recreational activity and loss of vegetation cover, which would increase the potential for exposure and deterioration of paleontological resources.

Implementing NSO stipulations on new oil and gas leases would reduce the level of surface disturbance associated with oil and gas development. Surface disturbance occurring on existing leases would continue but would be intensively managed, further reducing potential impacts on paleontological resources. In addition, closing the ACEC/NNL to locatable mineral entry and mineral material disposals would contribute to the protection of paleontological resources associated with these surface disturbing activities.

Summary

Intensive restrictions on surface disturbing activities would increase the level of protection to the unique paleontological resources in the ACEC/NNL beyond that provided by the other alternatives. As a result, the relevant and important values of the ACEC would be protected and no significant impacts would be anticipated.

4.13.2.5 Impacts Under Alternative 4: Preferred Alternative

Acquisition of adjacent lands or easements to improve public access would be considered and evaluated. Although this would allow more effective management of the NNL, pursuing new access areas would increase the potential for unauthorized collection of paleontological data; however, such impacts would be minimal. Facilitating use of these areas would also result in increased surface disturbing recreational activity and loss of vegetation cover, which would increase the potential for exposure and deterioration of paleontological resources.

Intensive management of surface disturbing activities within ¼ mile of the Morrison Formation exposures would ensure preservation of the paleontological resources. However, the potential for oil and gas exploration and development is low.

Summary

The Como Bluff ACEC designation would be terminated; however, the values for which it was designated an NNL would be protected through intensive management of all surface disturbing activities, acquisitions of private lands, and easements across private lands.

The management actions associated with the NNL designation would be similar to those under Alternative 1, thereby providing adequate protection to the relevant and important values for which this area was originally designated an ACEC. Significant impacts would not be expected to occur, because the level of development and activity in the NNL would be compatible with the objectives and management prescriptions for the area.

4.13.3 Sand Hills ACEC

4.13.3.1 Impacts Common to All Alternatives

Protection of cultural resource sites under the National Historic Preservation Act (NHPA) within the Sand Hills ACEC would provide indirect, localized protection to the unique vegetation complex and wildlife habitat associated with the ACEC. Restricting surface disturbing activities within ¼ mile of cultural properties (if the setting contributes to NRHP eligibility) would help protect the unique vegetation community complex, consisting of antelope bitterbrush, silver sage, big sage, rabbit brush, chokecherry, and serviceberry, that supports the abundance of wildlife (mule deer, elk, Greater sage-grouse, sharp-tailed grouse, and raptors) for which the area was originally designated an ACEC.

OHV use of existing roads and vehicle routes within the ACEC would create disturbances to raptor and sage grouse nesting activities and could in some cases result in lek abandonment. Any proliferation of trails would decrease vegetation cover and increase erosion, leading to big game, raptor, and sage grouse habitat loss. However, OHV use would be limited to designated roads and vehicle routes, which would minimize impacts on vegetation and wildlife resources.

Management actions specifically designed to protect the unique vegetation community and wildlife habitat in the ACEC would help maintain the relevant and important values for which the area was designated an ACEC. Restricting and intensively managing oil and gas development, locatable mineral exploration and development, and other surface disturbing activities within the ACEC would reduce the potential to degrade vegetation cover and wildlife habitat.

Vegetation treatments would have short-term impacts on the ACEC by reducing vegetation cover and increasing soil erosion. However, over the long term, vegetation treatments would enhance plant vigor, vegetation cover, and species diversity. Any vegetation treatment would be designed to increase forage and habitat for wildlife species and to maintain the desired plant communities of the area.

4.13.3.2 Impacts Under Alternative 1: Continuation of Existing Management

Surface disturbance associated with fire and fuels management, lands and realty management, livestock management, minerals management, and transportation and access management within the ACEC has the potential to affect the relevant and important values for which the ACEC was designated. Such activity would remove portions of the unique bitterbrush/big sagebrush vegetation community and thereby degrade the big game crucial winter range and the raptor and grouse nesting habitats provided by this vegetation community. Additional impacts would include loss, degradation, or fragmentation of habitat, and displacement of wildlife species from areas disturbed by authorized activities, such as linear features and other permitted facilities. Traffic would increase, which would increase dust and noise. Increased dust would make vegetation less palatable to wildlife species, resulting in forage loss. Increased noise would possibly affect the ability of female grouse to locate leks, potentially reducing the reproductive viability of the species. Management actions resulting in construction that is visible on or above the surface would have the potential to directly impact the visual integrity of the Sand Hills ACEC. Intensive management within the area would minimize these impacts through mitigation measures and best management practices (Appendix 15). Intensive management would help reduce disturbance of the unique vegetation community and would benefit wildlife species by maintaining forage quality and quantity, increasing hiding cover, and reducing stress during critical time periods. A case-by-case examination of any proposed surface disturbing activity would be conducted to determine potential adverse effects and appropriate mitigation to minimize those effects.

Wildland fire suppression activities would be managed for AMR with emphasis on suppression. This would help protect the unique bitterbrush/big sagebrush vegetation community and wildlife habitat from damage caused by wildland fires.

Existing fencing within the ACEC that is designed to improve grazing management would restrict wildlife movement. Construction of new livestock fences to BLM standards within the ACEC would help reduce impacts from fencing by making fences easier for wildlife to negotiate. In addition, designing livestock grazing systems to improve or maintain desired range conditions would maintain vegetation cover and soil stability, thereby preventing loss of the unique vegetation community for which the ACEC was originally designated.

Impacts on the Sand Hills ACEC from recreation activities, OHV use on roads and vehicle routes, and over-the-snow vehicle use would include displacement of and increased stress on wildlife when these activities occurred in crucial habitat or during critical time periods. The use of OHVs in the gathering of shed antlers would cause deer and elk undue stress.

Management of the Sand Hills ACEC would protect the unique vegetation community, thereby maintaining the suitability of habitats for big game species within the existing ACEC. However, the unique values of the ACEC extend beyond the existing boundaries into the proposed JO Ranch expansion

area, which would not receive the same level of protection under this alternative. The historic JO Ranch would be stabilized to protect the historic and cultural values for which it is eligible to the NRHP. The 18 acres surrounding the historic ranch would be an NSO for surface disturbing activities. This would protect the physical remains of the historic ranch and the setting that contributes to the NRHP eligibility of the ranch.

Management actions associated with water quality, watershed, and soils management would help maintain soil stability and wildlife habitat within the ACEC. Surface disturbing activities would be limited in areas of unstable or sensitive soils, thereby protecting the soils necessary to sustain the unique vegetation in this ACEC.

Avoidance or intensive management of surface disturbing activities in sensitive wildlife habitats would provide additional protection to the unique values of the ACEC by reducing the potential for such activities to remove the bitterbrush/big sagebrush vegetation community and degrade wildlife habitat. Vegetation resources would be completely protected in active raptor nesting areas, where surface disturbing activities are prohibited.

Summary

Surface disturbing activities resulting from lands and realty management, minerals management, OHV use management, and recreation management would have moderate impacts on the area by removing and degrading portions of the unique bitterbrush/big sagebrush vegetation community. Intensive management of these activities would help reduce, but would not eliminate, these impacts. The limited restrictions on surface disturbing and disruptive activities under this alternative would allow some loss of the relevant and important values of the ACEC. Moreover, these values would not be protected beyond the boundaries of the existing ACEC. However, significant impacts would not be expected to occur because the level of development and activity that would occur in the area would be compatible with the objectives and management prescriptions for the area.

Cultural resource management; vegetation management; water quality, watershed, and soils management; wildlife and fisheries management; and some aspects of fire and fuels management and livestock grazing management would help preserve the unique vegetation community complex that supports the abundance of wildlife in the area for which the area was originally designated an ACEC.

4.13.3.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts on the Sand Hills area from fire and fuels management; OHV management; recreation management; transportation and access management; and water quality, watershed, and soils management would be the same as those identified under Alternative 1.

Impacts from lands and realty management, minerals management, and livestock grazing management actions would be similar to those under Alternative 1, except that the actions would not be seasonally restricted. There would be no timing and spacing restrictions on surface disturbing and disruptive activities in crucial winter range and Greater sage-grouse/sharp-tailed grouse breeding, nesting, and wintering habitat. Development activities in these habitats would result in a larger degree of loss or alteration under this alternative than under Alternative 1. Degradation of Critical habitats, increased wildlife stress, displacement of species, and lower reproductive success of wildlife could result in loss of the relevant and important values that qualify the Sand Hills as an ACEC.

Grazing systems and range improvements would be implemented to enhance livestock production. Management would emphasize grass-dominated communities, resulting in loss of hiding cover for mule deer and elk, as well as shrub habitats used by songbirds and small mammals.

Impacts from the management of the Sand Hills area under this alternative would be similar to those under Alternative 1; however, the JO Ranch buildings and related facilities would not be stabilized, (although the historic and cultural values of the ranch would still be retained as required by law). This alternative also differs from Alternative 1 in that plans of operations for locatable federal mineral exploration and development (except casual use) would be required only for surface disturbances of 5 acres or more. This would likely result in localized increases in surface disturbance related to these activities, thereby increasing the potential to remove vegetation cover and degrade wildlife habitat. However, because the potential for locatable minerals in this area is low, impacts would be minimal.

Increased vegetation treatments would reduce acreages of dense, mature shrub cover to improve species composition and production of both shrubs and grasses. This would reduce hiding cover for mule deer and elk. Increased grass production would primarily benefit cattle and elk, whereas improved diversity of shrubs would benefit Columbian sharp-tailed grouse. As shrub canopy increases, following treatments, the area would provide nesting and brood rearing habitat for Greater sage-grouse.

Impacts on the Sand Hills area from wildlife management would be similar to those identified under Alternative 1, except that less restrictive management actions to protect wildlife habitat (see Table 2-10) would allow increased levels of surface disturbance within the area.

Summary

The Sand Hills ACEC designation would be terminated and the area would be managed for multiple use. Increased vegetation treatments would help preserve the unique vegetation community complex, consisting of antelope bitterbrush, silver sagebrush, big sagebrush, rabbitbrush, snowberry, chokecherry, and serviceberry, that supports the abundance of wildlife (mule deer, elk, Greater sage-grouse, Columbian sharp-tailed grouse, and raptors) for which the area was originally designated an ACEC. Enhanced livestock production would favor grassland communities over shrub communities. This would benefit some wildlife species (e.g., elk) but would reduce the overall habitat diversity that supports a greater variety of wildlife. However, because of less restrictive wildlife protection measures (i.e., lack of timing and spacing restrictions), impacts from lands and realty management and minerals management would likely increase. These impacts could escalate to significant levels if development and other disruptive activities were incompatible with the objectives and management prescriptions for the area.

4.13.3.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Protections to historical, vegetation, and wildlife resources provided by cultural resource management would increase under this alternative. Prohibiting surface disturbing activities within ¼ mile of historic properties where the setting contributes to the NRHP eligibility would eliminate all surface disturbance–related impacts on the unique bitterbrush/big sagebrush vegetation community and associated wildlife habitat in these areas.

Impacts on the Sand Hills ACEC from fire and fuels management would be similar to those identified under Alternative 1, except that the magnitude of wildland fires would be limited to the smallest possible area. This would greatly reduce the potential for wildland fires to remove vegetation cover and damage or destroy the historic buildings associated with the JO Ranch. In addition, this would help preserve the unique vegetation community complex, consisting of antelope bitterbrush, silver sage, big sage, rabbit

brush, chokecherry, and serviceberry, that supports the abundance of wildlife (mule deer, elk, Greater sage-grouse, sharp-tailed grouse, and raptors) for which the area was originally designated an ACEC.

Impacts on the Sand Hills ACEC from livestock grazing management would be similar to those identified under Alternative 1, except that grazing systems and range improvements would be implemented to achieve DPC and enhance wildlife, watershed, and riparian values while reducing livestock conflicts with other resources. Improved range conditions would subsequently help maintain the unique vegetation community and associated wildlife habitat within the ACEC. In addition, no new fences would be authorized and existing fences would be modified to current BLM standards. This would protect big game movement where fences were modified.

Impacts on the Sand Hills ACEC from lands and realty and minerals management would be similar to those under Alternative 1. However, closing public lands to locatable mineral development, to new oil and gas leasing, and to locatable mineral entry would minimize surface disturbing and disruptive activities. Wildlife habitat loss and fragmentation would be minimized, resulting in enhanced vegetation and wildlife resources, thus maintaining the values of the ACEC.

Impacts on the Sand Hills ACEC from OHV use would be similar to those identified under Alternative 1, except that the area would be closed to over-the-snow vehicles. This would reduce human-induced stress to big game during critical (winter) time periods. In addition, seasonal closures to motor vehicle use would be implemented as necessary to protect big game habitat by reducing inappropriate OHV use during certain times of the year.

Impacts from the management of the Sand Hills ACEC would be the same as those under Alternative 1, except that the ACEC would be expanded to include the JO Ranch expansion area. The expansion area contains the same unique vegetation complex, grouse habitat, and crucial big game winter range as the originally defined areas. As a result of this expansion, the ACEC would increase from 7,960 acres to 12,700 acres. Management actions for the ACEC, especially those prohibiting surface disturbing activities, would minimize conflicts with other resources and enhance the natural and cultural values of the ACEC.

Protection of the Sand Hills ACEC would increase as a result of VRM actions. The area within 2 miles (or the visual horizon) of the historic JO Ranch and the 5-mile viewshed along the Rawlins-Baggs Freight Road would be designated as VRM Class II, which would influence the size, scope, or location of surface disturbing activities, resulting in less habitat loss. In some cases VRM Class II designation would result in the relocation of a facility. The scenic values of the ACEC would be protected by this VRM management action.

The protections afforded to the Sand Hills ACEC from water quality, watershed, and soils management would be similar to those under Alternative 1. However, prohibiting surface discharge of produced water from federal leases would further protect the ACEC from erosion and channel modification in response to changes in surface hydrology.

Impacts on the Sand Hills ACEC from wildlife management would be similar to those under Alternative 1, except that more restrictive management actions to protect wildlife habitat (e.g., increasing buffer zones around lek habitat, greater seasonal restrictions, and controls and prohibitions on surface disturbing activities) would benefit big game, raptor, and sage grouse habitat associated with the ACEC.

Summary

Actions related to lands and realty management, minerals management, OHV management, and recreation management would have minimal impacts because of additional restrictions applied to surface disturbing and disruptive activities. As a result, the relevant and important values of the ACEC would be maintained. Significant impacts would not be expected to occur because the level of development and activity that would occur in the ACEC would be compatible with the objectives and management prescriptions for the area.

Cultural resource management; vegetation management; water quality, watershed, and soils management; wildlife and fisheries management; and some aspects of fire and fuels management and livestock grazing management would help maintain the unique vegetation community complex, consisting of antelope bitterbrush, silver sage, big sage, rabbit brush, chokecherry, and serviceberry, that supports the abundance of wildlife (mule deer, elk, Greater sage-grouse, sharp-tailed grouse, and raptors) for which the area was originally designated an ACEC. These values extend into the JO Ranch expansion area; thus, by expanding the ACEC to include this area, BLM would be able to provide additional protection of the area's unique values.

4.13.3.5 Impacts Under Alternative 4: Preferred Alternative

Impacts on the Sand Hills ACEC from cultural resource management; fire and fuels management; OHV use management; vegetation management; VRM; and water quality, watershed, and soils management would be the same as those identified under Alternative 3.

Impacts on the Sand Hills ACEC from lands and realty management, livestock grazing management, minerals management, and transportation and access management would be the same as those identified under Alternative 1.

Impacts from recreation management would be similar to those identified under Alternative 1, except that seasonal closures to motor vehicle use would reduce human-induced stress to big game wildlife during critical time periods. In addition, the development of an interpretive program for the JO Ranch area would benefit the area by creating awareness of and appreciation for the cultural, wildlife, vegetation, and scenic qualities of the area.

Impacts from the management of the Sand Hills ACEC would be similar to those identified under Alternative 1, except that the Sand Hills ACEC would be expanded to include the JO Ranch expansion area. The expansion area contains the same unique vegetation complex, grouse habitat, and crucial big game winter range as the originally defined ACEC. This expansion would increase the size of the ACEC from 7,960 acres to 12,700 acres. Because management actions for the ACEC would minimize conflicts with other resources and enhance the natural and cultural values, the expansion would ensure that the unique values of the ACEC would be protected beyond the ACEC's existing boundaries in the JO Ranch expansion area.

Impacts on the Sand Hills ACEC from wildlife management would be similar to those identified under Alternative 1, except that more protective stipulations, in the form of longer timing restrictions, would be required for Greater sage-grouse, sharp-tailed grouse, and raptors. The longer restrictions would better reflect breeding and nesting periods and would reduce potential disturbance and habitat loss and increase reproductive success of grouse within the ACEC. Implementation of BMPs within big game crucial winter range would reduce stress. Raptor timing restrictions would also be altered to better reflect individual species' requirements, which would increase protection for raptors during critical periods.

Summary

Actions related to lands and realty management, minerals management, OHV management, and recreation management would have minor impacts because of intensive management restrictions applied to surface disturbing and disruptive activities. These values would be protected beyond the boundaries of the existing ACEC in the JO Ranch expansion area. Significant impacts would not be expected to occur because the level of development and activity that would occur in the ACEC would be compatible with the objectives and management prescriptions for the area.

Cultural resource management; fire and fuels management; livestock grazing management; vegetation management; water quality, watershed, and soils management; and wildlife and fisheries management would help maintain the unique vegetation community complex, consisting of antelope bitterbrush, silver sage, big sage, rabbit brush, chokecherry, and serviceberry, that supports the abundance of wildlife (mule deer, elk, Greater sage-grouse, sharp-tailed grouse, and raptors) for which the area was originally designated an ACEC. These values would be protected beyond the boundaries of the existing ACEC in the JO Ranch expansion area.

4.13.4 Jep Canyon ACEC

4.13.4.1 Impacts Common to All Alternatives

The Jep Canyon ACEC (13,810 acres) would be managed to emphasize protection of crucial winter range for elk and nesting raptors. Wildland fires would be managed for AMR, which would most often result in suppression. However, some areas would be allowed to burn, which would enhance vegetation diversity within crucial winter range and benefit big game species. There would be minimal impacts on unique vegetation areas and wildlife habitats.

Management objectives for this area would be designed to minimize conflicts with adjacent landowners and to enhance the natural resource values of the area. However, the current checkerboard land ownership pattern in the area reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat as are similar activities on public land. The impacts of these actions on private land might carry over to adjacent BLM lands and reduce the quality of wildlife habitat and forage.

There would be minimal impacts from lands and realty, minerals development, and livestock grazing management. Competition for vegetation, water, and space between big game and livestock would occur in localized areas. In addition, the viewshed would be adversely affected and traffic would increase, which would increase dust and noise. Surface disturbance of any magnitude would increase the potential for introduction of invasive plant species, degrading crucial winter range habitat. Intensive management within the area, including species-specific buffers and seasonal or temporal stipulations, would minimize these impacts.

Vegetation management would enhance the health and diversity of plant communities through use of natural fire and management prescriptions, such as burning, chemical, mechanical, and biological treatments. This would increase the diversity of wildlife habitat and increase forage. Management of aspen stands for increased distribution and improved seral structure would provide additional habitat and forage for raptor and big game species.

Management actions related to water quality, watershed, and soils management would emphasize protection and improvement of vegetation resources, which would benefit wildlife species.

4.13.4.2 Impacts Under Alternative 1: Continuation of Existing Management

Surface disturbing activities associated with mineral and lands and realty development would have an impact on Jep Canyon ACEC under Alternative 1. Intensive management would limit impacts on wildlife and fish and their associated habitat. Management would include, but would not be limited to, species-specific buffers and seasonal or temporal timing stipulations. This would minimize impacts, such as habitat loss, degradation, and fragmentation and displacement of wildlife, from permitted facilities. In addition, increased human presence from oil and gas activity would increase traffic, dust, and noise. Surface disturbance would increase the potential for introduction of invasive plant species, degrading crucial winter range habitat. Intensive management and use of BMPs within the area would minimize these impacts, although they would not completely eliminate them.

Lack of special management actions for aspen communities could result in loss of critical raptor nesting habitat. Overall impacts on wildlife species would include habitat loss, degradation, and fragmentation and displacement of species.

Summary

Under Alternative 1, impacts on the Jep Canyon ACEC from other management actions would not be significant to the crucial elk winter range and the productivity of raptor nesting pairs. Therefore, the relevant and important values of the ACEC would be protected under this alternative.

4.13.4.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Under this alternative the number and type of wildlife protection stipulations in force during project development would be decreased compared with Alternative 1. Therefore, the potential for impacts on nesting raptors and big game species during certain times of the year would increase. Particular resources that would potentially be negatively affected include big game parturition areas, migration corridors, and transitional ranges.

OHV use and over-the-snow vehicle use would be allowed on all existing roads and vehicle routes, which would affect big game in crucial winter ranges and cause disturbance and stress to other wildlife during crucial time periods.

Impacts on the Jep Canyon area from minerals management would be similar to those identified under Alternative 1. However, plans of operation would be required only for locatable mineral exploration involving surface disturbance of 5 acres or more. This would potentially result in small-scale loss of habitat in discrete locations that would collectively affect the qualities of the area as a WHMA.

Summary

Reduction in restrictions under this alternative would decrease protection of aspen stands, crucial elk winter range, and productivity of raptor nesting pairs.

4.13.4.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Under Alternative 3, surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix

19 and Appendix 24). This would ensure protection of wildlife and their associated habitat, particularly during sensitive time periods.

Intensive management of existing oil and gas leases, including timing restrictions on disruptive activities in big game habitat, raptor nesting areas, and Greater sage-grouse strutting and nesting habitat, would minimize the potential for impacts. Impacts would include habitat loss, fragmentation, and degradation, as well as wildlife displacement.

Limits on OHV use and over-the-snow vehicles would reduce the potential for surface disturbance, which would help mitigate degradation of forage and wildlife habitat. Off-road vehicular travel for "necessary tasks" would not be allowed. OHV activity would be limited to designated roads and vehicle routes and closed to over-the-snow vehicles. These limitations would minimize displacement of wildlife and damage to forage and habitat, and limit disturbance or stress during crucial time periods.

Improvement of public access would be achieved through easements across private lands adjacent to the Jep Canyon WHMA. Cooperation with adjacent landowners would also improve public access, increasing recreational opportunities. However, increased human presence would increase stress and hunting pressures on some wildlife species.

Impacts from vegetation management would be the same as those under Alternative 1, except that surface disturbance in aspen communities would be restricted or prohibited. This would provide forage and cover for big game, as well as benefit raptor species, which nest in aspen.

Summary

Under this alternative, opportunities to improve public access would be pursued, which would increase related impacts. However, this alternative has more restrictive management of minerals activities and off-road vehicular travel for "necessary tasks." In addition, all impacts associated with surface disturbing and disruptive activities would be minimized through intensive management and implementation of BMPs. Therefore, big game crucial winter ranges and raptor habitat would undergo the fewest impacts under this alternative.

4.13.4.5 Impacts Under Alternative 4: Preferred Alternative

Under this alternative impacts from minerals management would be reduced compared with Alternative 1 because of changes in restrictions on surface disturbing activities in big game crucial winter range (see Table 2-10). Plans of operation would be required only for locatable mineral exploration involving surface disturbance of 5 acres or more. This could result in small-scale loss of habitat in discrete locations that would collectively affect the qualities of the area as a WHMA. However, the likelihood of this outcome is low because the area has a low potential for development in the foreseeable future. In addition, oil and gas leasing and related surface disturbance would be intensively managed to meet the objectives of the habitat management area.

Impacts from OHV use would be the same as those under Alternative 3.

Improvement of public access would be achieved through easements across private lands adjacent to the Jep Canyon WHMA. Cooperation with adjacent landowners would also improve public access. Increased access would lead to increased human presence, which would increase stress and hunting pressures on some wildlife species.

Impacts from vegetation management would be similar to those under Alternative 1, except that the aspen stands would be managed to increase distribution and improve seral structure. This would enhance nesting raptor habitat by increasing the amount and health of existing aspen stands.

Surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would ensure protection of wildlife and fish and their associated habitat and sensitive life cycles.

Summary

To preserve some important resource values under Alternative 4, some areas could limit or preclude OHV use. However, based on the anticipated amount of roads and vehicle routes that would remain available to OHV use within the RMPPA, these impacts would be negligible.

4.13.5 Shamrock Hills ACEC

4.13.5.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and to enhance the natural resource values of the area to meet management objectives. However, the checkerboard land ownership pattern in the area reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat as are similar activities on public land. The impacts of these actions on private lands might carry over to adjacent BLM lands and reduce the quality of wildlife habitat and forage.

Surface disturbance from management activities would increase the potential for introduction of invasive species, compromise the visual integrity of the area, increase human traffic, and increase dust and noise. Wildlife species within the Shamrock Hills ACEC/RCA would suffer displacement, as well as loss, degradation, and fragmentation of habitat. Intensive management of surface disturbing activities would maintain nesting raptor habitat, resulting in very few impacts.

Wildland fires would be managed for AMR, which would most often result in suppression. However, some areas would be allowed to burn, which would enhance vegetation diversity within crucial winter range and benefit big game species.

Reclamation of areas subjected to surface disturbing activities would aid in restoring healthy, functioning native plant communities. In addition, vegetation management prescriptions, including burning; plantings; seedings; and chemical, mechanical and grazing treatments, would enhance the health and diversity of plant communities. This would increase the diversity of wildlife habitat and forage. Management of aspen stands for increased distribution and improved seral structure would provide additional habitat and forage for raptor and big game species.

4.13.5.2 Impacts Under Alternative 1: Continuation of Existing Management

Shamrock Hills ACEC management actions under this alternative would maintain the productivity of nesting raptor pairs, especially ferruginous hawks, and other wildlife species. This would ensure the reproductive viability of all wildlife species.

Impacts the Shamrock Hills ACEC from minerals management would include degradation and fragmentation of habitat, and displacement of wildlife species from permitted facilities. In addition, the viewshed would be adversely affected and traffic would increase, which would increase dust and noise. Surface disturbing activities associated with the construction of facilities, pipelines, and mineral development would reduce the visual integrity of the Shamrock Hills ACEC. Surface disturbance would increase the potential for the introduction of invasive plant species, degrading the wildlife habitat. However, intensive management within the area would minimize these impacts.

There would be some impacts on big game in crucial winter ranges from over-the-snow vehicles. These impacts would include increased disturbance of and stress to wildlife during crucial time periods.

Wildlife habitat management actions would maintain the natural environment of the ACEC by restricting surface disturbing activities that alter wildlife habitat and forage. Seasonal restrictions on surface disturbing activities benefit nesting raptors by reducing stress to the species during sensitive times (see Table 2-10).

Summary

Existing wildlife stipulations would help reduce impacts; however, surface disturbing activities could affect the productivity of raptor nesting pairs.

4.13.5.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts on the Shamrock Hills area from minerals management and OHV management under this alternative would be the same as those identified under Alternative 1. However, plans of operation would be required only for surface disturbance of 5 acres or more. This could result in small-scale loss of habitat in discrete locations that would collectively affect the qualities of the area as a WHMA.

Seasonal restrictions on surface disturbing activities in wildlife and fish habitat during sensitive periods would be limited under this alternative. Seasonal wildlife restrictions for sage grouse and raptors would be reduced, which would increase the opportunity to disturb these species during the periods of the year when they are most vulnerable. Overall impacts on wildlife species would include the displacement of wildlife and the loss, degradation, and fragmentation of habitat.

Summary

Impacts on the Shamrock Hills area from other management actions would be greatest under this alternative. Fewer stipulations on surface disturbing activities would affect the productivity of wildlife.

4.13.5.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Under Alternative 3, surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would ensure protection of wildlife and their associated habitat, particularly during sensitive time periods. Development of oil and gas activities would be implemented according to BMPs for big game crucial winter range, which would reduce impacts on these species. Intensive management, including timing restrictions on disruptive activities in big game habitat, raptor nesting areas, and Greater sage-grouse strutting and nesting habitat, would also reduce impacts on these values. The amount of mineral development would decrease under this alternative because of withdrawals from

locatable mineral entry and prohibitions on new oil and gas leasing; therefore, impacts on wildlife species and their habitat would be reduced.

Limits on OHV and over-the-snow vehicle use would reduce the potential for surface disturbance, which would potentially damage forage and habitat. Off-road vehicular travel for "necessary tasks" would not be allowed. In addition, OHV activity would be limited to designated roads and vehicle routes and closed to over-the-snow vehicles. These limitations would minimize displacement of wildlife and damage to forage and habitat, and limit disturbance or stress during crucial time periods.

Improvement of public access would be achieved through easements across private lands adjacent to the Shamrock Hills Area. Cooperation with adjacent landowners would also improve public access, resulting in increased recreational opportunities. Increased human presence would increase stress and hunting pressures on some wildlife species.

Summary

Under this alternative, opportunities to improve public access would be pursued, which would increase related impacts. However, this alternative has more restrictive management for minerals activities and off-road vehicular travel for "necessary tasks." In addition, all impacts associated with surface disturbing and disruptive activities would be minimized through intensive management and implementation of BMPs. Therefore, big game crucial winter ranges and raptor habitat would undergo the fewest impacts under this alternative.

4.13.5.5 Impacts Under Alternative 4: Preferred Alternative

Under Alternative 4, surface disturbing or disruptive activities within big game crucial winter range would require the use of BMPs designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing and disruptive activities (see Table 2-10). Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would ensure protection of wildlife and their associated habitat, particularly during sensitive time periods.

Allowing over-the-snow vehicles and off-road vehicular travel for "necessary tasks" would have impacts on big game in crucial winter ranges. These impacts would include increases in disturbance of and stress to wildlife during crucial time periods. Timing restrictions and buffers on disruptive activities in raptor nesting and Greater sage-grouse strutting and nesting habitat would reduce impacts on wildlife species.

Summary

Impacts on the relevant and important values would not be significant under Alternative 4. The ACEC designation would be terminated because of the complexities of management associated with the checkerboard land ownership pattern in the area. Management measures for the raptor concentration area would afford sufficient protection to relevant and important values identified for this area.

4.13.6 Stratton Sagebrush Steppe Research Area

4.13.6.1 Impacts Common to All Alternatives

Protection of cultural resource sites under the NHPA within the Stratton Sagebrush Steppe Research Area would provide indirect, localized protection to the sagebrush steppe vegetation community located within the area. Restricting surface disturbing activities within ¼ mile of cultural properties (if the setting

contributes to NRHP eligibility) would help protect the ecology and hydrology associated with this vegetation community.

Surface disturbance associated with fire and fuels management, lands and realty management, and minerals management would directly remove portions of the sagebrush steppe vegetation community and degrade the effectiveness of hydrologic function. However, intensive management within the area would minimize these impacts through mitigation measures and BMPs (Appendix 15).

Closing the area to locatable mineral development and future land disposal actions would result in the elimination of future disturbance that would compromise the integrity of the research area.

Management actions that facilitate recreation activity and access throughout the RMPPA would increase the potential for disturbance to the vegetation resources in the Stratton Sagebrush Steppe Research Area. Although impacts are expected to be minimal, some localized vegetation removal and increased erosion could occur.

Vegetation treatments conducted within the Stratton Sagebrush Steppe Research Area could remove vegetation cover over the short term, depending on the type of treatment. Impacts would be expected to be minimal because vegetation treatments would be designed in consideration of research objectives for the area and to maintain the relevant and important values of the Stratton Sagebrush Steppe Research Area, where fire has historically played a role in maintaining the native plant communities.

4.13.6.2 Impacts Under Alternative 1: Continuation of Existing Management

The Stratton Sagebrush Steppe Research Area would be managed as an AMR suppression area, which would most often result in suppression of wildland fires because of the intermixed landownership within the area. Wildland fire and suppression activities in this area could compromise vegetation plots and damage infrastructure, such as snow fences or instrumentation used for studies.

Moderate impacts on the Stratton Sagebrush Steppe Research Area would occur from lands and realty management and minerals management. Impacts on research plots would include habitat loss and degradation, and wildlife displacement from linear features (e.g., power lines, roads, and pipelines) and other permitted facilities (e.g., wind turbines and well pads). However, specific placement of facilities would minimize these impacts by avoiding research plots when possible. New leases would include an NSO stipulation, requiring directional drilling to extract resources, resulting in decreased loss of research potential.

Livestock grazing within the Stratton Sagebrush Steppe Research Area would be managed for multiple use. This would result in impacts on existing or future long-term vegetation studies and could compromise research objectives by introducing unquantifiable disturbance from grazing. Livestock grazing management strategies would be determined by the allotment management plan (AMP) for the Middlewood Hill Allotment; research would only be able to study the effects of existing grazing management. This AMP would not allow flexibility in the design of livestock-related disturbances for research objectives.

Off-road vehicular travel for "necessary tasks" would be allowed within the Stratton Sagebrush Steppe Research Area. This would increase the potential to remove vegetative cover and diminish research opportunities. However, because the frequency of this activity is expected to be low, related impacts would be minimal.

Avoidance or intensive management of surface disturbing activities in sensitive wildlife habitats would provide additional protection to the relevant and important values of the Stratton Sagebrush Steppe Research Area by reducing the potential for such activities to remove the sagebrush steppe vegetation community and diminish research opportunities. Vegetation resources would be completely protected in active raptor nests areas, where surface disturbing activities are prohibited.

Summary

The research potential of the area could be compromised under Alternative 1. Impacts would be significant because grazing and vegetation treatment actions might not be compatible with the research objectives and management prescriptions for the area.

4.13.6.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts on the Stratton Sagebrush Steppe Research Area from fire and fuels management, lands and realty management, livestock grazing management, and OHV use management would be the same as those identified under Alternative 1.

Impacts on the Stratton Sagebrush Steppe Research Area from minerals management would be similar to those identified under Alternative 1, except that an NSO stipulation would not be required for new oil and gas leases. This would allow an increased level of surface disturbance related to well pad, road, and pipeline construction. To help minimize impacts, operators would be required to submit a management plan that described how their activities would affect research objectives. Mitigation measures would be required, where necessary, to protect the research area. Specifically, placement of well pads and roads would avoid research plots and minimize impacts whenever possible.

Impacts on the Stratton Sagebrush Steppe Research Area from wildlife and fisheries management would be similar to those identified under Alternative 1, except that the less restrictive management actions to protect wildlife habitat under this alternative (e.g., elimination of buffer zones around lek habitat, weaker seasonal restrictions, and elimination of controls and prohibitions on surface disturbing activities in big game habitat) would allow increased levels of surface disturbance within the area.

Summary

Impacts under this alternative would be the same as those under Alternative 1.

4.13.6.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts on the Stratton Sagebrush Steppe ACEC from lands and realty management would be the same as those identified under Alternative 1.

Protections to vegetation resources afforded by cultural resource management would increase under this alternative. Prohibiting surface disturbing activities within ¼ mile of historic properties where the setting contributes to the NRHP eligibility would eliminate all surface disturbance–related impacts on the sagebrush steppe vegetation community in these areas.

Impacts on the Stratton Sagebrush Steppe ACEC from fire and fuels management would be similar to those identified under Alternative 1, except that fire suppression activities would be managed to meet the research objectives of the ACEC. This would lessen the impacts associated with suppression activities by minimizing surface disturbances and avoiding research plots.

Impacts on the Stratton Sagebrush Steppe ACEC from livestock grazing management would be similar to those identified under Alternative 1, except that grazing strategies would not be determined on the basis of the AMP for the Middlewood Hill Allotment, and only activities that support research objectives would be allowed. This would reduce related impacts and enhance the research potential of the area.

Impacts on the Stratton Sagebrush Steppe ACEC from minerals management would be similar to those identified under Alternative 1. However, intensively managing surface disturbance on existing leases to meet research objectives of the ACEC would allow the placement of well pads and roads so that they avoided research plots and infrastructure and thereby would minimize impacts.

Impacts on the Stratton Sagebrush Steppe ACEC from OHV use management would be similar to those identified under Alternative 1, except that off-road vehicular travel for "necessary tasks" would not be allowed. This would reduce the potential to remove vegetative cover and diminish research opportunities.

Impacts on the Stratton Sagebrush Steppe ACEC from wildlife and fisheries management would be similar to those identified under Alternative 1, except that more restrictive management actions to protect wildlife habitat (e.g., increased buffer zones around lek habitat, greater seasonal restrictions, and increased controls and prohibitions on surface disturbing activities in wildlife habitat) would reduce the level of surface disturbance within the ACEC.

Summary

A lower level of surface disturbance from grazing and vegetation treatment actions under this alternative would reduce related impacts. Significant impacts would not be expected to occur because the level of development and activity that would occur in the area would be compatible with the objectives and management prescriptions for the area.

4.13.6.5 Impacts Under Alternative 4: Preferred Alternative

Impacts on the Stratton Sagebrush Steppe ACEC from lands and realty management would be the same as those identified under Alternative 1.

Impacts on the Stratton Sagebrush Steppe ACEC from cultural resources management, fire and fuels management, minerals management, and OHV use management would be the same as those identified under Alternative 3.

Impacts on the Stratton Sagebrush Steppe Research Area from livestock grazing management would be similar to those identified under Alternative 1, except that grazing strategies would be determined on the basis of the AMP for the Middlewood Hill Allotment and the research objectives for the area. This would benefit the research area by supporting existing or future long-term vegetation studies through quantifiable grazing disturbance.

Impacts on the Stratton Sagebrush Steppe Research Area from wildlife and fisheries management would be similar to those identified under Alternative 1, except that more restrictive management actions to protect wildlife habitat (e.g., increased buffer zones around lek habitat, greater seasonal restrictions, and increased controls and prohibitions on surface disturbing activities in wildlife habitat) would reduce the level of surface disturbance within the area.

Summary

A lower level of surface disturbance grazing and vegetation treatment actions under this alternative would reduce related impacts. Significant impacts would not be expected to occur because the types of disturbances from BLM-approved activities would be compatible with the research goals for the area.

4.13.7 Chain Lakes Habitat Management Area

4.13.7.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the checkerboard land ownership reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of wildlife habitat and forage.

The area is known to contain historic mud pots, a rare geologic feature. Protection of cultural resource sites under the NHPA provides protection to the area from surface disturbing activities. This results in preservation of the unique alkaline desert wetland system, a crucial winter habitat for pronghorn antelope.

Public lands within the checkerboard or other intermixed landownership areas would be managed in association with the private and state lands therein. Wildland fires would be managed for AMR, which would most often result in suppression.

Impacts on the Chain Lakes Potential Wildlife Habitat Management Area from lands and realty management and transportation and access management would occur. Impacts resulting from construction of linear features (e.g., power lines, roads, and pipelines) and other permitted facilities (e.g., wind turbines) would include habitat loss and degradation and displacement of wildlife. In addition, continuous noise from compressor stations would reduce the reproductive success of female Greater sage-grouse and interfere with their ability to locate leks. Wildlife species within the Chain Lakes WHMA/ACEC would suffer habitat loss, degradation, fragmentation, and displacement. Mitigation measures would minimize impacts on wildlife species by creating buffer zones around Critical habitat and restricting surface disturbing activities during critical times. Intensive management of surface disturbing activities would maintain the unique alkaline desert wetland system, resulting in very few impacts.

Reclamation of surface disturbing activities would aid in restoring healthy, functioning native plant communities. In addition, vegetation management prescriptions, including burning, plantings, seedings, and chemical, mechanical and grazing treatments, would enhance the health and diversity of the unique alkaline desert wetland system. This would increase the diversity and quantity of wildlife habitat and forage. Management actions related to water quality, watershed, and soils management would emphasize the protection and improvement of the unique alkaline desert wetland system. Wildlife species, including pronghorn, would benefit through increased forage and habitat diversity.

4.13.7.2 Impacts Under Alternative 1: Continuation of Existing Management

The area would be managed as a wildlife habitat management area and for compatible multiple use. Surface disturbing activities that would alter habitat, reduce forage, and fragment habitat would be intensively managed to minimize impacts.

Livestock grazing strategies and range improvement projects would be developed in cooperation with the WGFD to meet habitat objectives. Grazing practices would promote conditions that are in conformance with Standards for Healthy Rangelands (BLM 1997). Existing livestock use would be permitted on a temporary, nonrenewable basis, which would minimize impacts on wildlife habitat by not reducing critical forage for wintering species. With these agreements and practices and the flexibility in livestock permitting, impacts from livestock grazing on pronghorn winter range and the Chain Lakes wetlands would be minimal.

Impacts on the Chain Lakes Wildlife Habitat Management Area from minerals management would occur. Surface disturbing activities would be avoided within 500 feet of the edge of wetlands in the Chain Lakes Area, and development would be limited near these unique desert alkaline wetlands. Construction of roads, well pads, and maintenance facilities near these wetlands would compact soil, disturb vegetation and wildlife, and increase erosion and sediment transport, which could thereby modify the hydrology needed to support these wetlands. Surface disturbance would increase the potential for the proliferation of invasive plant species, which would affect the alkaline desert lake ecosystem. In addition, continuous noise from compressor stations would reduce the reproductive success of female Greater sage-grouse and interfere with their ability to locate leks. If these surface disturbing activities were allowed, impacts would be mitigated by site placement, design, or conditions of approval. Intensive management would minimize impacts on big game species in crucial winter range, nesting raptors, and breeding Greater sage-grouse.

Impacts on big game in crucial winter ranges from over-the-snow vehicles and off-road vehicular travel for "necessary tasks" during the winter would contribute, to varying degrees, to indirect impacts on wildlife when they are most vulnerable.

Surface discharges of produced water would be allowed in the contributing watershed with an NPDES permit. The contributing watershed has low to moderate potential for oil and gas development; however, if it were to occur, produced water could add to the flow of the Chain Lakes wetland complex. This action could change the chemistry of the wetland and contribute to salt and sediment loading to this system. Additional water might improve vegetation in the short term, but could alter the balance of the system with natural precipitation patterns. Impacts on the wetlands from the discharge of produced water in the contributing watershed would be indirect and depending on the volume of water discharged, could be substantial.

Wildlife habitat management actions would maintain the natural resources within the area by implementing NSO and timing restrictions for surface disturbing activities.

Summary

Under this alternative, the area would be managed for multiple use activities, and natural resources would be maintained. Mineral development activities and associated infrastructure would potentially result in significant impacts on relevant and important values, including pronghorn habitat and forage and the unique alkaline wetland system.

4.13.7.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from livestock grazing management, water quality, watershed, and soils management, minerals exploration management, OHV management, and wildlife management actions would be the same as those under Alternative 1.

Impacts under this alternative would be similar to those under Alternative 1. However, there is a greater potential for minerals management actions to affect wildlife species because of reduced restrictions from wildlife management actions. The seasonal disturbance zone restriction around active raptor nests would be reduced on a species-specific basis under Alternative 2. This would incrementally increase disturbance to nesting raptors. Development would be allowed year round in crucial winter range for pronghorn, which would increase stress to and temporarily displace species.

Summary

The potential for impacts on wildlife habitat and the unique alkaline lake system would be increased over Alternative 1 because of the reduction in wildlife and surface disturbance stipulations. Alternative 2 would provide the least protection for the relevant and important values of the Chain Lakes Wildlife Habitat Management Area.

4.13.7.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts on the Chain Lakes ACEC from grazing management would be the same as those in Alternative 1, except that the area would be managed as a vacant allotment and would have a temporary, non-renewable permit for livestock grazing. Livestock grazing strategies would support the objectives for the ACEC and benefit other allotments where rest from grazing use is needed.

Minerals management actions would be more restricted under this alternative. Under this alternative, surface disturbing activities would not be allowed within 500 feet of the wetland complex, and surface discharges of produced water from oil and gas activities would be allowed only if they meet ACEC objectives. More restrictive management actions to protect wildlife habitat (e.g., increased buffer zones around lek habitat, greater seasonal restrictions, and increased controls and prohibitions on surface disturbing activities in wildlife habitat) would reduce the level of surface disturbance within the ACEC. Closing the area to new oil and gas leasing and locatable mineral entry would prevent the loss and degradation of wildlife habitats and maintain the conditions of the unique alkaline desert wetlands. Since the objectives of this area under the ACEC designation would be to protect the wetlands and wildlife present, it is unlikely that surface discharges would be allowed in the contributing watershed to these wetlands, unless it was shown to improve the health of these systems.

Off-road vehicular activity for "necessary tasks" would not be allowed under Alternative 3. This would minimize impacts associated with this activity, including habitat loss, loss of vegetation and forage, damage to sensitive riparian/wetland areas and harassment of wildlife species.

Enhanced wildlife stipulations, including NSO and seasonal timing restrictions required for surface disturbing and other disruptive activities, would minimize disturbance to nesting and wintering wildlife.

Summary

Under this alternative, the Chain Lakes Area would be designated as an ACEC. The ACEC designation would restrict and/or prohibit new mineral development within the area, allowing for increased protection of pronghorn winter habitat and unique alkaline desert wetlands. Therefore, Alternative 3 provides the greatest protection for the relevant and important values of the area.

4.13.7.5 Impacts Under Alternative 4: Preferred Alternative

Impacts on the Chain Lakes WHMA from grazing management would be the same as those in Alternative 3. Livestock grazing strategies would support the objectives for the WHMA and benefit other allotments where rest from grazing use is needed.

Minerals management actions would be more restricted under this alternative. Under this alternative, surface disturbing activities would not be allowed within 500 feet of the wetland complex, and surface discharges of produced water from oil and gas activities would be allowed only if they meet ACEC objectives. More restrictive management actions to protect wildlife habitat (e.g., increased buffer zones around lek habitat, greater seasonal restrictions, and increased controls and prohibitions on surface disturbing activities in wildlife habitat) would reduce the level of surface disturbance within the ACEC. Closing the area to new oil and gas leasing and locatable mineral entry would prevent the loss and degradation of wildlife habitats and maintain the conditions of the unique alkaline desert wetlands. Because the objectives of this area under the ACEC designation would be to protect the wetlands and wildlife present, it is unlikely that surface discharges would be allowed in the contributing watershed to these wetlands, unless it was shown to improve the health of these systems.

In addition, AMR for wildland fire would be managed in association with the private and state lands within the WHMA. This would not result in significant impacts on the Chain Lakes WHMA.

Summary

Impacts would be similar to those in Alternative 1. Management of surface disturbing activities to minimize disturbance within the unique alkaline wetlands would reduce the potential for pronghorn habitat degradation. Stipulations designed to protect wildlife habitat would be adequate, but would not provide as much protection as under Alternative 3.

4.13.8 Laramie Peak Wildlife Habitat Management Area

4.13.8.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the intermixed land ownership reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of wildlife habitat and forage.

Fire and fuels management actions would serve to maintain the existing wildlife habitat of the area by reducing fuel loading and controlling wildland fires.

In the immediate area of new water developments, livestock use would increase, reducing available forage for wildlife. Grazing practices would promote conditions that are in conformance with Standards for Healthy Rangelands (BLM 1997); therefore, livestock grazing would not cause wildlife habitat degradation. The prohibition of domestic sheep and goats within 9 miles of bighorn sheep habitat in the WHMA would reduce the potential for the spread of disease to bighorn sheep populations, thereby maintaining the overall health of the big horn sheep populations.

Impacts on Laramie Peak WHMA from mineral material sales, disposable minerals, and locatable minerals actions would include big game habitat loss and fragmentation and wildlife displacement.

Because the potential for oil and gas development is so low within the WHMA, impacts from these actions would be minimal.

Vegetation management would restore healthy, functioning native plant communities through reclamation of surface disturbing activities. In addition, vegetation management would enhance the health and diversity of plant communities through use of natural fire and management prescriptions (e.g., burning, plantings, seedings, and chemical, mechanical, biological, and grazing treatments). This would increase forage and the diversity of wildlife habitat.

4.13.8.2 Impacts Under Alternative 1: Continuation of Existing Management

Surface disturbance associated with lands and realty management would impact wildlife species and associated habitat through habitat loss and degradation and displacement of wildlife species. These impacts would result from the construction of linear features (e.g., power lines, roads, and pipelines) and other permitted facilities (e.g., wind turbines). Mitigation measures would reduce impacts on big game species in crucial winter range.

OHV management actions and recreation management actions would result in impacts on wildlife species and sensitive habitat. Impacts that might occur include not only wildlife stress and displacement but also habitat loss and fragmentation. However, the natural terrain of the Laramie Peak WHMA limits most traffic; therefore, impacts would be minor.

The existing level of vegetation treatments would not be sufficient to meet wildlife habitat objectives in the existing Laramie Peak Bighorn Sheep Habitat Management Plan. The lack of weed treatments and the proliferation of cheatgrass would continue, resulting in loss of forage and the degradation of wildlife habitat.

Summary

Under this alternative, the area would be managed as a wildlife habitat management area and would restrict surface disturbing activities to protect habitat conditions. Because of the proliferation of cheatgrass in this region and the dominance of late seral condition plant communities, habitat and forage would be significantly affected.

4.13.8.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Land tenure adjustments would not be pursued under Alternative 2. This would result in a decreased opportunity to acquire lands that would provide improved habitat and forage under BLM management.

There would be a reduction in the number and type of wildlife protection stipulations during project development under this alternative. Therefore, the potential to increase impacts on wildlife species during certain times of the year would increase. Particular resources that potentially would be negatively impacted are big game parturition areas, migration corridors, and transitional ranges.

Increases in vegetation treatments would result in a mixture of early, mid, and late seral conditions that would achieve wildlife objectives. The increase in weed treatments—specifically, invasive weeds such as cheatgrass—would minimize proliferation into native plant communities and enhance the values of wildlife habitat.

Summary

Increased vegetation and weed treatments would maintain and/or enhance forage and habitat for wildlife and livestock. Not pursuing land tenure adjustments would reduce BLM's ability to effectively manage for wildlife objectives. Reduced restrictions on surface disturbing activities would increase the potential for forage loss, human induced stress to wildlife species, and habitat fragmentation.

4.13.8.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Acquisition of adjacent lands would increase the opportunity for BLM to improve the quality and quantity of wildlife habitat. However, increased public access achieved through acquisition of lands adjacent to the Laramie Peak ACEC would lead to an increase in recreational activity. Impacts from increased public access would have the potential to increase wildlife habitat disturbance through greater human presence.

OHV use for necessary tasks would be analyzed before authorization to ensure wildlife and associated habitats are not adversely affected. Restricting OHV use to designated roads and vehicle routes would minimize impacts on crucial wildlife habitat.

Increases in vegetation treatments would result in a mixture of early, mid, and late seral conditions that would achieve wildlife objectives. The increase in weed treatments with an emphasis on noxious and invasive weeds, such as cheatgrass, would minimize proliferation into native plant communities and enhance the values of wildlife habitat.

Wildlife management actions would restore, improve, and enhance habitat conditions for big game species through increased restrictions on surface disturbing activities. Surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This priority would ensure that the wildlife and fish and their associated habitat and sensitive life cycles are protected.

Summary

Under this alternative, Laramie Peak would be designated as an ACEC. Crucial habitat for bighorn sheep, elk, and mule deer would be afforded the greatest protection because of restrictions on surface disturbing activities. Relevant and important values would be conserved through management actions of other resource programs.

4.13.8.5 Impacts Under Alternative 4: Preferred Alternative

The Laramie Peak area would be managed as a wildlife habitat management area. Management objectives would restore, improve, and enhance habitat conditions for big game species.

Acquisition of adjacent lands would increase the opportunity to acquire lands under BLM management to improve the quality and quantity of wildlife habitat. However, increased public access achieved through acquisition of lands adjacent to Laramie Peak Area would lead to an increase in recreational activity. Impacts from this would have the potential to increase wildlife habitat disturbance through greater human presence.

OHV use for "necessary tasks" would be analyzed before authorization to ensure wildlife and associated habitats are not adversely affected. Restrictions on OHV use to designated roads and vehicle routes would minimize impacts on crucial wildlife habitat.

Vegetation treatments for noxious and invasive species would be conducted, which would improve big game crucial winter range. Vegetation management and treatment actions to achieve DPC would improve wildlife habitat.

Surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would ensure that the wildlife and fish and their associated habitat and sensitive life cycles are protected.

Summary

Management of the Laramie Peak WHMA would result in protection of big game crucial winter range and allowance of multiple-use. Vegetation treatments designed to achieve DPC, restrictions on surface disturbing activities, and restrictions on off-road motorized vehicle use would benefit wildlife and livestock species through enhanced forage, reduction in habitat loss, and decreases in human induced stress.

4.13.9 Red Rim-Daley Wildlife Management Area

4.13.9.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the checkerboard land ownership reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of wildlife habitat and forage.

Fire and fuels management actions would serve to protect the big game wildlife habitat of the area by reducing fuel loading and controlling wildland fires. Wildland fire would be managed for AMR, which would most often result in suppression. There would be minimal impacts on unique values of the area.

Surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would ensure that the wildlife and fish and their associated habitat and sensitive time periods are protected.

Reclamation of surface disturbing activities would aid in restoring healthy, functioning native plant communities. In addition, vegetation management prescriptions, including burning, plantings, seedings and chemical, mechanical, and biological treatments would enhance the health and diversity of antelope crucial winter range and maintain the scenic values of the red sandstone uplift. These actions would provide a mosaic of diverse wildlife habitat types and age classes of vegetation.

Management actions related to water quality, watershed, and soils management would emphasize the protection and improvement of vegetation resources.

4.13.9.2 Impacts Under Alternative 1: Continuation of Existing Management

Surface disturbing activities in Red Rim-Daley WHMA associated with lands and realty and minerals management actions would increase disturbance and human presence, resulting in localized habitat loss and degradation and in short-term wildlife displacement. These impacts would occur from construction of linear features (e.g., power lines, roads, and pipelines) and other permitted facilities. Mitigation measures would reduce disturbance to wildlife species in crucial winter range, nesting raptors, and breeding Greater sage-grouse.

Off-road vehicle traffic allowed for "necessary tasks" would potentially disturb pronghorn crucial winter range. Impacts that would occur to wildlife species and associated habitat include habitat loss and degradation and displacement of wildlife species.

Wildlife habitat management actions would enhance pronghorn habitat in the Red Rim-Daley WHMA. Management actions would emphasize protection and/or enhancement of habitat through restrictions on surface disturbing activities and limitations on seasonal use. Timing and distance restrictions for nesting raptors and grouse species would decrease impacts on pronghorn crucial winter range through restrictions on surface disturbing activities.

Summary

Under this alternative, the WHMA would be managed for multiple use activities, with emphasis on pronghorn crucial winter range. Surface disturbing activities would result in localized habitat loss and degradation and in short-term wildlife displacement. However, seasonal restrictions on surface disturbing activities would help reduce these impacts.

4.13.9.3 Impacts Under Alternative 2: Emphasis on Development of Resources

The potential for impacts on wildlife species would be increased over Alternative 1 because of the reduction in wildlife stipulations.

Impacts from OHV use would be the same as those mentioned in Alternative 1.

Impacts from lands and realty management and minerals management actions would be similar to those in Alternative 1, except that some oil and gas activity would be allowed during crucial winter periods, increasing stress to wintering pronghorn and other wildlife. The disturbance zone timing stipulation would be reduced for active raptor nests, which would potentially increase disturbance to nesting raptors and pronghorn habitat.

Increase in vegetation treatments would promote a mixture of early, mid, and late seral conditions that would achieve wildlife objectives by resulting in a healthier mosaic of forage species.

Summary

Vegetation management actions would promote diverse, healthy forage. Surface disturbing activities would not be mitigated to the extent in Alternative 1, resulting in a potential loss of wildlife forage and habitat. A reduction in the timing stipulations would increase human induced stress to wildlife species, potentially resulting in displacement.

4.13.9.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Improved public access would be achieved through acquisition of lands adjacent to Red Rim-Daley ACEC and acquisition of easements across private lands adjacent to the ACEC. Acquisition of private lands and easements across private lands would allow for contiguous habitat management; however, it would increase human presence, which would introduce stress to wintering wildlife.

Minerals management actions would have increased restrictions under this alternative. Closing the area to new oil and gas leasing and locatable mineral entry would prevent the loss and fragmentation of wildlife habitats. Under Alternative 3, wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would ensure that the wildlife and fish and their associated habitat and sensitive time periods are protected. Surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Timing restrictions on disruptive activities in big game habitat, raptor nesting areas, and Greater sage-grouse strutting and nesting habitat would also reduce impacts on these values.

OHV use for necessary tasks would be analyzed before authorization to ensure wildlife and associated habitats are not adversely affected. Restricting OHV use to designated roads and vehicle routes would minimize impacts on crucial wildlife habitat.

A VRM Class II designation would benefit the Red Rim-Daley ACEC by restricting the placement of facilities so that they would not compromise the visual integrity of the ACEC.

Summary

Management objectives for the ACEC would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area. Increased restrictions on surface disturbing activities would reduce the loss of habitat and forage and stress to wildlife species. Pursuing land acquisitions would potentially result in contiguous management of wildlife habitat.

4.13.9.5 Impacts Under Alternative 4: Preferred Alternative

Intensive management of locatable minerals disturbance would restrict access seasonally across the area. Under this alternative, there would be an NSO stipulation in areas with raptor nests and Greater sage-grouse leks, which would protect the unique wildlife values identified for the potential ACEC.

Off-road vehicular travel for "necessary tasks" would be analyzed before authorization to ensure wildlife and associated habitats are not adversely affected. Restricting OHV use to designated roads and vehicle routes would minimize impacts on crucial wildlife habitat.

Vegetation management actions to achieve DPC would enhance pronghorn winter range under this alternative by creating a mosaic of communities with herbaceous and woody species.

Summary

Under this alternative, the Red Rim-Daley Area would be managed as a wildlife habitat management area and for compatible multiple use. Restrictions on surface disturbing activities would reduce the loss of wildlife forage and habitat and stress to wildlife species during critical periods. Increased vegetation management actions would enhance wildlife habitat.

4.13.10 Pennock Mountain Wildlife Habitat Management Area

4.13.10.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the intermixed land ownership reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of wildlife habitat and forage.

Fire and fuels management activities would contribute to the productivity and availability of big game habitat. Wildland fire would be managed for AMR, which would most often result in suppression. There would be minimal impacts on the unique values of the area.

Vegetation management would restore healthy, functioning native plant communities through reclamation of surface disturbing activities. Vegetation management also would enhance the health and diversity of plant communities through the use of natural fire and management prescriptions, such as burning, plantings, and seedings, and chemical, mechanical, biological, and grazing treatments. Vegetation treatments would have short-term impacts on Pennock Mountain Wildlife Habitat Management Area depending on the type and success of the treatment. Prescribed burns or other vegetation treatments would be designed to maintain the crucial wildlife habitat and improve the nutritional value of the forage. This would increase forage and the diversity of wildlife habitat.

Surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This priority would ensure that the wildlife and their associated habitat and sensitive time periods are protected.

Seasonal restrictions for lands and realty management actions and minerals management actions would minimize the impacts on wildlife during specific times of year. However, the human disturbance associated with construction activities would create stress to the wildlife, causing displacement of the species. The potential for mineral exploration and development is low.

Acquisition of adjacent lands ensures that these lands would be managed in accordance with BLM policy for protection of elk and mule deer crucial winter habitat. Currently, the Pennock Mountain Area is closed to human presence from November 15 to April 30. This restriction would reduce the potential for stress to elk and mule deer populations from human presence.

4.13.10.2 Impacts Under Alternative 1: Continuation of Existing Management

The area would be open to locatable mineral entry and mineral materials disposal. These activities would result in habitat loss, wildlife harassment, and potential displacement of animals, especially during sensitive time periods. However, implementation of seasonal restrictions, buffers, and timing stipulations would minimize impacts on wildlife and associated habitat.

The prohibition on livestock grazing within the management area would reduce competition between wildlife and livestock for forage. This would remove the use of livestock as a method of manipulating vegetation communities.

Off-road motor vehicle travel would only be allowed for "necessary tasks" between May 1 and November 14. This would result in minor impacts, such as habitat loss and fragmentation, as well as wildlife stress during this time of the year.

Improved public access achieved through acquisition of lands adjacent to Pennock Mountain WHMA and easements through private lands would lead to higher recreational visitation. Impacts from this would have the potential to increase wildlife habitat disturbance through greater human presence during the summer months. However, land tenure agreements would result in improved BLM management of wildlife habitat.

Summary

Seasonal restrictions on surface disturbing activities and prohibiting livestock grazing would reduce stress on wildlife species during critical times. Increased public access through land acquisitions would increase human induced stress. BLM's ability to effectively manage for wildlife habitat would be increased through land acquisitions.

4.13.10.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts on Pennock Mountain WHMA from livestock grazing and OHV management would be the same as those described in Alternative 1.

There would be a reduction in the number of protective measures for wildlife species under this alternative. This reduction would potentially result in increased stress to wildlife species during the summer months. Additional impacts would include loss, degradation or fragmentation of habitat, and displacement of wildlife species from areas disturbed by authorized activities such as linear features and other permitted facilities. However, because of the low potential for mineral development this impact would be minimal.

Summary

Seasonal restrictions would be less restrictive. However, mineral development is unlikely to occur; therefore, associated disturbances to wildlife and their habitats would be minimal.

4.13.10.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

The Pennock Mountain WHMA would be managed as a vacant allotment for livestock use. Grazing use would be licensed on a temporary, non-renewable basis to maintain the vegetation values and support wildlife use within the unit. The use in the unit would allow deferment or rest of other allotments in the RMPPA to promote improved wildlife habitat and/or allow recovery following wildfires and vegetation treatments. Livestock management actions (i.e., water improvements) would be designed to maintain and enhance overall habitat. This would be accomplished through strategic placement, which would promote dispersion of livestock throughout the area.

Closing the area to locatable mineral entry and mineral material sales, in addition to restrictions on OHV use, would reduce the potential for forage loss and stress to elk and mule deer populations from human presence.

This alternative would provide the most protection to raptor nests, big game parturition areas, and Greater sage-grouse leks through NSO stipulations, as well as timing and seasonal restrictions. The unique wildlife values identified for the WHMA would be protected through restrictions. Development of oil

and gas activities would be implemented according to BMPs for big game crucial winter range, which would reduce impacts on elk and mule deer populations. Seasonal restrictions on disruptive activities in big game habitat, raptor nesting, and Greater sage-grouse strutting and nesting habitat would also reduce stress induced by human presence. In addition, activity would not be permitted at night within one-quarter mile of Greater sage-grouse leks, which would reduce disturbance to breeding grouse.

Summary

Impacts would not be significant. The WHMA and associated crucial winter habitat for elk and mule deer would be afforded the greatest level of protection through restrictions on surface disturbing activities, reduced human presence during critical times, and using livestock as a management tool for wildlife objectives.

4.13.10.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from OHV management and the management of the Pennock Mountain WHMA would be the same as those under Alternative 1.

Livestock grazing on the Pennock Mountain WHMA would be the same as those described in Alternative 3.

Timing stipulations on surface disturbing activities would reduce impacts on raptors, big game habitat and parturition areas, and Greater sage-grouse leks and nesting habitat, compared with Alternative 1. Management measures under the WHMA would afford sufficient protection of values for big game and raptor species.

Intensive management of minerals related surface disturbance would restrict access seasonally across the area. Seasonal restrictions on disruptive activities in big game habitat, raptor nesting, and Greater sage-grouse strutting and nesting habitat, as well as prohibition of human presence at night would also reduce stress to wildlife species. Surface disturbing or disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). Wildlife habitat objectives would be considered for all surface disturbing activities. Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would ensure that wildlife species and their associated habitat would be protected during sensitive periods of their life cycle.

Summary

The WHMA would provide for multiple use and would afford protection for crucial winter habitat for elk and mule deer. Management actions from wildlife, vegetation, and livestock management would maintain and enhance Critical habitat and forage. Wildlife habitat objectives would be considered for all surface disturbing activities.

4.13.11 Wick-Beumee Wildlife Habitat Management Area

4.13.11.1 Impacts Common to All Alternatives

Under the MOU between BLM and the WGFD, the 280-acre parcel of BLM land associated with the Wick-Beumee WHMA reserves the grazing use for elk and other wildlife. In addition, the area is closed to human presence and motorized vehicle use, including over-the-snow vehicles, from November 16

through May 31. The impacts from these two stipulations would have a beneficial impacts on wildlife for which the Management Unit was established.

4.13.11.2 Impacts Under Alternative 1: Continuation of Existing Management

There would be no significant impacts on the continued operation of the unit by the WGFD for the purposes intended under this alternative from any BLM program management decision or activity.

Summary

Under this alternative, there would be no significant impacts on the continued ability of the unit to serve it intended purpose from any BLM program activity.

4.13.11.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts under this alternative would be the same as those under Alternative 1 for all resources.

Summary

Impacts under this alternative would be the same as those under Alternative 1 for all resources.

4.13.11.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Additional protections added to this area as a result of closure to locatable mineral entry, pursuit of withdrawals, closure to operation of the public land laws, closure to mineral material sales, closure to oil and gas leasing with intensive management of existing leases, active acquisition of adjacent parcels, and avoidance of surface disturbing activities in aspen communities would enhance the ability of this parcel to positively contribute to the objectives of the Wick-Beumee WHMA.

Summary

Impacts under this alternative would be similar to those under Alternative 1, except that additional protections would be provided to this isolated parcel.

4.13.11.5 Impacts Under Alternative 4: Preferred Alternative

Acquisition of neighboring parcels, pursuit of withdrawals, and closure to operation of the public land laws would increase the ability of this parcel to contribute to the effectiveness of the Wick-Beumee WHMA. All other impacts under this alternative would be similar to those described under Alternative 1.

Summary

Impacts under this alternative would be similar to those under Alternative 1, except that additional protections would be afforded to this isolated parcel.

4.13.12 Shirley Mountain SRMA

4.13.12.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the intermingled land

ownership reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of wildlife habitat and forage.

AMR would most often result in fire suppression. There would be minimal impacts on unique values of the area. Fire and fuels management actions would serve to protect the big game wildlife habitat.

Because the potential for development is low, impacts from minerals management actions to the area would be minimal.

4.13.12.2 Impacts Under Alternative 1: Continuation of Existing Management

Under Alternative 1, the Shirley Mountain Caves SRMA (24,440 acres) (Map 2-14) would be managed to provide for protection and enjoyment of the cave system, whereas other resource uses would be allowed aboveground. There would be no additional management actions for the protection for bat species under this alternative. The lack of special management for bat species would result in loss of habitat, displacement, and disturbance to bat species that depend on the cave complex.

Human visitation to the cave during critical time periods could impact the cave ecosystem, and the bat species dependent on associated climatic conditions. Uncontrolled human presence within the cave changes temperatures and humidity levels outside species requirements, which would impact the breeding success rates and increases bat mortality during hibernation. The seasonal closure of the Cave Creek Cave to human occupancy from November 1 through March 31 would reduce human impacts on the cave system. However, potential easement acquisition would increase human visitation to the cave resulting in further degradation to the cave ecosystem.

Current forest management practices, such as restriction of timber harvest within 500 feet of riparian habitat and associated buffer zones, and mitigation requirements on steep slopes, would reduce disturbance and disruption of species, especially big game species, and would help to maintain the integrity of the habitat.

Summary

Alternative 1 would provide adequate protection to most wildlife resources in the area. However, because timber harvesting would be allowed in the watershed above the caves would alter the hydrology, the climatic and ecological conditions required for the bat species within the cave system would not protected.

4.13.12.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Under Alternative 2, the Shirley Mountain Caves SRMA, including the Cave Creek Cave, would not be maintained and the area would be managed as a multiple-use area. Management actions under this alternative would focus on Cave Creek Cave, and the protection of the cave complex and associated bat species. Overall, management actions proposed under this alternative would benefit these sensitive species.

Timber harvest would be intensively managed within ¼ mile of the cave to meet bat cave management objectives. Intensive management would provide protection to the cave ecosystem by maintaining climatic conditions that are essential for bat species.

Shirley Mountain would be downgraded from VRM Class II to VRM Class III. This would provide less protection of the visual qualities, which could potentially reduce the quality of the recreational experience in the area.

Summary

Intensive management of timber harvesting within one-quarter mile of the cave complex would help maintain the hydrology that creates the climatic and ecological conditions required for bat species to maintain a viable population within the cave system.

4.13.12.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Under Alternative 3, the Shirley Mountain Caves SRMA would not be maintained, and the area would be managed as an ACEC (520 acres). Management actions, including seasonal closures for cave use would focus on Cave Creek Cave, and the protection of the cave complex and associated bat species. These actions would benefit these sensitive species.

The unique characteristics of the cave complex would be enhanced through restrictions on timber harvesting within one-half mile of the bat cave complex. This action would benefit the sensitive bat species that require specific temperatures and humidity during breeding and hibernating periods.

Under this alternative, public lands would be closed to operation of public lands laws, including sale, and withdrawals would be pursued. These actions would benefit the unique cave complex by maintaining public ownership and federal management. Further, land acquisitions would provide greater control over management activities on adjacent lands.

Impacts on Shirley Mountain Bat Cave Potential ACEC from recreation management would have the same type of impacts as Alternative 1.

Summary

Not allowing timber harvesting within one-half mile of the cave complex would maintain the hydrology that creates the climatic and ecological conditions required for bat species to maintain a viable population within the cave system.

4.13.12.5 Impacts Under Alternative 4: Preferred Alternative

Under Alternative 4, the Shirley Mountain Caves SRMA would not be maintained, and the area would be managed as an ACEC (240 acres). The Shirley Mountain Bat Cave ACEC management would benefit the cave ecosystem by controlling human presence. Management actions would focus on Cave Creek Cave and the protection of the cave complex and associated bat species. These would include seasonal closure to human occupancy from October 15 through April 30, which would reduce human disturbance to both the cave system and bat species.

Timber harvest would not be allowed within one-quarter mile of the bat cave complex, providing protection to the cave ecosystem by maintaining the climatic conditions that are essential for bat species.

Withdrawals from land tenure adjustments, including sale, would be pursued. Land acquisitions would provide greater control over management activities, such as timber harvesting, on adjacent lands, which would ensure the climatic stability of the cave for breeding bats. Acquisition of lands would increase recreational visitation to the general area.

Summary

Not allowing timber harvesting within one-quarter mile of the cave complex would maintain the hydrology that creates the climatic and ecological conditions required for bat species to maintain a viable population within the cave system.

Increasing the seasonal closure under this alternative would afford additional protection of the bat species.

4.13.13 Laramie Plains Lakes Area

4.13.13.1 Impacts Common to All

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the intermixed land ownership reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of wildlife habitat and forage.

There would be minimal impacts on unique values of the area as a result of fire management activities. Wildland fire would be managed for AMR, which would most often result in suppression.

Reclamation of surface disturbing activities would aid in restoring healthy, functioning native plant communities. In addition, vegetation management prescriptions, including burning, plantings, seedings and chemical, and mechanical and grazing treatments would be designed to enhance the health and diversity of the potential Wyoming toad habitat.

Management actions related to water quality, watershed, and soils management would emphasize the protection and improvement of potential Wyoming toad habitat.

Wyoming toad habitat objectives would be considered for all surface disturbing activities. Surface disturbing or disruptive activities would result in habitat loss, degradation, fragmentation, and displacement of potential Wyoming toad populations. Surface disturbance would increase the potential for introduction and proliferation of invasive plant species, potentially harming riparian vegetation critical for Wyoming toad populations.

4.13.13.2 Impacts Under Alternative 1: Continuation of Existing Management

Off-road vehicular travel for "necessary tasks" would be allowed throughout the area. Improved public access would be achieved through acquisition of adjacent lands to the Laramie Plains Lakes area. Additional or improved access would lead to a more recreational visitation. Impacts would include increased surface disturbance, soil and vegetation compaction, and an increase in two tracks.

The potential for impacts from lands and realty and minerals management actions would be low as a result of the low potential for development within the area. Impacts would include habitat loss, degradation and fragmentation, and displacement of potential Wyoming toad habitat from the construction of linear features (e.g., power lines and roads) and other permitted facilities. Surface disturbance areas would increase the potential for proliferation of invasive plant species, potentially changing the vegetation component required for Wyoming toad populations. Intensive management would be required to ensure that this would not occur. As potential Wyoming toad habitat is within avoidance areas for surface disturbing activities the potential for impacts is low.

Summary

Pursuit of public land acquisitions could increase the potential for expansion of Wyoming toad habitat. However, increased access associated with acquisitions could increase impacts from surface disturbing and disruptive activities.

4.13.13.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from minerals, lands and realty, and OHV management would be the same as those under Alternative 1.

Acquisition of additional public lands would not be pursued, which would limit the opportunity to expand potential Wyoming toad habitat. Conversely, the potential for recreational visitation would decrease as compared to Alternative 1, thereby reducing probable disturbance to potential Wyoming toad habitat.

Summary

Public land acquisitions would not be pursued within the Laramie Plains Lakes Area, potentially limiting management opportunities for the benefit of Wyoming toad habitat.

4.13.13.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Acquisition of lands would be pursued to expand potential Wyoming toad habitat. In addition, public lands within the ACEC would not be disposed of, thereby protecting potential Wyoming toad habitat. This would improve the overall quality and quantity of habitat.

Closure of the ACEC to operation of the public land laws, locatable minerals, new oil and gas leasing, and common variety mineral disposals would further reduce potential loss of Wyoming toad habitat. Restrictions on surface disturbing activities, including seasonal restrictions, species-specific buffers, practicing BMPs, and intensive management, would minimize impacts. Intensive management of all authorized actions within the ACEC would ensure that potential Wyoming toad habitat is not destroyed.

Prohibiting all forms of OHV travel would maintain potential Wyoming toad habitat through reductions in potential surface disturbance.

Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would result in the maintenance or enhancement of the vegetation component necessary for Wyoming toad habitat.

Summary

Closure of the ACEC to operation of the public land laws, locatable minerals, new oil and gas leasing, and common variety mineral disposals would further reduce potential loss of Wyoming toad habitat by reducing the probability of surface disturbance. Additional or improved access to the area would likely increase soil compaction and surface disturbance in the area, resulting in a greater loss of potential Wyoming toad habitat. Management for DPC would maintain or enhance Wyoming toad habitat.

4.13.13.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from OHV and minerals management would be the same as those under Alternative 1.

Acquisition of lands would increase the opportunity to expand BLM jurisdiction in potential Wyoming toad habitat. Closure of the WHMA to land tenure adjustments and not allowing disposals of public lands would keep potential Wyoming toad habitat under BLM jurisdiction. This would benefit the species by ensuring surface disturbing activities do not degrade or fragment potential habitat. The improved access that would result from land acquisitions would lead to more recreational visitation. Impacts would include increased surface disturbance, soil and vegetation compaction, and an increase in two track roads.

Priority would be given to achieving DPC for wildlife habitat (Appendix 19 and Appendix 24). This would result in the maintenance or enhancement of the vegetation component necessary for Wyoming toad habitat.

Summary

Impacts would be similar to Alternative 1. However, limiting off-road vehicular use for necessary tasks and mineral entry activity would also help to maintain habitat for the endangered Wyoming toad.

4.13.14 Historic Trails (Cherokee, Overland, Rawlins to Baggs, and Rawlins to Fort Washakie)

4.13.14.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the historic resource values of the area to meet management objectives. However, the checkerboard land ownership reduces BLM's ability to effectively manage for cultural values. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of historic values. These actions might have impacts that carry over to the adjacent BLM lands and reduce the potential for properties to be listed on the National Register.

Surface disturbance associated with fire and fuels management, lands and realty management, livestock grazing management, and minerals management that occurs within the viewsheds of the historic trails would create visual intrusions and degrade the visual integrity and historic values of the trails. However, in accordance with the Wyoming Mitigation Guidelines for Surface Disturbing and Disruptive Activities (Appendix 1), areas within one-quarter mile of historic trails where the setting contributes to the NRHP eligibility would be avoidance areas for all surface disturbing activities. Development would be allowed with intensive mitigation on a case-by-case basis. Implementation of these measures would reduce the level of visual intrusion to the trails' viewsheds, which would help protect the values for which they are eligible to the NRHP.

Consideration of the contributing setting in conjunction with compliance with laws and regulations would help to mitigate development-related impacts within the setting, ensuring that significant effects do not occur (Appendix 5). The ability to manage the setting of the historic trails would be limited in the checkerboard landownership areas because federally stipulated mitigation measures would apply to only those actions on federally administered lands or on undertakings with federal involvement (Appendix 5). Impacts would likely occur on adjacent parcels where BLM has no management responsibilities.

Wildland fire suppression activities (e.g., construction of fire lines, bulldozing access roads, and general movement of heavy equipment) would create surface disturbances and resultant visual intrusions to the trails' viewsheds. On large fires, cultural resource specialists would be present to ensure that suppression activities do not adversely affect known historic properties. To ensure protection of cultural properties, cultural resource specialists occasionally inventory fire lines and access roads before suppression activities.

Impacts on the historic trails from OHV use would be minimal. OHV use would be allowed on only those portions of the trails where such use would not result in adverse impacts. Uses that would potentially cause an adverse effect would be evaluated on a case-by-case basis. This effort would ensure the protection of the physical integrity of the historic trails while allowing for OHV use.

Travel, camping, historic reenactments, and other recreational activities would potentially affect the physical integrity of the trails. Impacts might include modification of original ruts and swales and displacement of associated historic artifacts and features. Interpretive signs and markers along the historic trails would be used to reduce these impacts by educating the public about the importance of historic preservation.

General vegetation management actions designed to protect and maintain vegetation resources within the viewshed of historic trails would indirectly help maintain the physical integrity of the historic trails. Implementing the Standards for Healthy Rangelands (BLM 1997) would maintain or improve soil stability and vegetation cover, thus protecting the historic trails. Over the long term, vegetation treatments would improve vegetation cover and soil stability and would protect the physical integrity of the trails. Vegetation treatments would also restore a more natural landscape, which would potentially restore the setting of the trails.

VRM actions would provide protections to the viewsheds of historic trails. Segments of the historic trails that are located within VRM class I and II areas would benefit from preclusion or intensive mitigation of surface disturbing activities and associated visual impacts. In addition, management actions that require structures to blend into the landscape on portions of the historic trails where the setting contributes to NRHP eligibility would further protect the visual integrity of the historic trails (Appendix 5).

4.13.14.2 Impacts Under Alternative 1: Continuation of Existing Management

The Overland Trail and the Cherokee Trail area would be managed for the preservation of historic values.

Wildland fire suppression activities would be managed for AMR, which would consider protection of natural and cultural resources. This would likely limit the degree and location of suppression activities and thereby reduce the potential for such activities to create visual intrusions and degrade the visual integrity and historic values of the trails.

Management actions associated with lands and realty management, livestock grazing management, and leasable, locatable, and common variety minerals management that result in development projects within the trails' setting that contributes to NRHP eligibility would be mitigated. The area within one-quarter mile (or the visual horizon) of the trails would be an avoidance area for surface disturbing activities. This would reduce surface disturbance in proximity to the trails and minimize related visual intrusions. Consequently, there would be no direct impacts on the trails where the setting contributes to NRHP eligibility.

Designing livestock grazing systems to improve or maintain desired range conditions would serve to maintain vegetation cover and soil stability, which would help to protect the physical integrity of the historic trails.

Avoidance or intensive management of surface disturbing activities in sensitive wildlife habitats would provide indirect protection to segments of the historic trails located in these areas by reducing surface disturbance and related visual intrusions. The historic trails and their viewsheds would be completely protected in active raptor nesting areas where surface disturbing activities are prohibited.

Summary

Surface disturbing activities would create visual intrusions to the viewsheds of the trails and degrade the visual integrity and historic values of the trails. However, these impacts would be mitigated by cultural resources management actions and implementation of federal regulatory laws, actions, and guidelines designed to protect cultural resources. Restricting activities that would adversely affect contributing trail segments or requiring mitigation measures would ensure that the physical integrity of these segments would be preserved. Consequently, direct impacts on the historic trails where the setting contributes to NRHP eligibility would not occur. This would protect the trails from activities that might compromise the values for which they are eligible to the NRHP. Significant impacts would not be expected to occur because the level of development and activity that would occur in the area would be compatible with the objectives and management prescriptions for the area.

4.13.14.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from locatable and common variety minerals management will be the same as under Alternative 1.

Impacts on the historic trails from fire and fuels management would be similar to those identified in Alternative 1, except that emphasis would be placed on the suppression of all wildland fires. This would increase suppression activities and related surface disturbance and increase the level of visual intrusions to the historic trails.

Impacts on the historic trails from lands and realty management, livestock grazing management, and leasable minerals management would be similar to those identified in Alternative 1. However, a greater number of development projects are anticipated throughout the RMPPA because of fewer restrictions being placed on other resource programs. Compliance with laws and regulations would mitigate adverse effects to the visual integrity of the setting (Appendix 5). Collective, adverse effects would result from allowing multiple developments with less restrictive mitigation. Individually, these might not compromise the values for which the trails are eligible; however, when several developments are permitted with less restrictive mitigation, the historic trails setting could be compromised to the point that it is no longer contributing to the overall eligibility.

Impacts on the historic trails from vegetation management would increase under this alternative. Conducting a greater number of vegetation treatments would increase short-term losses of vegetative cover but would benefit the historic trails through increased soil stability over the long term.

Fewer VRM Class II designations, especially in the checkerboard landownership areas, would increase potential impacts on the historic trails. Surface disturbing activities would be allowed over a larger area with fewer restrictions, potentially resulting in increased visual intrusions to the viewshed of the historic trails.

Impacts on the historic trails from wildlife and fisheries management would be similar to those identified in Alternative 1, except that less restrictive management actions to protect wildlife habitat (e.g., elimination of buffer zones around lek habitat, weaker seasonal restrictions, and elimination of controls and prohibitions on surface disturbing activities in big game habitat) would allow for increased levels of surface disturbance within the viewshed of the historic trails.

Summary

Impacts under this alternative would be similar to those identified in Alternative 1. However, an increase in the number of proposed mineral developments, fewer restrictions on surface disturbing activities from other resource programs, and a decrease in VRM class II designations in the checkerboard area would potentially result in collective, adverse effects to the values for which the trails are eligible. Consequently, the setting of the historic trails would be compromised to the point that it is no longer contributing to the overall eligibility, thereby resulting in significant impacts.

4.13.14.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Protections to the historic trails that result from cultural resource management would increase under this alternative. Prohibiting surface disturbing activities within one-quarter mile of historic properties where the setting contributes to the NRHP eligibility would eliminate all surface disturbance-related impacts within these areas.

Impacts on the historic trails from fire and fuels management would be similar to those identified in Alternative 1, except that a decrease in wildland fire suppression activities would decrease the level of visual intrusions to the viewsheds of the historic trails. Although the potential for degradation of the trails' viewsheds would decrease, impacts from post-fire rehabilitation activities would increase. In addition, the extreme heat associated with the increased intensity of wildland fires would increase the potential for damage to historic artifacts associated with the trails.

Impacts on the historic trails from lands and realty management, livestock grazing management, and minerals management would be similar to those identified in Alternative 1, except that increased restrictions on surface disturbing activities would greatly reduce potential impacts. Prohibitions on surface disturbing activities within the Historic Trails ACEC, implementation of NSO stipulations on new oil and gas leases, pursuance of withdrawals, and closures to mineral material disposals and locatable mineral entry would protect the physical integrity of the trails and any associated sites or segments from adverse physical impacts.

The area within 5 miles of the historic trails where the setting contributes to the NRHP eligibility would be designated as VRM Class II. Developments associated with lands and realty management, livestock grazing management, and leasable minerals management within the VRM Class II areas would be required to repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape (Appendix 25). This would increase the protections to the visual integrity of the historic trails within these areas. However, as the majority of the historic trails in the RMPPA occur in the alternating checkerboard land ownership area, this management action would only effectively protect the setting of the historic trails if there were federal involvement in the proposed undertaking (Appendix 5).

Those areas of the Historic Trails ACEC that overlap with the proposed Sand Hills ACEC and the Upper Muddy Creek Watershed/Grizzly Area would benefit from the additional restrictions to surface disturbing activities in those areas. Additional restrictions would provide increased protection to the physical trace and the setting of the historic trails.

Managing soils and vegetation for DPC, would reduce the potential for impacts on the physical integrity of the historic trails by enhancing specific plant communities, which would improve soil stability. These actions would encourage preservation of the historic trails in their current condition.

Impacts from wildlife and fish management actions on cultural resources would be similar to those impacts identified in Alternative 1, except that restrictions on surface disturbances would increase in sensitive wildlife habitat areas. A greater number of areas would be avoidance areas for surface disturbing activities under this alternative. This would result in fewer potential impacts on the setting that contributes to the historic trails' NRHP eligibility. Additional restrictions within big game crucial winter range and within 2 miles of Greater sage and sharp-tailed grouse leks would protect the visual setting of the historic trails in those areas.

Summary

Actions under this alternative would provide the most protection to the physical and visual integrity of the historic trails. The VRM Class II designation within 5 miles (or the visual horizon) of the historic trails would preclude or further restrict a greater number of developments over a larger area. The setting of the historic trails that contributes to NRHP eligibility would benefit because management actions would require developments to blend into the landscape, thus not producing an adverse effect to the setting of the historic trails (Appendix 5 and 25).

Prohibiting all surface disturbing activities within the ACEC and closing the area to locatable mineral entry and common variety minerals disposals would protect the physical and visual integrity of the historic trails and any associated sites or segments, thereby maintaining the relevant and important values for which the area was designated an ACEC. Significant impacts would not be expected to occur because the level of development and activity that would occur in the ACEC would be compatible with the objectives and management prescriptions for the area.

4.13.14.5 Impacts Under Alternative 4: Preferred Alternative

Impacts on the historic trails from cultural resources management would be the same as those identified in Alternative 3.

Impacts on the historic trails from fire and fuels management would be the same as those identified in Alternative 1.

Impacts on the historic trails from lands and realty management, livestock grazing management, and minerals management would be similar to those identified in Alternative 1, except that greater restrictions on surface disturbing activities would provide further protection to the visual and physical integrity of the trails. The area within one-quarter mile (or the visual horizon) of the historic trails where the setting contributes to the NRHP eligibility would be open to oil and gas leasing with an NSO stipulation, closed to locatable mineral entry, and closed to mineral material disposals. This would reduce the level of surface disturbance in proximity to the trails and ensure the protection of the physical and visual integrity of the trails.

The area within 2 miles of the historic trails where the setting contributes to the NRHP eligibility would be designated as VRM Class II. Developments within the VRM Class II areas would be required to repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape (Appendix 25). This would ensure the protection of the integrity of setting of the historic trails within these areas. Although these management actions would only apply to those actions on federally administered lands or on undertakings with federal involvement, this action would effectively protect the majority of the setting of the historic trails within the checkerboard landownership area.

Vegetation treatments would be increased throughout the RMPPA under this alternative. This would not only increase short-term losses of vegetative cover, but also benefit the historic trails through increased

soil stability over the long term. Managing soils and vegetation for DPC would reduce the potential for impacts on the physical integrity of the historic trails by enhancing specific plant communities, which would improve soil stability. These actions would encourage preservation of the historic trails in their current condition.

Impacts on the historic trails from wildlife and fisheries management would be similar to those identified in Alternative 1, except that more restrictive management actions to protect wildlife habitat (e.g., increased buffer zones around lek habitat, greater seasonal restrictions, and increased controls and prohibitions on surface disturbing activities in wildlife habitat) would increase indirect protections to the historic trails by reducing surface disturbance.

Summary

Impacts on the historic trails would be similar to those identified in Alternative 1. Most impacts on the historic trails would continue to be mitigated by cultural resources management actions and implementation of federal regulatory laws, actions, and guidelines designed to protect cultural resources (Appendix 5). However, increased restrictions on surface disturbing activities under this alternative would likely reduce impacts compared with Alternative 1. The designation of VRM Class II within 2 miles of the historic trails would ensure that federally involved management actions would be mitigated so as to not compromise the visual integrity of the trails. Prohibiting all surface disturbing activities within one-quarter mile of the trails where the setting contributes to the NRHP eligibility and closing the area to locatable mineral entry and common variety minerals disposals would protect both the physical and visual integrity of the historic trails. Significant impacts would not be expected to occur because the level of development and activity that would occur in the area would be compatible with the objectives and management prescriptions for the area.

4.13.15 Blowout Penstemon Area

4.13.15.1 Impacts Common to All Alternatives

Protection of cultural resource sites under the NHPA within the Blowout Penstemon Area would provide indirect, localized protection to blowout penstemon potential habitat. Restricting surface disturbing activities within one-quarter mile of cultural properties (if the setting contributes to NRHP eligibility) would reduce the level of disturbance within potential habitat areas and increase the potential for expansion of the population.

Increased use of wildland fire for resource benefit and vegetation treatments would allow wildland fire to play its natural ecological role (subject to suppression needs), thereby improving vegetative and soil conditions, including the areas where blowout penstemon occurs.

Surface disturbance associated with livestock grazing would reduce competition from competing plants and promote potential expansion of blowout penstemon populations. Conversely, grazing of the blowout penstemon plant during extended periods of drought or during the reproductive period of the plant would potentially reduce the viability of the population.

Blowout penstemon is federally listed as an endangered plant and receives protection under the ESA. Therefore, direct disturbance to blowout penstemon from any activities on BLM-administered lands would not occur. Locations where blowout penstemon has been identified would be avoidance areas for all surface disturbing activities on federal lands. Surface disturbing activities would be intensively managed in these areas. However, surface disturbing activities would be allowed in blowout penstemon potential habitat, which would indirectly affect the future expansion of the population.

Surface disturbance associated with lands and realty management, livestock grazing management, and minerals management that occurs within the Blowout Penstemon Area has the potential to disturb and degrade blowout penstemon potential habitat. This could in turn reduce species recruitment and the amount of area available for expansion of the population.

OHV use within the Blowout Penstemon Area would increase the potential for invasive weed proliferation, which could result in increased competition for nutrients, water, and space between weed species and blowout penstemon. This would degrade blowout penstemon potential habitat areas and increase the potential for loss of individual plants.

Vegetation management actions would maintain or enhance the habitat of the blowout penstemon, ensuring future success of the plant.

4.13.15.2 Impacts Under Alternative 1: Continuation of Existing Management

The Blowout Penstemon Area would be managed with emphasis of management for the plant, which would protect blowout penstemon habitat and the research potential of the species.

Wildland fire suppression activities would be managed for AMR, which would include consideration of natural and cultural resources. This would help limit impacts on blowout penstemon potential habitat by considering this species when determining the degree and location of suppression activities.

Land tenure adjustments (acquisitions, easements, and exchanges) would reduce the potential for surface disturbing activities to degrade blowout penstemon habitat or remove individual plants on non-federal inholdings. Increasing the amount of blowout penstemon habitat under federal jurisdiction would ensure that the species receives protection from federal agencies.

Allowing off-road vehicular travel for "necessary tasks" would increase the potential to degrade blowout penstemon potential habitat and inadvertently damage or remove individual plants. However, because the frequency of this activity is expected to be low, related impacts would be minimal.

Summary

Surface disturbing activities that occur in blowout penstemon potential habitat would indirectly affect the future expansion of the population. Land tenure adjustments would be pursued to reduce the effects of surface disturbance associated with nonfederal inholdings and thereby protect additional blowout penstemon habitat areas. Intensive management of surface disturbing activities would prevent direct impacts on blowout penstemon on BLM-administered lands. Significant impacts would not be expected to occur because the level of development and activity that would occur in the area would be compatible with the objectives and management prescriptions for the area.

4.13.15.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts on the Blowout Penstemon Area would be the same as those identified in Alternative 1 for all resource programs, except that land tenure adjustments would not be pursued. The absence of land tenure adjustments (acquisitions, easements, and exchanges) would not limit surface disturbance associated with nonfederal inholdings, as would be the case under Alternative 1. Consequently, blowout penstemon habitat would not be afforded additional protection under federal ownership. Significant impacts would not be expected to occur because the level of development and activity that would occur in the area would be compatible with the objectives and management prescriptions for the area.

Summary

Impacts under this alternative would be similar to Alternative 1, except that land tenure adjustments would not be pursued, potentially limiting management opportunities for the benefit of blowout penstemon habitat.

4.13.15.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts on the Blowout Penstemon ACEC from lands and realty management would be the same as those identified in Alternative 1.

Managing fire suppression activities for early succession of plant communities would ensure that the natural processes of the sand dune complexes continue to create viable habitat for the blowout penstemon.

Closing the area to locatable mineral entry and mineral material disposals would reduce surface disturbance within the ACEC. This action would protect the existing plant community and protect potential habitat. Prohibitions on surface disturbing activities within blowout penstemon potential habitat would enable the species to proliferate, possibly to the extent that it would no longer require protection under ESA.

Impacts on the Blowout Penstemon ACEC from OHV use management would be similar to those identified in Alternative 1, except off-road vehicular travel for "necessary tasks" would not be allowed. This would reduce the potential to degrade blowout penstemon potential habitat and inadvertently damage or remove individual plants.

Designating the area as an ACEC would help to maintain and enhance blowout penstemon habitat and research potential by providing additional protection to potential habitat within the sand dune complexes. It would allow research goals to be fulfilled, ensure the viability and expansion of the species, and possibly result in delisting the species from the ESA.

Summary

Impacts under this alternative would be similar to Alternative 1, except that designating the area as an ACEC would promote additional protection for blowout penstemon habitat through restrictions on surface disturbing and disruptive activities. Although surface disturbing and disruptive activities would still affect the future expansion of the population, the relevant and important values of the ACEC would be protected.

4.13.15.5 Impacts Under Alternative 4: Preferred Alternative

Impacts would be the same as those identified in Alternative 3.

4.13.16 Upper Muddy Creek Watershed/Grizzly Area

4.13.16.1 Impacts Common to All Alternatives

Impacts from transportation and access and the associated road network would include accelerated erosion throughout the area. This would impact native fish habitat by increasing sediment delivery to the streams. This would also impact riparian function and reduce the availability of hard substrate (gravels, cobbles) required by many native fishes. Upland habitat would also be degraded because of increased erosion.

The area would be open to locatable mineral entry and mineral material disposal. Given the presence of a very unique native fish fauna, reintroduction area for CRCT and high ecological diversity of the area, surface disturbing activities (e.g., road construction) would impact the conservation of sensitive fish and wildlife species in the RMPPA by increasing sedimentation rates and altering local hydrological conditions.

Vegetation management would enhance the health and diversity of plant communities through the use of natural fire and management prescriptions, such as burning, plantings, seedings, and chemical, mechanical, biological, and grazing treatments. This would increase forage and the diversity of wildlife habitat.

Wildlife and fish species would benefit from improved vegetative conditions resulting from water quality, watershed, and soils management actions.

Surface disturbing and disruptive activities within big game crucial winter range would require the use of best management practices designed to reduce the amount of human presence and activity during the winter months (Appendix 15). This would prevent loss of habitat, forage and cover during sensitive life cycles. Wildlife habitat objectives would be considered for all surface disturbing activities.

4.13.16.2 Impacts Under Alternative 1: Continuation of Existing Management

Implementation of management actions associated with reintroduction efforts for Colorado River cutthroat trout would impact the Upper Muddy Creek Watershed/Grizzly area by improving habitat conditions for native coldwater fishes. The implementation of these reintroduction efforts above the confluence of Muddy and McKinney Creeks would primarily benefit coldwater fishes. However, this would not benefit the conservation of the entire fauna of native warm water and coldwater fishes known to occupy adjacent habitats within the upper Muddy Creek watershed.

Impacts on wildlife and associated habitat within the Upper Muddy Creek Watershed /Grizzly area from lands and realty management would include loss and degradation of habitat and temporary displacement of wildlife during construction of linear features (e.g., power lines, roads, and pipelines) and other permitted facilities.

Given the presence of a very unique native fish fauna, reintroduction area for CRCT, and high ecological diversity of the area, livestock use in riparian areas within this area would impact fish habitats and negatively affect the conservation of sensitive wildlife and fish species in this area. Livestock grazing of riparian vegetation in this area would slow progress toward the desired future stream conditions in fish habitats exhibiting high sedimentation rates, diminished woody vegetation density, altered physical and chemical water quality parameters, and altered stream geometry.

Intensive management of aspen communities would improve elk habitat and provide habitat, forage, and cover for other wildlife species. However, the lack of weed treatments and the proliferation of weed species would continue, resulting in the degradation of watersheds and wildlife habitat.

Because the potential for oil and gas development is high, there is a corresponding potential for surface disturbing and disruptive activities. Intensive management would reduce the potential for loss of crucial habitats. In addition, restrictions on surface disturbing activities within crucial habitat during sensitive periods (i.e., big game crucial winter range, grouse nesting habitat, and raptor nests) would reduce the potential for stress to and displacement of wildlife species. However, these restrictions would not adequately protect important values of the area.

Off-road vehicular travel would be permitted for "necessary tasks." This activity would result in surface disturbance that would alter vegetation composition, increase erosion, and alter the riparian function and quality of important aquatic and big game habitat.

Surface disturbing activities would not be permitted within 500 feet of Muddy and Littlefield Creeks and other ephemeral and perennial streams. Management of streams to improve their PFC rating would result in improved fish habitat conditions. However, these actions alone might not provide all the required habitat elements because the management of riparian areas to achieve PFC would not take into consideration the habitat requirements of native fishes.

Impacts resulting from the construction of impoundments, in stream structures, and road crossings would be minimized where possible. However, impacts associated with fragmentation and alteration of fish habitats would remain.

Summary

Management would not emphasize habitats to proactively address the conservation of BLM sensitive species. Therefore, there would be significant impacts on the area.

4.13.16.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from OHV, water quality, watershed, and soils management and livestock grazing management would be the same as those identified in Alternative 1.

Lands and realty and minerals management actions would be allowed during crucial winter periods, increasing stress to wintering wildlife. Construction of linear features (e.g., power lines, roads, and pipelines) and other permitted facilities would result in habitat loss, degradation and fragmentation, and temporary displacement of wildlife species. In addition, disruptive activities would be authorized in migration and transition ranges, which would increase stress to big game. Surface disturbing activities would be permitted in aspen communities. The timing stipulation would be reduced for active raptor nests during the nesting period, which would increase disturbance to nesting raptors. Surface disturbance areas would increase the potential for proliferation of invasive plant species, degrading crucial winter range and native fish species habitat. Impacts on the habitat of native fishes would be the similar to those described in Alternative 1. However, the magnitude of those impacts would increase as a result of additional emphasis on the production of commodity resources under this alternative.

Increased vegetation treatments would result in a mixture of early, mid, and late seral conditions that would achieve the objectives of the fish and wildlife habitat management area. The increase in weed treatments, with an emphasis on all noxious and invasive weeds, would minimize proliferation into native plant communities and maintain the values of wildlife habitat.

Summary

Impacts under this alternative would be similar to those under Alternative 1, except that the potential for development activities would be greater; therefore, impacts would be significant and proportionally larger.

4.13.16.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts from lands and realty management actions, surface disturbance in aspen communities, OHV use, and minerals management would be minimal as a result of increased restrictions of surface disturbing

activities. Intensive management of surface disturbing activities, through BMPs, timing and distance stipulations, and other mitigations, would minimize impacts on wildlife by reducing disturbance to raptors, sage-grouse, prairie dogs, native fishes, and wintering big game.

Impacts on riparian habitats and associated aquatic species would be greatly reduced under this alternative by restricting development within one-quarter mile of all ephemeral or perennial stream channels. This would limit the amount of alteration to local hydrologic processes caused by road development and surface disturbing activities and act to maintain existing hydrologic conditions required to provide suitable habitat conditions for the unique native fish fauna present in this watershed.

Livestock grazing strategies designed to achieve DPC would maintain or enhance habitats required by wildlife and fish.

The ACEC would be closed to locatable mineral entry and mineral material disposals, thereby preventing impacts from these activities in this area. Impacts from minerals exploration and development would be reduced from those of Alternative 1 as a result of increased restrictions on the timing and/or location of surface disturbing activities. The number of surface locations for oil and gas drilling would be determined from BMPs for crucial winter ranges and Greater sage-grouse leks, which would reduce surface disturbance when compared with Alternative 1. Native fish habitat would be maintained and enhanced through decreased sediment loading in streams. Intensive management of surface disturbing activities would minimize impacts on wildlife by reducing disturbance to raptors, Greater sage-grouse, native fishes, wintering wildlife, and prairie dogs.

Restrictions on OHV use would be greater, resulting in reduced stress to big game species and minimizing soil erosion and sedimentation within the Upper Muddy Creek/Grizzly ACEC. In addition, seasonal closures to motor vehicle use would be implemented as necessary to protect big game habitat by reducing inappropriate OHV use during certain times of the year.

Under this alternative, BLM would actively pursue, in cooperation with WGFD, USFS, and private landowners, opportunities to expand reintroduction efforts for CRCT and other native cold and warm water fishes into adjacent habitats within the upper Muddy Creek watershed. This would constitute a meaningful conservation unit for the unique fauna of native warm water and coldwater fish species present in the Muddy Creek watershed.

An increase in vegetation treatments would result in a mixture of early, mid, and late seral conditions that would achieve the objectives of the fish and wildlife management area. The increase in weed treatments, with an emphasis on maintaining weed free areas, would minimize the proliferation into native plant communities and maintain the value of the wildlife habitat.

Management actions associated with water quality, watershed, and soils management would maintain existing hydrologic conditions and habitat connectivity required to provide suitable habitat conditions for the unique native fish fauna present in this watershed. Injecting the water produced from the development of natural gas from coal reservoirs would eliminate potential alterations of the highly fluctuating environment in which the native fishes have evolved. Restriction of projects that (1) result in water depletions or (2) cause salt loading in the Colorado River Basin would similarly act to preserve local hydrologic processes required to maintain habitats of native fishes. Prohibiting surface disturbing activities in areas outside (1) identified 100-year flood plains, (2) areas within 500 feet of perennial waters, springs, wells, and wetland/riparian areas, and (3) areas 100 feet from the inner gorge of ephemeral channels would also act to enhance existing hydrologic conditions required to maintain suitable fish habitats.

Impacts under this alternative would be the same as those under Alternative 1, except that wildlife and fish management actions would enhance the Upper Muddy Creek/Grizzly area for fish and wildlife habitat by incorporating fish and wildlife habitat requirements in DPC and DFC objectives. Management of fish habitats to achieve their potential natural condition would provide habitat suitable for native fishes.

Expanding reintroduction efforts for Colorado River cutthroat trout and other native cold and warm water fishes into adjacent habitats within the Upper Muddy Creek/Grizzly ACEC would act to preserve the native Colorado River Basin fish fauna in this isolated headwater system.

Impacts resulting from the construction of impoundments and instream structures would be avoided where they conflict with habitat requirements of special status fishes. Design of road crossings to simulate natural stream processes would provide unimpeded movement among required habitats for fishes.

Summary

Under this alternative, ACEC objectives would emphasize enhancement of habitats required to support the unique native Colorado River Basin fish fauna, Greater sage-grouse, and wintering big game species. The relevant and important values of the area would be afforded the greatest amount of protection under Alternative 3.

Increased wildlife protection measures would result in proportionally fewer impacts, such as surface disturbance, to vegetative communities and fish and wildlife habitats when compared with the other alternatives.

4.13.16.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from lands and realty management and minerals management would be the same as those identified in Alternative 1.

Impacts from livestock management under this alternative would the same as Alternative 1, except that DPC in areas suitable for reintroduction of native fishes would emphasize the habitat requirements of these fishes.

Vegetation management actions would enhance the Upper Muddy Creek/Grizzly area for fish and wildlife habitat by incorporating fish and wildlife habitat requirements in DPC and DFC objectives.

Impacts under this alternative would be similar to those under Alternative 1, except that waters produced from CBNG development activities in the Colorado River Basin would be injected, thus eliminating potential alterations of the highly fluctuating environment in which the native fishes have evolved.

Impacts under this alternative would be the same as those under Alternative 1, except that wildlife and fish management actions would enhance the Upper Muddy Creek/Grizzly area for fish and wildlife habitat by incorporating fish and wildlife habitat requirements in DPC and DFC objectives. The design of road crossings to simulate natural stream processes would allow for the unimpeded movement of aquatic species.

Summary

Increased vegetation and weed treatments would help achieve the objectives of the wildlife and fisheries habitat management area. Increased wildlife protection measures would result in proportionally fewer

impacts, such as surface disturbance, to vegetative communities and fish and wildlife habitats when compared with other alternatives.

4.13.17 White-Tailed Prairie Dog Area

4.13.17.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the checkerboard land ownership reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of wildlife habitat and forage.

Avoidance of cultural resource sites under the NHPA, where they occur, would provide protection to the area from surface disturbing activities.

Surface disturbing activities associated with authorized actions would fragment and degrade white-tailed prairie dog habitat, specifically short grass, saltbush steppe, and low sagebrush-grass communities.

Management actions related to water quality, watershed, and soils management include emphasis on the protection and improvement of vegetation resources, which would maintain white-tailed prairie dog habitat.

4.13.17.2 Impacts Under Alternative 1: Continuation of Existing Management

The area would be open to locatable mineral entry and mineral material disposal. Existing prairie dog towns would be avoided during surface disturbing activities, which would ensure that the species would not suffer any significant loss of habitat.

Impacts on the White-Tailed Prairie Dog area from lands and realty management would occur from linear features and other permitted facilities. Construction of aboveground facilities would be allowed adjacent to white-tailed prairie dog towns. These facilities can create perches for raptors and increase predation of the white-tailed prairie dog. Additional impacts would include habitat loss and temporary displacement of prairie dogs. Intensive management for other wildlife species would include buffers and seasonal restrictions. This would minimize disturbance during sensitive periods within the life cycle of white-tailed prairie dogs.

Summary

Under this alternative, activities permitted in the area would result in potential disturbance and destruction of habitat and displacement of prairie dogs. However, intensive management and continuation of existing management practices would meet the needs of the white-tailed prairie dog populations and protect the area by relocating activities outside white-tailed prairie dog towns.

4.13.17.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from lands and realty and minerals management would be the same as those identified in Alternative 1. However, decreased restrictions from wildlife management actions, including allowance of surface disturbing activities in prairie dog towns and complexes and increased numbers of structures, would result in additional loss of habitat and potential predation.

Summary

The removal of protections would degrade white-tailed prairie dog habitat and increase predation and stress of white-tailed prairie dogs. Moderate impacts would occur to prairie dogs, a keystone species for many raptors, including burrowing owls.

4.13.17.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

The ACEC would be closed to locatable mineral entry and mineral material disposal. As opportunity arises, land tenure adjustments, easements or exchanges would be pursued to meet the ACEC objectives. Closure of specific roads would be considered on a case-by-case basis to meet the objectives of the ACEC. These actions would improve the quantity and quality of white-tailed prairie dog habitat by reducing potential surface disturbing activities.

Management actions associated with wildlife management (i.e., intensive management of surface disturbing activities) would provide protection to white-tailed prairie dog towns and complexes. In addition, protection is afforded through restrictions in crucial winter range, nesting and breeding grouse habitat, grouse leks, and nesting raptor species. Restrictions on prairie dog poisoning by Animal and Plant Health Inspection Service (APHIS) would benefit the viability of the species.

Surface disturbing activities would not be allowed within a 150-foot avoidance zone around individual prairie dog towns, which would reduce prairie dog habitat disturbance. The number and placement of surface locations for oil and gas drilling would be influenced by BMPs for big game crucial winter ranges and seasonal restrictions for nesting and breeding grouse and raptors. Surface disturbance would be decreased, resulting in less white-tailed prairie dog habitat loss. No aboveground facilities would be allowed within one-quarter mile of prairie dog towns unless equipped with anti-raptor perching devices are installed, resulting in reduced raptor predation.

Summary

Surface disturbing and disruptive activities would be prohibited within white-tailed prairie dog towns or complexes. Intensive management would meet the needs of the white-tailed prairie dog populations and protect the area by relocating activities outside white-tailed prairie dog towns.

4.13.17.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from lands and realty and minerals management would be the same as those identified in Alternative 1.

Impacts from wildlife management actions would be the same as those identified in Alternative 3.

Summary

Alternative 4 would provide greater protection to white-tailed prairie dogs and their associated habitat than Alternative 1. Intensive management and continuation of existing management practices would meet the needs of the white-tailed prairie dog populations and still meet multiple-use objectives.

4.13.18 High Savery Dam

4.13.18.1 Impacts Common to All Alternatives

The area would be cooperatively managed for recreational objectives, multiple-use objectives and irrigation water, consistent with the June 2003 MOU between WWDC and BLM (see Appendix 23).

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the intermingled land ownership reduces BLM's ability to effectively manage for wildlife habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of wildlife habitat and forage.

Under all alternatives, protection of cultural resource sites under the NHPA provides an additional layer of protection of the area from surface disturbing activities.

AMR would most often result in suppression, reducing impacts on unique values of the area from wildfire. Although construction of fire lines and general movement of heavy equipment would temporarily displace wildlife species within the area, fire and fuels management actions would protect the big game wildlife habitat over the long term through the reduction of fuel loading and control of wildland fires.

The High Savery Dam ACEC would be managed as a vacant allotment for livestock use. Grazing use would be licensed on a temporary, non-renewable basis to maintain the vegetation values and support wildlife use within the unit. The use in the unit would allow deferment or rest of other allotments in the RMPPA to promote improved wildlife habitat and/or allow recovery following wildfires and vegetation treatments. Livestock management actions (i.e., water improvements) would be designed to maintain and enhance overall habitat. This would be accomplished through strategic placement, which would promote dispersion of livestock throughout the area. These livestock grazing strategies would support the June 2003 MOU between WWDC and BLM.

OHV management actions would have a beneficial impact on the High Savery Dam by restricting vehicular access and associated surface disturbance in sensitive areas, such as riparian areas. Big game and grouse habitat would be protected through this action.

There are no current oil and gas or other mineral leases within the High Savery Dam Area. Any future leasing within the area would be restricted from surface disturbance; therefore, no impacts would result from leasable minerals actions.

The application of vegetation treatments would help conserve riparian habitat and increase the potential for fishery development. Such actions would increase recreational opportunities by enhancing wildlife and fish habitat.

Lands would be managed in coordination with WWDC to protect water quality and watershed health. This would minimize impacts and benefit these resource values.

4.13.18.2 Impacts Under Alternative 1: Continuation of Existing Management

The area would be open to the operation of public land laws, including sale, where consistent with the intent and purpose of the MOU.

Surface disturbance could result from locatable mineral entry and disposal of common variety minerals; however, the potential for locatable and common variety minerals is low. Mitigation would be required to reduce sediment loading to the reservoir. Reclamation activities and proper placement of facilities would minimize erosion. Long-term impacts on the area from minerals activities would be minimal.

Summary

Under this alternative, management actions from lands and realty and minerals management would result in minimal surface disturbance to the area.

4.13.18.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts under this alternative would be the same as those identified in Alternative 1.

Summary

Impacts under this alternative would be the same as Alternative 1.

4.13.18.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

The area would be intensively managed to protect and enhance the riparian habitat of High Savery Dam ACEC. This area would also be managed to achieve DPC, which would result in improved vegetation conditions to benefit all resource values.

Closing the area to future land disposal actions would result in the elimination of future disturbance that would compromise the integrity of the ACEC. The area would be managed cooperatively in accordance with BLM standards ensuring enhancement of the resource. There would be no impacts from lands and realty management under this alternative because the area would be withdrawn from operation of public land laws, which would further reduce the potential for surface disturbing and disruptive activities. These actions would collectively enhance wildlife habitat and quality of the recreation experience.

The High Savery Dam Area would be closed to locatable mineral entry and mineral material disposals, which would prevent associated surface disturbance. Decreased potential for surface disturbance would indirectly preserve the relevant and important values of the area, and maintain the quality of recreational experiences and wildlife habitat.

Summary

Under Alternative 3, management actions from resource programs would enhance the relevant and important values of the High Savery Dam and Reservoir ACEC. This alternative would provide additional protection to riparian habitat, result in attainment of DPC, and eliminate lands and realty and minerals management actions.

4.13.18.5 Impacts Under Alternative 4: Preferred Alternative

The area would be open to the operation of public land laws, including sale, where consistent with the intent and purpose of the MOU.

This area would be managed to achieve DPC, which would result in improved vegetation conditions to benefit all resource values.

Surface disturbance could result from locatable mineral entry and disposal of common variety minerals; however, the potential for locatable and common variety minerals is low. Decreased potential for surface disturbance would indirectly maintain the quality of recreational experiences and wildlife habitat.

Summary

Impacts under this alternative would be the same as Alternative 3.

4.13.19 Continental Divide National Scenic Trail SRMA

4.13.19.1 Impacts Common to All Alternatives

Developments would be allowed along the trail, showcasing multiple use on BLM lands. Some recreation opportunities might be limited but not precluded. Range improvements provide water sources where no others exist along portions of the trail. Where the trail passes through the checkerboard land pattern, it follows state highways and BLM roads because they provide the only legal pubiic access through these areas.

4.13.19.2 Impacts Under Alternative 1: Continuation of Existing Management

Based on the objectives for the SRMA, which encourage multiple use of lands adjacent to the trail, resource program management actions would not impact the Continental Divide National Scenic Trail SRMA under this alternative.

4.13.19.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Based on the objectives for the SRMA, which encourage multiple-use of lands adjacent to the trail, resource program management actions would not impact the Continental Divide National Scenic Trail SRMA under this alternative.

Summary

Impacts under this alternative would be the same as Alternative 1.

4.13.19.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Based on the objectives for the SRMA, which encourage multiple use of lands adjacent to the trail, resource program management actions would not impact the Continental Divide National Scenic Trail SRMA under this alternative. Public lands that are 30 feet either side of the centerline along the trail would be closed to locatable mineral entry and land tenure adjustments. These actions would limit industrial development that would potentially reduce the quality of the recreational experience of some users of the trail.

Summary

Impacts under this alternative would be similar to Alternative 1, except public lands (30 feet either side of the centerline) along the trail would be closed to locatable mineral entry and land tenure adjustments. These actions would limit industrial development that would potentially reduce the quality of the recreational experience of some users of the trail.

4.13.19.5 Impacts Under Alternative 4: Preferred Alternative

Based on the objectives for the SRMA, which encourage multiple use of lands adjacent to the trail, resource program management actions would not impact the Continental Divide National Scenic Trail SRMA. The public lands (30 feet either side of the centerline) along the trail would be closed to locatable mineral entry and land tenure adjustments. These actions would limit industrial development that would potentially reduce the quality of the recreational experience of some users of the trail.

Summary

Impacts under this alternative would be the same as Alternative 3.

4.13.20 North Platte River SRMA

4.13.20.1 Impacts Common to All Alternatives

Management actions would be designed to minimize conflicts with adjacent landowners and enhance the natural resource values of the area to meet management objectives. However, the intermixed land ownership reduces BLM's ability to effectively manage for recreational opportunities and wildlife and fish habitat. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of wildlife habitat. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of fish and wildlife habitat and forage.

Protection of cultural resource sites under the NHPA, where they occur, provides protection to the area from surface disturbing activities.

Wildland fire would be managed for AMR, which would result in suppression. There would be minimal impacts on the unique values of the area.

Windpower development near the North Platte River would negatively affect the river experience for some people by creating new visual impairments on the horizon. If windpower facilities were located close enough to the river, there also could be audible impacts on SRMA visitors.

Impacts from recreation management actions would include improved river access, camping and recreational opportunities, and dispersed visitor use along the river.

Watershed management actions in the Sage Creek watershed would improve water quality and reduce sediment loading in the North Platte River.

The North Platte River is bald eagle habitat, which would limit the location of campgrounds and river access points. However, this would also limit industrial development along the river corridor, enhancing the recreational experience through preservation of the pristine setting.

4.13.20.2 Impacts Under Alternative 1: Continuation of Existing Management

Intensively managing surface disturbance from lands and realty actions, oil and gas exploration and development, locatable mineral entry, and mineral material disposals within one-quarter mile of the SRMA would preserve the quality of the recreation experience and visual resources along the North Platte River. Lands and realty management actions, including land acquisitions, would improve public access to the SRMA and disperse visitor use along the river.

Construction of new access and campgrounds would disperse visitor usage and enhance the recreational experience and sense of solitude along the river. Management of river outfitter permits would further disperse visitor usage.

Transportation and access management actions would improve access and disperse visitor usage, which would enhance the quality of the recreational experience.

Insufficient weed treatments would allow invasion and proliferation of noxious and invasive weed species. Noxious and invasive weeds would limit access to the river by creating physical barriers to foot traffic in localized areas, lead to increased erosion, and degrade water quality and wildlife and fish habitat. Proliferation of noxious and invasive weeds would reduce wildlife visitation and use along the river corridor and would directly affect the recreational experience.

The VRM class III designation does not afford protection to the recreational experience. Developments would be allowed that are visible from the SRMA, compromising the visual integrity of the setting.

Summary

Lands and realty management actions to improve access to the river would help disperse usage and improve the recreational experience. Significant impacts from noxious and invasive weeds would occur, which would detract from the recreational experience along the river.

4.13.20.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from lands and realty, minerals management, transportation and access and VRM would be the same as those identified in Alternative 1.

Vegetation management would reduce invasion and proliferation of noxious and invasive weed species along the North Platte River. The increase in weed treatments for noxious and invasive weeds, such as knapweed, leafy spurge, and tamarisk, would minimize proliferation into native plant communities and maintain the value of the wildlife habitat. Noxious and invasive weed management actions would improve access to the river, wildlife and fish habitat, and water quality, all of which would improve the recreational experience.

Summary

Lands and realty management actions to improve access to the river would help disperse usage and improve the recreational experience. Noxious and invasive weeds management actions would improve the overall recreational experience.

4.13.20.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts from the management of the North Platte SRMA would be the same as those identified in Alternative 1.

Impacts from minerals management would be similar to those under Alternative 1, except that the North Platte River SRMA would be closed to the operation of the public land laws over a greater area (12,740 acres). This would provide enhanced protection of the recreation experience and visual resources within the SRMA. In addition, the SRMA would be closed to mineral development within one-half mile of the river. This closure would result in enhanced protection of the recreation experience and visual resources

within the SRMA, unless development activities occur outside the one-half mile buffer and create noticeable dust or noise.

Surface disturbing activities and other management actions from other resource programs would be intensively managed within one-half mile of each side of the North Platte River SRMA. This would preserve the quality of the recreational experience and protect the visual quality along the river.

Vegetation management actions would be the same as those found in Alternative 2.

The SRMA would be managed as VRM Class II to further protect the visual experience along the river. Developments within the VRM Class II areas would be required to repeat the basic elements of form, line, color, and texture found in the predominant natural features of the landscape (Appendix 25). This would increase the protections to the recreational experience of the SRMA. However, because the majority of the SRMA is within intermixed landownership, this action would only effectively protect the setting if there were federal involvement in the proposed undertaking.

Summary

Visitor access would be limited to existing public access points along the river. A wider corridor on either side of the river and a VRM Class II designation would protect the recreational experience of the North Platte River SRMA. Noxious and invasive weeds management actions would improve the overall recreational experience.

4.13.20.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from transportation and access and VRM would be the same as those identified in Alternative 1.

Closure of the area to operation of the public land laws, oil and gas leasing, locatable mineral entry, and mineral material sales (5,060 acres) would protect the recreation experience and visual resources of the SRMA. Development activities occurring outside the SRMA might temporarily create noticeable dust or noise; however, this impact would be short term and minimal.

Acquisitions and easements would create new access points on the river, which would disperse recreationists and enhance a sense of solitude along the river.

Summary

Lands and realty management actions to improve access to the river would help disperse usage and improve the recreational experience. Noxious and invasive weeds management actions would improve the overall recreational experience.

4.13.21 Rawlins OHV Area

4.13.21.1 Impacts Common to All Alternatives

No impacts would be common to all alternatives.

4.13.21.2 Impacts Under Alternative 1: Continuation of Existing Management

The OHV area would not be an SRMA. OHV use would be limited to designated roads and vehicle routes with directional traffic, which would minimize accidents.

Minerals management actions would potentially reduce the quality of the OHV experience in the area. However, the potential for mineral development in the area is low.

Summary

OHV use would be constrained within the designated area, which would enhance public safety and minimize resource conflicts.

4.13.21.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Management actions would facilitate development and use of the area. OHV use would be open within the designated area; thus, desired contours for motocross events would not be constructed.

Closure of the SRMA to the public land laws, mineral material sales, and new mineral leasing would ensure that conflicts do not arise between OHV users and mineral development. Existing leases might still be developed but would be intensively managed to reduce conflicts from OHV users.

Summary

OHV use would not be constrained within the SRMA. Riders would have unrestricted use of the designated area. This would lead potential threats to public safety, and resource conflicts.

4.13.21.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Lands and realty and minerals management actions would have the same impact on the Rawlins OHV SRMA as Alternative 2.

OHV management actions would have the same impact on the Rawlins OHV SRMA as Alternative 1.

Summary

OHV use would be limited to a designed recreational course, which would improve public safety, limit resource damage, and minimize conflicts between users.

4.13.21.5 Impacts Under Alternative 4: Preferred Alternative

Management actions would have the same impact on the Rawlins OHV area as Alternative 3, except that the area would not be managed as an SRMA.

Summary

Impacts under this alternative would be the same as Alternative 3.

4.13.22 National Natural Landmarks

4.13.22.1 Impacts Common to All Alternatives

There would be negligible impacts on the NNLs from any management action under all alternatives.

4.13.23 Encampment River Potential Wild and Scenic River (WSR)

4.13.23.1 Impacts Common to All Alternatives

The area proposed for WSR designation falls entirely within the Encampment River Canyon WSA, which constrains the development of alternate interim management prescriptions. Protections afforded the WSA would protect the outstandingly remarkable characteristics of the river segment, unless Congress releases the canyon from wilderness consideration. For a description of the WSR designation process, see Appendix 3.

Cultural resource management would enhance the management of the Encampment River Canyon by providing protection and interpretive opportunities to the canyon.

The Encampment River would be designated an AMR area with emphasis on wildland fire suppression for the protection of vegetation and wildlife habitats. Because of its WSA status, restrictions would be placed on the type of suppression equipment used. These limitations could lead to an increase in acres burned by wildland fires. Burned areas would be subject to visual degradation, accelerated erosion, wildlife displacement, and loss of forage in the short term.

Lands within the WSR would be closed to operation of the public land laws, oil and gas leasing, surface disturbing activities, and locatable mineral entry. The outstandingly remarkable values and classification of the WSR would be protected by these actions. Closure of the area to the operation of the public land laws would prevent the possibility of removing this area from federal jurisdiction. Surface disturbing activities would not be allowed within the WSR except for abandoned mine reclamation, which would be considered on a case-by-case basis. This activity might result in short-term localized impacts on the visual setting and recreational experience from increased human presence and industrial activity.

Seasonal increases in recreational visitation would result in occasional user conflicts, detracting from the experience of solitude expected in a WSR. These impacts, if they occur, would be negligible. Recreational use, including horseback riding and the use of pack animals, would contribute to the proliferation of noxious and invasive weeds.

The WSR would be managed as a VRM Class I, which preserves the outstandingly remarkable character of the canyon through intensive management.

4.13.23.2 Impacts Under Alternative 1: Continuation of Existing Management

Surface disturbing activities would not be allowed within ¼ mile of the Encampment River. Geophysical exploration would be limited to foot access and the use of surface cables on public lands. Surface charges might be allowed following site-specific analysis. The outstandingly remarkable values of the WSR would be protected by these management prescriptions.

Vegetation treatments would be restricted to hand or aerial application. There would be impacts on the Encampment River Potential WSR from weed infestations along the Encampment River trail. The lack of weed treatments and the proliferation of cheatgrass would continue, resulting in the degradation of the qualities of the wild river, potentially resulting in compromising the WSR designation.

Summary

There would be a significant impact from the proliferation of invasive weed species, which would impact the outstandingly remarkable characteristics of the WSR. The area proposed for WSR designation falls

entirely within the Encampment River WSA, which constrains the development of alternate interim management prescriptions.

4.13.23.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Under this alternative, the Encampment River would not be proposed for WSR designation. The river segment would be protected as long as it retains its WSA status. If Congress were to release the WSA from wilderness consideration, some of the protections currently protecting the canyon would be removed. The land would revert to multiple use management.

Vegetation management actions would control the proliferation of noxious and invasive weeds within the area. Access to the river would be improved.

Summary

Although the river would not be designated a WSR, values would be protected under the management of the Encampment River Canyon WSA unless Congress were to release the WSA from wilderness consideration.

4.13.23.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Under this alternative, the Encampment River would be managed to maintain the outstandingly remarkable characteristics of the river segment (wild). For a description of the WSR designation process, see Appendix 3.

Surface disturbing activities would not be allowed within the viewshed of the Encampment River. This would effectively increase the buffer zone along the river and thereby minimize disturbance to vegetation communities and riparian function.

Vegetation treatments would be the same as those identified in Alternative 2.

Summary

This alternative would provide the most protection to the outstandingly remarkable characteristics of the proposed WSR, and significant impacts would not occur.

4.13.23.5 Impacts Under Alternative 4: Preferred Alternative

Impacts on the Encampment River would be the same as those in Alternative 1, except that surface disturbance would be prohibited within the viewshed of the river, rather than within one-quarter mile. This would effectively increase the buffer zone along the river and thereby minimize disturbance to vegetation communities and riparian function. Impacts from vegetation treatments are the same as those identified in Alternative 2.

Summary

Although protection level would not be as great as that under Alternative 3, the outstandingly remarkable characteristics of the proposed WSR would be protected, and significant impacts would not occur.

4.14 TRANSPORTATION AND ACCESS

This section describes potential impacts on transportation and access management from other management actions. Existing conditions concerning transportation and access management are described in Section 3.14.

Significance Criteria

Impacts on transportation and access would be considered significant if either of the following were to occur:

- Substantial limitation on public access to and travel within the RMPPA
- Substantial reduction in opportunity for access easement acquisition and road development.

Methods

Transportation and access provides for appropriate ingress, egress, and access in the RMPPA. Potential access and transportation impacts are characterized by changes in vehicle movement on designated roadways and trails to and from the RMPPA. Impact analyses and conclusions are based on the interdisciplinary team knowledge of the RMPPA and associated resources, review of existing literature, and information provided by BLM and other agencies. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate.

The analysis is based on the following assumptions:

- Consolidation of and access to public lands with prime recreational values would be pursued as opportunities arise.
- The transportation and access program operates as a support program rather than an environmental component. The program responds to a need to maintain an adequate transportation system to provide access and use of public land resources.
- RFDs and RFAs can be found in Appendix 33.

4.14.1 Impacts Common to All Alternatives

Restrictions on surface disturbing activities associated with SMA management, vegetation management, water quality, watershed and soils management, and wildlife and fisheries management would modify the location and route of proposed roads. Seasonal restrictions to protect wildlife species would limit the window of opportunity for constructing roads and would preclude vehicle access during certain times of the year.

Placement of facilities (e.g., utility, communication sites, and energy developments) would enhance travel and access opportunities through the development of roads to access project sites. Restrictions on facility placement in areas with important resource values would limit the degree of increased access and travel opportunities. The upgrade of existing roads within existing oil and gas fields would accommodate increased traffic volume and thereby enhance travel opportunities.

Management of OHV use would not only facilitate safe travel within the RMPPA but also would restrict access and travel opportunities. Closing areas to OHV use, limiting use to designated roads and vehicle routes, and implementing seasonal restrictions would restrict travel and seasonal access in some areas. Seasonal closures to protect wildlife habitat from disturbance during critical periods would prevent

damage to saturated roads. Permanent road closures for public safety, to protect wilderness values, or to reduce fragmentation of critical wildlife habitat would reduce opportunities to access public lands in localized areas. High Savery Dam area (530 acres) and Ferris Mountain WSA (21,880 acres) are closed to OHV use.

4.14.2 Impacts Under Alternative 1: Continuation of Existing Management

Impacts from lands and realty management actions would result from the potential disposal of approximately 61,010 acres of BLM-administered public lands (Maps 2-22 through 2-25 and Appendix 7). Although this would eliminate public access to and travel within these areas, any disposal actions accomplished through exchanges would result in increased opportunity to access public land.

Roads constructed or upgraded to provide access to 8,945 well sites would provide increased opportunity for access to public lands.

Roughly 610 acres would be closed to OHV use, which would eliminate motorized access to the Encampment River WSR. Other OHV designations (limited and open) would maintain the existing transportation and access network.

Summary

Acquisitions and mineral development would improve access opportunities within the RMPPA. Road closures within Encampment River WSR would limit vehicle access to this area.

4.14.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from OHV use management would be the same as those identified in Alternative 1.

Impacts from lands and realty management would be similar to those identified in Alternative 1, except the area identified as potentially suitable for disposal would be reduced to 46,230 acres. This would reduce the potential for land disposals to reduce access and travel opportunities.

Impacts from oil and gas management actions would be similar to those identified in Alternative 1, except a total of 9,198 wells would be developed. This would increase the access to public land.

Summary

Impacts would be the same as those identified in Alternative 1, except for additional opportunities for access in mineral development areas.

4.14.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts from lands and realty management would be similar to those identified in Alternative 1. However, no specific tracts of land would be identified for disposal.

Impacts from oil and gas management actions would be similar to those identified in Alternative 1, except a total of 8,632 wells would be developed. This would increase the access to public land.

Impacts from OHV use management would be similar to those identified in Alternative 1, except 67,730 acres would be closed to motorized travel in the WSAs. Other OHV designations (limited and open) would maintain the existing transportation and access network.

Summary

Impacts would be the same as those described in Alternative 1. All WSAs would be closed to OHV travel. Reduced mineral development would decrease transportation and access opportunities.

4.14.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from lands and realty management would be the same as Alternative 2.

Impacts from oil and gas management actions would be similar to those identified in Alternative 1, except a total of 8,822 wells would be developed. This would increase the access to public land.

Impacts from OHV use management would be similar to those identified in Alternative 1, except areas closed to OHV travel would be increased to 34,110 acres, which includes all WSAs with the exception of Adobe Town. Other OHV designations (limited and open) would maintain the existing transportation and access network.

Summary

Impacts would be the same as those described in Alternative 1. All WSAs, with the exception of Adobe Town, would be closed to OHV travel. Reduced mineral development would decrease transportation and access opportunities.

4.15 VEGETATION

This section presents the potential impacts on vegetation from other management actions. The first part of this section discusses vegetation. This section is followed by a discussion of Special Status Species plants and vegetation communities. The last section focuses on noxious and invasive weed management. When the word "weed" is used throughout this section, it refers to noxious and invasive weeds. Existing conditions concerning vegetation are described in Section 3.15.

Significance Criteria

Impacts on vegetation would be considered potentially significant if the following were to occur:

- Any action or event that would remove a community's unique attributes or ability to support other resource values within the planning period, or if corrective actions were beyond the scope of this document.
- The viability of protected plant species is jeopardized, with little likelihood of reestablishment after disturbance, or actions result in the need to list a species under the Endangered Species Act (ESA).
- Actions that have the potential to destroy sensitive plant species or substantially harm habitat of sensitive plant species.

- Reclaimed areas do not attain adequate vegetation groundcover and species composition to stabilize the site within 5 years from disturbance, or there is invasion and establishment of noxious or invasive weeds that contribute to unsuccessful revegetation.
- Introduction of noxious and invasive weeds into areas considered weed free, or an increase in noxious and invasive weeds where they already exist.

Methods of Analysis

Different program actions are assessed for their impacts on the vegetation resource. Activities impact flora resources by removing soil and vegetation. These impacts are either mitigated or avoided. Impact analysis and conclusions are based on interdisciplinary team knowledge of the region of influence and the interaction of the different management activities. The effects of each action on flora resources are quantified when possible; however, many impacts must be qualitatively assessed when suitable data are not available.

Assumptions can be made on the condition of the flora resource, vegetation and forage responses to different stimuli, and the level of activity. The analysis is based on the following assumptions, although it is recognized that fluctuations will occur within populations and habitats based on climatic, economic, and other conditions:

- The livestock type and stocking rate will remain relatively stable over the planning period.
- Wildlife populations will remain relatively stable over the planning period.
- Wild horse populations will remain relatively stable over the planning period.
- Current trends in plant succession/vegetation health would continue.
- Grassland and shrubland communities would be maintained with a mix of species composition, cover, and age classes.
- Noncommercial woodland communities would increase in age and cover with reduced composition and cover of understory species.
- Riparian plant communities are functioning properly or are in the process of achieving proper functioning condition.
- Noxious and invasive weeds will continue to be introduced and spread as a result of ongoing vehicle traffic in and out of the resource area, recreational activities, wildlife and livestock grazing and their movements, and surface disturbing activities.
- Noxious and invasive weeds would further expand into native plant communities, and disturbances to these communities would expand opportunities for the spread of non-native invasive plant species.
- BLM will continue to treat noxious and invasive weeds and pests on public land. Livestock permit holders; ROW holders; and mineral lease, claim, and permit holders will continue to treat noxious and invasive weeds and pests on public land as stipulated within their permits and authorizations.
- Weed and pest control will be carried out in coordination with the appropriate county weed and pest control district and owners of adjacent property.

- As more monitoring and survey data become available, it is possible that additional populations of existing threatened or endangered plants might be found within the RMPPA.
- Management of threatened and endangered plant species is subject to the ESA.
- Wildland fire burns an average of 4,000 acres per year based on a 5-year average.

Management of Special Status Plants and Unique Plant Communities

Impacts on Special Status Species plants are potentially more harmful than impacts on overall vegetation, because they have narrow habitat parameters, and losses of individual plants or communities might affect the survival of the species. This section outlines the impacts on special status plants and unique plant communities by management actions that have the potential to affect these plants and plant communities.

Noxious and Invasive Weeds

Most management activities on BLM-administered lands have the potential to introduce or promote the proliferation of noxious and invasive weeds. Motor vehicles, animal movement, and all surface disturbing activities increase the potential to introduce and spread noxious and invasive weeds. Noxious and invasive weeds can outcompete native vegetation through mechanisms such as the noxious and invasive weeds' ability to change soil chemistry. They also can produce numerous seeds early in the growing season and the rapid growth of roots to take advantage of moisture availability. Non-native species often have a competitive advantage resulting from the lack of natural controls in their new environment. In areas where noxious and invasive weeds have invaded, the ecology of the area is altered, and native plants that provide habitat and forage for animals would be reduced or eliminated. Some of the costs of weed proliferation are loss of forage, decreased animal health, devaluation of animal commodities, equipment decontamination, and reduced land values.

The invasion and proliferation of noxious and invasive weeds increases the cost of weed control to entities responsible for their control. If noxious and invasive weeds become established, treatment can be difficult and expensive, and eradication is often impossible. Areas might require several treatments over many years with mechanical equipment, biological controls, and/or chemical herbicides designed to kill the noxious and invasive weeds with minimal impacts on native vegetation.

The approved RFO Noxious Weed Prevention Plan (Appendix 31) includes BMPs for surface disturbances, roads, vehicles, livestock, recreation sites, and wildland fire and prescribed fire designed to eliminate or minimize impacts on or from noxious and invasive weeds. The following paragraphs outline the impacts of different activities on the control and management of noxious and invasive weeds.

4.15.1 Impacts Common to All Alternatives

Management of cultural resources would have minor and short-term effects on vegetation resources. Management actions focus on the avoidance and protection of cultural sites, which in turn decrease surface disturbing activities on or near such sites. This might result in adjustment of the project location or design, and impacts on vegetation would still occur. Data recovery excavations would cause minor surface disturbance and vegetation removal; however, standard protection measures and required reclamation practices would mitigate any effects to acceptable levels. The areas described are small (under 1 acre), with vegetation disturbance localized and temporary.

Cultural sites are often found in the sand dune areas within the RMPPA. These are also important vegetation sites that often hold Special Status Species plants and plant communities. Before cultural

excavations are conducted in these areas, a vegetation inventory would be conducted. If Special Status Species plants or plant communities are found in these areas, they would be avoided, thus causing minimal to no effect on Special Status Species plants or their communities.

Excavations of cultural resource sites disturb the soil surface, which increases the opportunity for the establishment of noxious and invasive weeds. However, the amount of disturbed surface associated with cultural site excavations is less than 1 acre per excavation and these sites are reclaimed immediately. Therefore, impacts would be minimal.

Surface disturbance resulting from fireline construction, use of heavy equipment, and other fire suppression activities would damage vegetation and accelerate natural soil erosion in localized areas. However, these small areas would be quickly rehabilitated to minimize long-term impacts.

Wildland and prescribed fires result in short-term loss of vegetation. The vegetation response to fire is dependent on the size, location, intensity, season, timing, and amount of precipitation; preexisting plant community condition; and the abundance of noxious and invasive weeds in the area. Fires change the composition of the plant community, set back plant succession, and remove woody vegetation and plant litter. Wildland and prescribed fires might burn with enough heat to kill soil organisms and root systems, resulting in diminished plant recruitment and growth rates, particularly for fire-sensitive species.

Although fires would have short-term localized impacts on vegetation, the long-term effect of fire would be improved vegetation production, nutritional value, and a more diverse plant community (e.g., diverse species, cover, and age class). However, this would occur on relatively small acreages and plant communities as a whole would generally remain unchanged (late seral condition). Fuel reduction projects in WUIs would result in early- to mid-seral plant communities. However, this would also occur on a small scale.

Wildland and prescribed fires would also cause a long-term decrease in fire-sensitive shrubs and trees, a short-term increase in annual grass and forb species, and a long-term increase in fire resistant shrubs and trees. Fire-sensitive shrubs and trees would eventually reestablish on burned sites. Fire-dependent species, such as aspen communities, would benefit from fires with an increase in community composition, vigor, and overall health.

Wildland fires affect Special Status Species plants and plant communities by temporarily removing above ground vegetation, changing plant community composition, setting back plant succession, and removing woody vegetation and plant litter. If Special Status Species plants are dependent on a specific seral stage or associative plants, a wildland fire can upset the ecological balance that supports a sensitive plant's habitat or plant community. Wildland fires might also enhance the habitat for Special Status Species plants and serve as a catalyst for their reestablishment and proliferation.

Wildland fires create an opportunity for the establishment or spread of noxious and invasive weeds by removing above ground vegetation, leaving burned areas more susceptible to noxious and invasive weeds. Some species of noxious and invasive weeds respond well post-fire and outcompete native species. In areas where noxious and invasive weeds occur or are in close proximity, wildland fire increases the likelihood of weed expansion. Firefighters and their equipment might also introduce or spread noxious and invasive weeds. Some mechanical control activities disturb the soil surface and remove vegetation, creating an opportunity for the establishment or spread of noxious and invasive weeds.

Noncommercial forestlands would be managed primarily to sustain forest health objectives and for the benefit of other resource values, such as wildlife, watershed, fisheries, and healthy plant communities. Management actions would include the removal of encroaching conifers from shrub and aspen stands,

thinning of diseased and insect infested trees, and reducing fuel loads. These actions result in increased vegetation diversity, altered successional status, increased plant vigor, increased available water for herbaceous vegetation, and improved watershed health.

The installation of utility systems and other ROW actions would result in short-term vegetation removal until the area has been reclaimed. Native grasses and forbs would dominate reclaimed sites initially. Shrubs will return over a longer time period. Long-term impacts would mostly be associated with the construction of access routes. Increased erosion and decreased vegetation cover would occur from soil compaction and the channelization of surface runoff in ruts and road ditches. Areas below mid-slope roads become drier, which reduces plant productivity and can potentially change species composition.

When proposed ROWs go through sites of Special Status Species plants and plant communities, the project would be rerouted to avoid the site. Potential habitat of threatened and endangered plants on federal land or on split estate lands would require searches for the plants before approval of any project or activity. For federally listed species, conservation measures (BLM 2004b) would be implemented. These requirements would reduce disturbance to threatened and endangered (T&E) species. Because proposed ROWs are surveyed before lands and realty actions, new locations of threatened and endangered plant communities might be located, increasing knowledge of these plant species.

Land tenure adjustment would consider the presence of T&E plants, and a vegetation analysis would be conducted to ensure the maintenance of these sites and habitats. Where known populations of these species occur, withdrawals from locatable mineral entry would ensure that they were protected.

Lands and realty management actions usually result in surface disturbance, which increases the land susceptibility to weed invasion or spreads existing weed patches. Land proposed for exchange or acquisition would be inventoried for noxious and invasive weeds to ensure noxious weed infestations would not be inherited. Timely reclamation of disturbed areas diminishes the probability of weed proliferation in these areas. Failure to comply with existing weed control stipulations would increase weed abundance and proliferation.

Impacts on vegetation resulting from livestock grazing management actions include the removal of forage by livestock, which might alter the amount, condition, and vigor of vegetation in grazed areas. Impacts from livestock grazing are usually related to a long duration of use during the growing season, resulting in lower vigor of desired species and a change in species composition. Salting areas and bed grounds often have disturbed soil and a loss of plant cover, which usually results in localized areas dominated by invasive plants. Livestock grazing can be used as a tool to manipulate and improve plant community composition.

Grazing management strategies, such as rotation, deferment, rest from use, and the manipulation of season of use and grazing intensity, would be implemented to manage composition, cover, and the vigor of vegetation. These provide rest periods for plant growth and seed production to maintain plant vigor. The objective of these strategies is to maintain or reach rangeland standards for wetland/riparian areas and upland plant communities. The response of vegetation to these strategies would be monitored, and adjustments would be made accordingly to achieve the desired response (Appendix 17). The use of riparian pastures and exclosures increases the density, age class, and cover of desirable riparian plants, including willow, cottonwood, and herbaceous wetland/riparian plants.

Range improvements would continue to occur at current rates to reach rangeland improvement goals. The types of projects would vary from year to year based on resource needs and priorities. All range improvements would result in minor and short-term disturbances to vegetation, including loss of

vegetation cover and changes in plant composition and vigor adjacent to each project. The use of range improvements is intended to improve the control of livestock grazing.

Livestock grazing sometimes maintains or creates habitat for sensitive plants by creating disturbance areas or by reducing vegetation competition. However, livestock grazing would potentially reduce the occurrence of some plants as a result of trampling or consumption. Roughly 15 acres are excluded from grazing to protect the sensitive plant Gibben's beardtongue. Known locations of threatened or endangered plants would be avoided when planning range improvements to decrease potential loss of these Special Status Species plants.

Livestock can transport seeds and fruits of invasive species to other areas where they are spread by the animal physically removing the seed or fruit, or through the deposition of fecal matter. Disturbed areas where animals concentrate are particularly vulnerable to infestations of noxious and invasive weeds. In addition, range improvements that disturb the soil provide opportunities for weed. The overuse of native vegetation in areas where best management practices have not yet been implemented might increase the susceptibility of an area to weed invasions. Grazing plans that promote healthy rangelands and vegetation create conditions resistant to the spread of noxious and invasive weeds.

The exclusion of domestic sheep and goats within 9 miles of bighorn sheep habitat would preclude the use of domestic sheep as a method of controlling noxious and invasive weeds within these areas. This would reduce the possibility of passing diseases to big horn sheep populations, but might result in use of less effective weed control methods. The increased use of chemicals or mechanical treatments for weed management might not be as effective in controlling the spread of noxious and invasive weeds into rangelands and wetland/riparian habitats.

Minerals management actions would result in the localized removal of vegetation to build well pads, roads, and other associated infrastructure. Mineral development actions would also fracture continuous vegetation communities, change plant community structure and diversity, and alter vegetation landscapes. The majority of minerals impacts on vegetation are on the sagebrush-grass and saltbush steppe communities. Long-term impacts would mostly be associated with the location and design of roads. Increased erosion and decreased vegetation cover would occur from soils compaction and the channelization of surface runoff in ruts and road ditches. Areas below mid-slope roads become drier, which reduces plant productivity and can potentially change species composition. Similar impacts would occur for leasable, locatable, or common variety minerals. The regulatory authorities, although they might differ among the mineral categories, are in place to protect existing vegetative communities and/or to assure reestablishment of new vegetation following completion of the mineral extraction and reclamation cycle.

Mineral resource development actions can benefit vegetation resources by increasing total perennial plant cover in contrast to plant cover present on adjacent undisturbed areas. The presence of threatened or endangered species could be identified as a result of baseline studies conducted in connection with new mineral development. Plant surveys are conducted in potential habitat for all surface disturbing projects, which identify wildlife habitats and aid in developing vegetation maps and baseline data. In addition, reclamation activities provide opportunities for experimentation and refinement of revegetation techniques and processes. Native grasses and forbs would dominate reclaimed sites in the short-term. Shrubs will return over a longer time period.

Quarries and mines associated with locatable and saleable minerals typically disturb 1 to 20 acres of vegetation during operation of the project. Disturbances result in the loss of vegetation cover, density, and composition changes. Reclamation is necessary for reestablishing plants on these disturbed areas.

Reclamation should increase plant species diversity and lower the seral stage of the community by replacing shrubs with grasses and forbs.

Quarries associated with sand, gravel, and other aggregates typically disturb 1 to 20 acres of vegetation during the operation of the quarry. Disturbances include loss of vegetation cover, density, and composition changes. Reclamation of these areas is necessary for reestablishing plants on these areas. When completed properly, reclamation should increase plant species diversity and lower the seral stage of the community by replacing shrubs with grasses and forbs.

OHV use would result in impacts on vegetation, such as loss of vegetation cover, density, and composition changes. OHV users would introduce and spread noxious and invasive weed seeds from their vehicles, shoes, clothing, and recreational equipment. As OHV use increases, people from outside the area would bring in noxious and invasive weeds, including new invasive species. OHV activities in undisturbed and remote areas have the potential to distribute weed seeds into weed-free areas.

Paleontology excavation and research activities cause short-term, small, and localized impacts on vegetation by disturbing and removing the topsoil. Reclamation mitigates these impacts. Impacts on special status plants would be avoided or mitigated by paleontology activities.

Recreational activities, such as camping, hiking, and backpacking would result in localized vegetation disturbance from trampling. Permitted recreational activities would not be authorized in known locations of Special Status Species plants if a potential existed to adversely impact the plants. Activities that do not require a permit, such as camping outside developed campgrounds, might cause minor impacts on sensitive plants and their habitats. Recreational activities would introduce and spread noxious and invasive weed seeds from vehicles, shoes, clothing, and recreational equipment. As recreation use increases, people from outside the area would bring in noxious and invasive weeds, including new invasive species. Recreation activities that occur in undisturbed and remote areas have the potential to distribute weed seeds into weed-free areas.

Increases in the region's population and increases in visits to the RMPPA would impact vegetation and the demand on it for a various uses. As more people travel, recreate, hunt, and otherwise enjoy BLM-administered public lands, vegetation resources are trampled from foot, animal, bike, and vehicle travel. This occurs on small, localized areas, and the effect is minimal. Conversely, education of the public who use and value these resources creates advocates for the natural ecology and traditional uses of the vegetative resources, which might have long-term benefits to vegetation resources. As the public becomes aware of their impacts, the public would learn to use techniques that are less harmful to vegetation in the RMPPA.

The closure of roads within WSAs reduces the potential for vehicles distributing noxious and invasive weeds, compacting soil, and damaging vegetation because vehicles are limited to boundary roads. Restrictions on surface disturbance in ACECs would minimize disturbance to vegetation. The Sand Hills ACEC protects approximately two-thirds of the unique bitterbrush/sagebrush plant community. The remaining third, which is in the checkerboard land pattern, would be managed as the remainder of the RMPPA. Visitor use and access is promoted in SRMAs, resulting in increased vegetation disturbance from trampling.

The Interim Management Policy for WSAs prohibits or restricts motorized equipment use, which would limit weed treatment options in these areas. In addition, the restriction on motorized travel results in less surface disturbance overall in the WSAs. However, dispersed hiking and equestrian use would increase the potential for the introduction or spread of noxious and invasive weeds. Designation of SMAs would

increase popularity and visitation resulting in increased potential for the introduction and proliferation of noxious and invasive weeds to these areas.

Expansion of the transportation network would result in the permanent loss of vegetation. Areas disturbed during road construction and not part of the permanent road would be reclaimed. New transportation corridors would avoid Special Status Species plant communities. Because proposed projects are reviewed before construction, new locations of Special Status Species plant communities might be located, increasing knowledge of these plant species. Transportation corridors typically have the highest density of noxious and invasive weeds occurring in the region. Weed infestations throughout the RMPPA can mostly be attributed to on- and off-road vehicle dispersion and from construction and maintenance activities.

Impacts from vegetation treatments are short-term losses of vegetation and changes in plant structure. In the long term, treatments would increase health and vigor the vegetation community, increase vegetation diversity, modify vegetation types (i.e., changes from shrubs to herbaceous vegetation) and modify age class and structure. The nature and uses of various types of treatments are discussed in Appendix 19. A review would be conducted before any vegetation treatment or other vegetation management action (exclosures) to ensure the activity would not result in the loss of Special Status Species plants.

Special Status Species plant communities (because of their limited size and distribution) would be adversely impacted by the spread and proliferation of noxious and invasive weeds. Impacts would be controlled through aggressive use of noxious and invasive weed treatments.

Weed management actions would control some noxious and invasive weed populations resulting in healthier native plant communities. Mechanical vegetation treatments would increase the potential for the establishment of noxious and invasive weeds attributed to increased soil surface exposure. These impacts would potentially be avoided by using chemical or biological treatments. Prescribed burns occur in the cool seasons (April–June and September–November). These burns are usually much cooler on the soil surface and would not burn the root crowns of herbaceous plants. Following prescribed fire, native herbaceous plants return with increased vigor, which reduces the likelihood of weed infestations.

VRM Class I and II areas would negligibly impact the timing or extent of vegetation treatments. There would be no impacts on Special Status Species plants from VRM. There would be no impacts on noxious and invasive weed management from VRM.

Effective watershed management would result in healthy and diverse plant communities. The restriction of surface disturbance around wetland/riparian areas, perennial surface waters, identified flood plains, and ephemeral channels would further protect vegetation from disturbance. Consideration of water quality standards and watershed guidelines during construction of other program projects would assist in achieving the desired plant and litter cover objectives. Developed water sources on uplands would be used to reduce livestock concentrations in wetland/riparian areas. The use of exclosures to protect seeps and springs precludes grazing in these areas. These improve species composition, vigor, and cover in wetland/riparian habitat.

Management actions aimed at maintaining or improving soil conditions and minimizing soil erosion would also maintain or improve the condition of vegetation. Watershed management actions would consider impacts on sensitive plants and avoid negative impacts on these communities. Maintenance of good soil condition would enhance the viability, vigor, and abundance of Special Status Species plants and plant communities. Where accelerated erosion or other soil disturbing activities are affecting these species, measures would be taken to reduce or prevent the loss of habitat.

Effective watershed management would result in healthy and diverse plant communities and would minimize the establishment of noxious and invasive weeds. Minimizing erosion and protecting the soil would help decrease the potential for weed establishment and spread.

Wild horse management actions result in minimal impacts on vegetation. Gathering efforts would result in short-term, localized trampling of vegetation in areas where wild horses are herded and confined. Riparian areas and other Special Status Species plant communities would be avoided during gathering operations. Wild horse population objectives are designed to avoid long-term impacts on plants and vegetation communities.

Wild horses impact riparian vegetation around watering locations by trampling and grazing plants, and compacting the soil, which reduces riparian species cover and diversity. Protection and development of seeps and development of alternative water sources mitigate impacts of wild horses on wetland/riparian habitat. The distribution, population, and grazing intensity of wild horses might change or delay vegetation treatments, and vegetation recovery following a treatment might be slowed if concentrated year-round use by wild horses occurs.

Wild horses would contribute to the spread of noxious and invasive weeds. Weed seeds and fruits can either attach to animals or be ingested. They can then be transported to other areas where they are spread by the animal physically removing the seed or fruit, or through the deposition of fecal matter. Areas where animals concentrate and disturb the soil are particularly vulnerable to infestations of noxious and invasive weeds.

Most wildlife grazing has little impact on vegetation because wildlife often move frequently and do not regraze forage unless they are confined. Minor effects to vegetation occur from wildlife trails, bedding areas, and other congregation areas. Wildlife concentration areas, where shrubs are heavily used, exhibit vegetation shifts from sagebrush, bitterbrush, and mountain mahogany to conifers, grasses, forbs, annuals, and occasionally bare ground. Extensive browsing of desirable shrubs in riparian habitat might impact the density, height, and vigor of willows, aspen, waterbirch, cottonwood, dogwood, and currant. Prairie dogs affect the density and type of herbaceous vegetation around their towns. Beaver lower the density of willows, aspen, and other streamside vegetation, although the ponds that beaver create often raise the water table, allowing for more extensive areas of water loving shrubs and herbaceous plants. However, when beaver dams wash out, the drained pond area provides bare ground where willow would establish. The distribution, population, and grazing intensity of wildlife might change or delay vegetation treatments, and vegetation recovery following a treatment might be slowed if use by wildlife occurs.

Management of wildlife and fish habitat would have minimal impact on Special Status Species plants and unique plant communities. Wildlife can contribute to the spread of noxious and invasive weeds. Weed seeds and fruits can either attach to animals or be ingested. They can then be transported to other areas where they are spread by the animal physically removing the seed or fruit, or through the deposition of fecal matter. Areas where animals concentrate, such as crucial winter range or prairie dog towns, are particularly vulnerable to infestations of noxious and invasive weeds.

4.15.2 Impacts Under Alternative 1: Continuation of Existing Management

Limitations on surface disturbing activities would protect vegetation resources associated with the cultural sites, which in turn would maintain or enhance forage conditions at the site.

The use of wildland fire for resource benefit would allow wildland fire to play its natural role in the ecosystem. This would alter the plant community age structure from predominately late to early and mid seral, creating more diverse plant communities. Many otherwise small and manageable fires would

potentially burn larger areas. Wildland fires would be suppressed unless they met the criteria for a wildland fire for resource benefit. Wildland fire would be used to maintain and improve fire dependent plant communities. This alternative would require less line construction and other surface disturbance resulting in reduced impacts on plants.

Forest management actions, including small timber sales, firewood gathering, and other permitted activities might result in the introduction and/or spread of noxious and invasive weeds. The vehicles, equipment, animals, and operator's clothing transport weed seed to the project site. With the application of proper forest management practices, the introduction and spread of noxious and invasive weeds from small timber sales and thinning projects would be minimal.

Forest management actions that would impact vegetation are tree thinning, timber harvesting, and other practices used to improve forest health. The impacts of thinning on vegetation include increased vigor of the remaining trees and a more open tree canopy, which increases herbaceous plant cover. Fuel reduction would also reduce the frequency and intensity of wildland fires. Harvesting of commercial forestlands would increase herbaceous vegetation in the short term. Roads and skid trails would have short- and long-term impacts on vegetation cover, depending on the scale of the timber harvest and whether the roads and skid trails are needed for future harvesting. If necessary, clear-cut areas, roads, and skid trails would be reclaimed to initially establish herbaceous vegetation for soil stabilization, followed by tree plantings. Roads would be revegetated within 3 to 5 years after closure. The impacts of these actions on vegetation would result in fewer trees but would lower fire potential because harvested areas could serve as buffer areas for wildland fires.

Known locations of special status plants would be avoided or mitigated by the timber harvesting plan to ensure the stability of Special Status Species plant species and communities. Firewood gathering and Christmas tree cutting would be restricted if Special Status Species plants and plant communities were harmed by these activities.

Managing to meet the Standards for Healthy Rangelands (BLM 1997) changes plant community composition and can be used to increase the health and diversity of natural vegetative systems. Additional development of range improvement projects would help reduce effects associated with the concentration of livestock, such as reduced spread of noxious and invasive weeds and removal of vegetation cover.

Minerals management impacts on Special Status plant species would be negligible as a result of required mitigation measures (i.e., avoidance). Because proposed developments are reviewed before permitting, new locations of special status plant communities might be located, increasing knowledge of these plant species.

Mineral resource development activity can mitigate weed proliferation through ongoing reclamation and eradication programs during operational phases and in conjunction with final site reclamation. Immediate and successful site reclamation results in increased cover or density of native plants, which would help preclude weed invasion. Failure to comply with existing weed control stipulations would continue to increase weed abundance and proliferation.

Allowing OHV travel off existing roads and vehicular routes to retrieve big game kills and to access primitive campsites would increase disturbance from OHVs and trampling by humans, increasing vegetation damage in these localized areas.

Under Alternative 1, vegetation treatments would occur on an average of 2,500 acres per year, or 50,000 acres over the next 20 years would be treated. This average includes using prescribed fire on 1,500 acres

per year, chemical treatments on 1,000 acres per year, and minimal use of mechanical treatments. In spite of this existing level of acres treated annually, the seral condition class would remain predominantly late (e.g., dominated by mature to decadent vegetation). Reintroduction of wildland fire into the ecosystem would increase ecological diversity, vegetation structure, and age class distribution. Herbaceous cover would continue to be inadequate for watershed protection, and exhibit lower vigor and production.

Noxious and invasive weed treatments would occur on 2,800 acres per year by BLM and other agents, including ROW lease holders, and oil and gas companies. Noxious and invasive weeds would remain untreated on roughly 15,000 acres. Infested acreage would continue to decline in plant diversity and productivity and would provide the seed source for further expansion into native rangelands as noxious and invasive weeds displace native plants.

Effective watershed management would result in healthy and diverse plant communities and would minimize the establishment of noxious and invasive weeds. Minimizing erosion and protecting the soil would help decrease the potential for weed establishment and spread. Avoiding surface disturbance would minimize impacts on vegetation in identified 100-year flood plains, areas within 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and areas 100 feet from the inner gorge of ephemeral channels.

Wildlife habitat management restrictions would impact vegetation treatments by decreasing the window of opportunity, changing the scale, and/or location of proposed projects.

Summary

There would be an increase in decadent plant communities and weed proliferation resulting from insufficient acreage being treated. The treatment of only 50,000 acres of vegetation (2,500 acres annually) would result in the majority of vegetation communities remaining in late succession. This treatment would not allow plant communities to adequately support other resource uses. The treatment of only 56,000 acres of noxious and invasive weeds (2,800 acres per year) would not be sufficient to slow the proliferation of weed species, further reducing the productivity of vegetation communities. The disturbance of 61,895 acres of vegetation (3,095 acres per year) from minerals management actions and 5,733 acres (287 acres per year) from lands and realty management actions would be susceptible to weed invasion. Approximately 47,479 acres of this disturbance would be reclaimed, which would return vegetation cover and forage production to most of this acreage. Existing acres affected by wildland fire (4,000 acres per year) and suppression efforts would continue to create opportunities for weed invasion and expansion. Other than cheatgrass and musk thistle, weed invasion following wildland fires has been minimal.

4.15.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from cultural resource management, OHV management, and water quality, watershed, and soils management would be the same as those identified in Alternative 1.

Increasing fire suppression efforts would decrease the likelihood of high-intensity fires in the short term. However, this action would also allow fuel accumulation to continue, which could lead to an increased number of wildfires in the long term. Fuels treatments would increase tenfold compared with Alternative 1, resulting in an overall shift in plant communities to more early and mid-seral conditions.

Increased suppression activity would increase soil disturbance and potentially increase susceptibility to weed invasion and proliferation. However, the smaller number of acres burned during the hot season

(from 4,000 acres to 2,000 acres) would reduce opportunities for weed invasion. The tenfold increase in vegetation treatments would provide more opportunity for the potential establishment or proliferation of noxious and invasive weeds. However, mitigation measures and increased weed treatments would be implemented to minimize the potential.

Forest management actions would increase the impact on vegetation and on noxious and invasive weeds by doubling the allowable level of commercial timber harvest and associated activities compared with Alternative 1. Additional human presence and vehicles would increase ground disturbance and the spread of noxious and invasive weeds. Other impacts are the same as Alternative 1.

Impacts to vegetation, special status plant species, and noxious and invasive weeds under this alternative would be similar to Alternative 1 because grazing management would still be required to meet Standards for Healthy Rangelands (BLM 1997). Therefore, the Alternative 2 objectives, which are to emphasize commodity production, would have minimal effect on vegetation.

The change in emphasis of range improvements to develop more reliable water sources, including larger reservoirs, would increase the acreage of vegetation disturbed. However, additional reliable water sources would allow for increased adherence to prescribed grazing systems, would reduce duration of use, and would control the season of use in pastures to improve vegetation vigor and species composition.

Impacts from minerals management would be greatest under Alternative 2. Additional disturbances from increased oil and gas development would increase impacts to vegetation. These communities are abundant in the RMPPA. Approximately 63,649 acres of disturbance would occur during the planning period—an increase of 3 percent compared with Alternative 1. Reclamation would restore approximately 46,636 acres (73 percent); however, reclamation cannot guarantee that the vegetative community would return to its original composition.

Occupied special status plant habitat would be protected; however, potential habitat for expansion of these species would not be protected; consequently, opportunities for population increases would be reduced.

The maintenance or attainment of PFC in riparian areas would result in lower seral plant communities exhibited by herbaceous dominated communities that would otherwise be dominated by woody plants. An estimated 24,400 acres per year would be treated, with an emphasis on landscape-scale projects. This tenfold increase in vegetation disturbance would increase the proportion of early and mid-seral plant communities to late-seral plant communities. This increase would result in vigorous, diverse, and productive plant communities. Prescribed fire treatments would reintroduce fire into fire-dependent plant communities on a landscape-scale, from which they have been long absent. The reintroduction of fire into the ecosystem would increase ecological diversity, vegetation structure, and age class distribution. Management of aspen stands for early seral conditions would positively affect vegetation. Aspen is a disturbance-dependent early succession species that usually dominates a site only until conifers replace it and other shade tolerant species (Mueggler 1985). Therefore, managing aspen colonies for early seral conditions would increase total aspen cover and increase vegetation diversity and understory production in aspen stands (Kay 1997).

Impacts to sensitive plants species from vegetation management would be greatest under Alternative 2. State-sensitive species would not be analyzed on a case-by-case basis, which would potentially increase disturbance to these sensitive species' habitat.

Placing priority for weed management actions on areas where commodity benefits would be enhanced would positively affect vegetation resources. Increased activity levels associated with increased

commodity production would result in more disturbed acres and larger size of vegetation treatments, increasing the opportunity for weed invasion and proliferation.

Weed treatments would occur on 25,786 acres per year by BLM and by the other agents. There would be an emphasis on all weeds, including poisonous plants, to enhance commodity production from rangelands. Infested acreage would continue to decline in plant diversity and productivity and would provide the seed source for further expansion into native rangelands as noxious and invasive weeds displace native plants in the short term. However, in the long term, treatments would slow the proliferation of existing weed species and the introduction of new weed species into new areas until all areas received treatments.

There would be fewer restrictions on the timing of vegetation treatments for the protection of wildlife species, which would allow increased time periods for weed treatment and habitat manipulation projects.

Summary

Vegetation treatments would emphasize landscape-scale projects that would increase the proportion of early and mid-seral plant communities to late-seral plant communities. Projected annual vegetation treatments would occur on 24,400 acres, which is the greatest level of treatment. This tenfold increase from Alternative 1 would result in vigorous, diverse, and productive plant communities.

The disturbance of 63,663 acres of vegetation (3,183 acres per year; a 3-percent increase) from minerals management actions and 5,733 acres (287 acres per year; no change) from lands and realty management actions would be susceptible to weed invasion. Approximately 46,636 acres of this disturbance would be reclaimed, which would return vegetation cover and forage production to most of this acreage. Acres affected by wildland fire would be reduced (from 4000 acres to 2000 acres per year), which would also decrease opportunities for weed invasion and expansion.

Sensitive species and unique plant communities would not be analyzed on a case-by-case basis, which would potentially increase disturbance to these sensitive species' habitat.

There would be no significant impacts on weed management. Treatments would occur on a scale (25,786 acres annually) that in the long term would control the introduction and would slow the proliferation of noxious, invasive, and poisonous weeds.

4.15.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

In addition to impacts from cultural resources management under Alternative 1, increased limitations on surface disturbing activities on and near cultural sites would protect vegetation resources associated with the cultural sites.

Impacts from wildland fire management actions would be similar to those under Alternative 1, except that the use of wildland fire for resource benefit would be emphasized under this alternative, which would double (4,000 acres to 8,000 acres annually) the acreage burned and would allow wildland fire to play its natural role in the ecosystem. Fire management actions would alter the plant community age structure from predominately late to early and mid-seral, creating more diverse plant communities. Many otherwise small and manageable fires would potentially burn larger areas. Wildland fires would be suppressed unless they met the criteria for a wildland fire for resource benefit. Wildland fire would be used to maintain and improve fire-dependent plant communities. This alternative would require less line

construction and other surface disturbance resulting in reduced disturbance to and loss of plants and less acreage where weed invasion could occur.

Fuel treatments would increase fivefold compared with Alternative 1, resulting in an overall shift in plant communities to more early and mid-seral conditions.

Forest management actions—specifically, the termination of commercial timber harvesting—would increase woody vegetation, fuel loading, and the age class structure of conifer stands. Understory diversity and production would decrease. The potential for resource damaging wildland fires, insect infestations, and disease would increase. Plant species adapted to late seral forest communities would benefit from Alternative 3.

The elimination of commercial timber harvesting would reduce the surface disturbance that might lead to establishment of noxious and invasive weeds and would reduce the potential to disturb Special Status Species' habitat.

Vegetation disturbance would be reduced because of less new ROW activity, which reduces opportunities for the spread of noxious and invasive weeds.

Alternative 3 emphasizes the implementation of range improvements and management plans to meet DPC objectives, which would improve overall vegetation health. Implementation of this alternative would ensure vegetation impacts from grazing are minimized, and range improvements would emphasize modification of fences and small-scale water developments, resulting in reduced disturbance to vegetation. The exclusion of bison from grazing blocked public lands (amounting to 60 percent of the RMPPA) would limit grazing prescriptions using bison to manage the vegetation resource.

Establishing the Chain Lakes, Pennock, and High Savery areas as vacant allotments would result in improved vegetation management in other allotments. During drought years, following wildland fires or after vegetation treatments, these vacant allotments could be used instead, effectively reducing impacts to vegetation. During a normal year, forage on the vacant allotments would be available for wildlife, which might reduce grazing pressure on the other allotments. This would result in healthier vegetation.

Impacts from minerals management actions would be the same as under Alternative 1, except that fewer acres of vegetation would be disturbed as a result of decreases in oil and gas development. Oil and gas development would disturb 56,505 acres during the planning period, a 10-percent decrease compared with Alternative 1. Reclamation would restore roughly 41,016 acres (73 percent). However, reclamation cannot guarantee that the vegetative community would return to its original composition and function.

Impacts on Special Status Species from minerals management would be the same as under Alternative 1. Impacts on noxious and invasive weeds under this alternative would be the same as under Alternative 1, except fewer acres of vegetation would be disturbed as a result of decreases in oil and gas development resulting in decreased potential for weed invasion.

Limiting OHV travel for retrieving big game kills and camping to designated roads and vehicle routes would reduce disturbance from OHV use to these areas, thereby protecting these areas from vegetation damage by OHV use.

Designation of the Blowout Penstemon ACEC would protect and enhance existing and potential habitat, which would maintain or increase populations of this endangered plant species.

Upland and riparian areas would be managed to meet DPC objectives. This effort would result in a landscape consisting of early, mid, and late seral stage communities with a mixture of herbaceous and multi-aged woody species, more stable soils, increased vegetation production, and diversity.

Vegetation treatments would occur on an average of 11,800 acres per year with an emphasis on numerous smaller areas of treatment. The fivefold increase in vegetation treatments would create a more diverse mixture of species and age class, but seral conditions would remain in a higher proportion of late seral than desired. Small treatment areas would create more surface disturbance from fire perimeter control and fires would burn slower, increasing mortality to fire-sensitive species.

Weed control treatments would occur on 28,542 acres per year, which would reduce and control weed infestation, where possible, from native communities in the long term. The priorities for treatment of noxious and invasive weeds would be to maintain weed free, native communities, and unique communities to maintain their natural values. Native vegetation communities are often healthy and are not conducive to invasive weed infestations. Areas with established noxious and invasive weed patches would be treated to contain weeds, which would protect adjacent native plant communities from invasion. The increase of smaller vegetation treatments would create more surface disturbance from fire perimeter control and fires would burn slower (and hotter), increasing the opportunity for establishment of noxious and invasive species.

Impacts from water quality, watershed, and soils management would be similar to Alternative 1, except prohibiting surface disturbance (instead of avoidance) would eliminate impacts to vegetation in identified 100-year flood plains, areas within 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and areas 100 feet from the inner gorge of ephemeral channels.

Provisions concerning the Encampment River Watershed and protection for municipal water supplies would reduce surface disturbing activities such as permanent roads or structures, and promote grazing management and forest management actions to meet watershed objectives. This would result in healthier vegetation communities with increased plant vigor and cover.

Increased wild horse AML numbers in the Lost Creek HMA (from 70 to 165 adults) would heighten the need for special management of limited desert riparian habitats in this area. This management would be achieved through the use of exclosures, offsite water development, and/or riparian pastures to maintain riparian management objectives.

Additional sensitive habitat restrictions (such as NSO on raptor nests) would influence the size, location, and timing, but would not preclude, vegetation treatment projects.

Managing important waterfowl areas for preferred waterfowl habitat would improve vegetation cover and diversity. Prohibiting water development in big game crucial winter range would reduce flexibility to manage livestock impacts on vegetation, which could increase grass dominance on shrub rangelands. Conversely, water developments in big game crucial winter range would potentially lead to big game remaining on winter ranges longer, thereby reducing forage availability and quality in the long term.

Summary

Vegetation treatments would occur on an average of about 11,800 acres per year with an emphasis on smaller and more numerous projects. This would be a fivefold increase in vegetation disturbance that would increase the proportion of early and mid seral plant communities to late seral plant communities. This would result in vigorous, diverse and productive plant communities.

The disturbance of 56,505 acres of vegetation (2,828 acres per year; a 10-percent decrease) from minerals management actions and 5,733 acres (287 acres per year; no change) from lands and realty management actions would be susceptible to weed invasion. Approximately 44,029 acres of this disturbance would be reclaimed, which would return vegetation cover and forage production to most of this acreage. Acres affected by wildland fire would be increased (from 4,000 acres to 8,000 acres per year), which would also increase opportunities for weed invasion and expansion.

Treatments (28,542 acres annually) would keep up with the introduction and attempt to control the proliferation of noxious and invasive weeds in the long term.

There would be no significant impacts to special status plants or their communities.

4.15.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from lands and realty and wild horse management would be the same as under Alternative 1.

Impacts from cultural resource management and SMA management would be the same as those identified in Alternative 3.

Wildland fire management actions would be similar to those under Alternative 1, except fuel treatments would increase four to eight times resulting in an overall shift in plant communities to more early and mid-seral conditions.

Forest management actions, such as eliminating commercial timber harvest on 6,700 acres of land on steep slopes, riparian areas and associated buffer zones, would maintain soil and vegetation stability on steep slopes and riparian areas. Impacts to other upland areas would be similar to those described in Alternative 1. There would be no impacts from forest management to Special Status Species under this Alternative 1.

Impacts from livestock grazing management on vegetation would be the same as Alternative 1, except emphasis would be placed on achieving DPC, which would result in improved vegetation composition and health in upland and riparian areas.

Establishing the Chain Lakes, Pennock, and High Savery areas as vacant allotments would result in improved vegetation management in other allotments. During drought years, following wildland fires or after vegetation treatments, these vacant allotments could be used instead, effectively reducing impacts to vegetation. During a normal year, forage on the vacant allotments would be available only for wildlife, which may reduce their use on other allotments. This would result in healthier vegetation. Impacts to Special Status Species, unique plant communities, and noxious and invasive weeds would be the same as under Alternative 3.

Impacts from minerals management would be similar to Alternative 3. Approximately 57,819 acres of disturbance would occur during the planning period; a 7-percent decrease compared with Alternative 1. Reclamation would restore approximately 42,347 acres (73 percent). However, reclamation cannot guarantee that the vegetative community will return to its original composition and function. Impacts to Special Status Species and noxious and invasive weeds under this alternative would be the same as under Alternative 1.

Limiting OHV travel for retrieving big game kills and camping within 300 feet of designated roads and vehicle routes would reduce disturbance to these areas, thereby limiting potential vegetation damage by OHVs.

Upland and riparian areas would be managed to meet DPC objectives. This effort would result in a landscape consisting of a mixture of early, mid-, and late-seral stage communities with herbaceous and multi-aged woody species, more stable soils, increased vegetation production, and diversity. Vegetation treatments would occur on about 16,400 acres per year and help achieve DPC objectives. Prescribed fire treatments would reintroduce fire into fire-dependent plant communities on a landscape scale from which it has been absent. Reintroduction of fire would increase ecological diversity, vegetation structure, and age class distribution on a landscape scale.

Priority would be placed on treating new and small infestations of noxious and invasive weeds, thereby controlling outbreaks before they become large and established. Areas of large infestations would be treated to control the rate of spread. There would be an increase in vegetation treatments, which would create more opportunities for establishment of noxious and invasive species. Treatments would occur at a pace (25,000 acres annually) that would keep up with the introduction and proliferation of noxious and invasive weeds in the RMPPA in the long term. In the short term, some infested acreage would continue to result in the decline of plant diversity and productivity and provide the seed source for further expansion into native rangelands as noxious and invasive weeds displace native plants. However, in the long term, treatments would slow the proliferation of existing weed species and the introduction of new weed species into new areas, until all areas received treatments.

Provisions outlined in this alternative concerning the Encampment River Watershed and protection for municipal water supplies would reduce surface disturbing activities (e.g., construction of permanent roads or structures) and promote grazing management and forest management actions to meet watershed objectives. This effort would result in healthier vegetation communities with increased plant vigor and cover.

Wildlife management actions to achieve the objectives of maintaining vegetation condition and reducing long-term disturbances to provide quality wildlife habitat would impact vegetation by improving vegetation cover, diversity, and vigor. However, vegetation seral stages would be manipulated to provide the proper vegetative habitat for wildlife, which would influence the type, timing, and size of the vegetation treatment used.

Summary

Vegetation treatments would occur on about 16,400 acres per year. This would be a sixfold increase in vegetation disturbance, which would increase the proportion of early and mid-seral plant communities to late-seral plant communities. This effort would result in vigorous, diverse, and productive plant communities. Use of wildland fire for resource benefit would reintroduce fire into fire-dependent plant communities on a landscape scale from which they have been long absent.

The disturbance of 57,819 acres of vegetation (2,890 acres per year; a 7-percent decrease) from minerals management actions and 5,733 acres (287 acres per year; no change) from lands and realty management actions would be susceptible to weed invasion. Approximately 42,207 acres of this disturbance would be reclaimed, which would return vegetation cover and forage production to most of this acreage. Acres affected by wildland fire (4,000 acres per year) and suppression efforts would continue to create opportunities for weed invasion and expansion.

Significant impacts to weed management are unlikely because most of the actions are designed to preserve and protect vegetation resources. Treatments would occur on a scale (25,000 acres annually) that in the long term would control the introduction and mostly control the proliferation of noxious and invasive weeds in the long term.

There would be no significant impacts to special status plants or their communities.

4.16 VISUAL RESOURCES

VRM provides management actions that direct how the visual quality of the RMPPA will be maintained. This section presents potential impacts to VRM from implementation of management actions for other resource programs. Impacts from the implementation of VRM management prescriptions on other resources and resource users are discussed under those particular resource headings.

Significance Criteria

Impacts to visual resources would be considered significant if the following were to occur:

- An activity or development in an area is incompatible with the designated VRM class objective and becomes an unacceptable feature of the landscape or visual horizon.

Methods of Analysis

Impact analysis and conclusions are based on interdisciplinary team knowledge of resources and the project area, review of existing literature, spatial analysis using ESRI's ArcGIS Desktop 8.x computer software, and information provided by other agencies. Effects are quantified where possible. Maps 2-49 through 2-52 present VRM classes; Table 2-9 presents acreages for each VRM class under each alternative. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate. The analysis is based on the following assumptions:

- A management action for a program or resource will have an effect on visual resources if that action does not conform to the designated VRM class.
- The checkerboard land pattern along the original Union Pacific Railroad (U.P.R.R.) ROW is not conducive to Class II VRM because BLM has no control over private surface. BLM will mitigate developments on BLM surface in the Class II checkerboard as best it can and encourage proponents to apply comparable mitigation to adjacent private surface.
- Conflicts will continue to occur in the Seminoe VRM Class II area between minerals exploration and extraction, the Seminoe-to-Alcova Back Country Byway, and the checkerboard land pattern.
- RFDs and RFAs can be found in Appendix 33.

4.16.1 Impacts Common to All Alternatives

Cultural resource management actions would benefit VRM Class II by intensively managing any surface disturbing activity that modifies the visual setting of historic properties where the setting contributes to NRHP eligibility.

Use of fire for resource benefit would increase the size of wildland fires. Larger burned areas would create short-term visual obstructions and could create an uneven form and line in the visual horizon.

Surface disturbances associated with the construction of facilities and ROWs would impact visual resources. The clearing and grading of land associated with new construction and the establishment of ROWs would remove vegetation, which could alter the character of the visual landscape in some VRM

classifications. Belowground utilities and some aboveground facilities would be compatible with VRM Class II if properly mitigated using BMPs (Appendix 15). Management actions involving surface disturbance and construction of facilities would be approved within Class II designations with adequate mitigation.

Prescribed fire would create a natural appearance within the characteristic landscape, as a result of the ash and charred appearance or straight-line treatment edges that might be visually unattractive to some viewers. Impacts would be short term, depending on the spatial arrangement, vegetation mosaics, and proximity to key observation points.

4.16.2 Impact Under Alternative 1: Continuation of Existing Management

VRM Class II designation within the checkerboard area would be difficult to manage. The checkerboard land ownership reduces BLM's ability to effectively manage for visual resources. Surface disturbing activities located on private lands are not subject to the same restrictions and stipulations for preservation of VRM Class. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of visual integrity.

Summary

VRM Class II designation within the checkerboard area would be difficult to manage because of a lack of BLM control on adjacent private property. Surface disturbing activities designed to be consistent with the VRM Class would maintain VRM classifications.

4.16.3 Impacts Under Alternative 2: Emphasis on Development of Resources

VRM Class II acreage would be reduced around the Pathfinder and Seminoe Reservoirs and would be eliminated in the Shirley Mountains and the checkerboard land ownership pattern as a result of suitability and manageability issues. These areas are better suited as VRM Class III areas; thus, these 125,680 acres would not be protected from major visual intrusions.

Summary

The checkerboard and intermixed land ownership areas would be designated VRM Class III because of the lack of BLM control on adjacent private property. Surface disturbing activities designed to be consistent with the VRM Class would maintain VRM classifications.

4.16.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

The 5-mile visual corridor of the Historic Trails ACEC and the JO Ranch buildings and the 2-mile visual horizon would be protected as VRM Class II under this alternative. The majority of the Historic Trails ACEC is within the checkerboard. VRM Class II designation within the checkerboard area would be difficult to manage. The checkerboard land ownership reduces BLM's ability to effectively manage for visual resources. Surface disturbing and disruptive activities located on private lands are not subject to the same restrictions and stipulations for preservation of VRM Class. These actions might have impacts that carry over to the adjacent BLM lands and reduce the quality of visual integrity.

VRM Class II acreage would be reduced around the Seminoe and Pathfinder Reservoirs and would be eliminated in the Shirley Mountains and the area with the checkerboard land ownership pattern. However, an additional 582,200 acres would be designated as VRM Class II as a result of managing the Historic Trails ACEC and Ferris Mountain viewsheds as VRM Class II areas.

Lands exhibiting wilderness characteristics that are located adjacent to the Adobe Town and Ferris Mountain WSAs would be designated as VRM Class II. The creation of VRM Class II acreage in these areas would preserve the visual horizon from key observation points, such as from Adobe Town WSA and access routes to the area, but would not preclude development if such actions can be properly mitigated. The area is almost entirely leased; therefore, development is probable and could impair the wilderness characteristics of naturalness, solitude, and unconfined primitive recreation.

Summary

VRM Class II designation within the checkerboard area would be difficult to manage because of a lack of BLM control on adjacent private property. Surface disturbing activities designed to be consistent with the VRM Class would maintain VRM classifications.

4.16.5 Impacts Under Alternative 4: Preferred Alternative

All impacts from resource management actions would be similar to those under Alternative 3.

Summary

Portions of the checkerboard and intermixed land ownership areas would be designated VRM Class III because of the lack of BLM control on adjacent private property. Surface disturbing activities designed to be consistent with the VRM Class would maintain VRM classifications.

This alternative would solve some VRM conflicts associated with the checkerboard and isolated BLM parcels within VRM Class II. It also creates VRM Class IV in heavily developed areas where it is appropriate.

4.17 Water Quality, Watershed, and Soils

This section describes potential impacts to water quality, watershed, and soils. Section 3.17 describes existing conditions regarding water quality, watershed, and soils. Wetland/riparian areas are also addressed in this section. Section 4.15 describes potential impacts to wetland/riparian vegetation.

Significance Criteria

Impacts on water quality, watershed, and soils would be considered significant if any of the following were to occur:

- Degradation of water quality beyond the designated use of the receiving water body, or other violations of federal or state water quality standards
- Any unmitigated loss of wetlands or wetland function, or violation of Clean Water Act Section 404 permit requirements
- Human activities degrade wetland/riparian areas such that, as a minimum physical state, PFC is not being maintained

- Soil loss greater than 2 tons per acre per year in areas attributed to surface disturbance after reclamation.

Methods of Analysis

Impact analysis and conclusions are based on interdisciplinary team knowledge of resources and the project area, review of existing literature, and information provided by other agencies. Effects are quantified where possible. Spatial analysis was conducted using ESRI's ArcGIS Desktop 8.x computer software. Impacts are sometimes described using ranges of potential impacts or in qualitative terms, if appropriate.

Analysis of impacts on water resources would be based on achieving the watershed objectives of managing surface land use and groundwater resources to maintain or improve water quality to comply with the water quality standards for uses and classes as established in the State Water Quality Rules and Regulations and to maintain wetland/riparian areas at PFC or better.

The analysis is based on the following assumptions:

- Substantial disturbance to soil, including compaction of soil or changes in vegetative cover, would increase water runoff and downstream sediment loads and would lower soil productivity, thereby degrading water quality, channel structure, and overall watershed health.
- The degree of impact attributed to any one disturbance or series of disturbances is influenced by several factors, including location within the watershed, time and degree of disturbance, existing vegetation, and precipitation.
- Changes in water quality for surface waters, such as increases in pollutants or physical parameters (e.g., temperature) would degrade habitat used by aquatic live and would affect other beneficial uses (e.g., stock-watering, irrigation, and drinking water supplies).
- BLM would comply with the Water Quality Standards for Salinity in Colorado River System as recommended by the Colorado River Basin Salinity Control Forum and adopted by the State of Wyoming, Department of Environmental Quality.
- BLM would assess wetland/riparian sites on BLM land using the PFC method. BLM would manage livestock and implement rangeland improvement projects to seek to bring locations not rated as PFC into PFC, where conditions allow. BLM would continue to develop and maintain water sources in the uplands as a critical tool for managing grazing animals to reduce impacts on wetland/riparian areas.
- Access roads would follow standard practices described in Appendix 26. However, properly designed roads would alter hillslope hydrology and concentrate overland flow in some areas. In areas with steep topography, these impacts would increase.
- Fine-textured soils are more susceptible to water erosion and compaction when wet, whereas coarse-textured soils are more susceptible to wind erosion.
- In most cases, the BMPs described in Appendix 13 would be implemented during planning for surface disturbing activities.
- RFDs and RFAs can be found in Appendix 33.

4.17.1 Impacts Common to All Alternatives

Management of cultural resources would have minor and short-term effects on water quality and soil resources. Management actions generally focus on the protection or preservation of cultural sites, which in turn benefit water and soil resources by limiting or excluding surface disturbing activities on or near such sites. Data recovery excavations of cultural sites (typically less than an acre) would cause local and short-term impacts, including surface disturbance and vegetation removal resulting in an increase of localized erosion. Protection measures afforded by the NHPA and required reclamation would mitigate any effects to acceptable levels.

The use of wildland fire, as a component of the ecosystem, would reduce canopy and ground cover, thereby exposing soils to wind and water erosion and increased runoff potential, and could adversely affect the soil's physical properties reducing infiltration. These impacts would affect sediment loading and downstream water quality depending on the severity of the fire and location within the watershed.

Harvesting of minor wood products would have minimal short-term effects on water quality. Harvesting methods would cause some surface disturbance, which would increase soil erosion, runoff, and sedimentation of surface waters during the short term. However, the level of impact would be minimal because the methods employed would involve selective tree removal and not the use of heavy equipment. During the long term, these actions would improve water quality by reducing the risk of large wildland fires and subsequent soil erosion. No new, permanent roads would be constructed and temporary roads would be reclaimed.

Construction of facilities, pipelines, and roads would cause localized short-term effects on watershed and soils until the disturbed areas have been reclaimed. Approximately 5,794 acres over 20 years would be disturbed from lands and realty actions. Communication site construction would disturb an average of 9 acres per year, or 180 acres over 20 years. Impacts from construction would cause localized short-term effects on water and soil until the disturbed area had been reclaimed. Impacts would include erosion, changes in local surface hydrology, decreased soil productivity from compaction, and removal of vegetative cover.

Ditch ROW would be evaluated for impacts, especially in locations with poor soils or steep topography. Even with appropriate planning, there would still be a possibility of ditches overflowing during extreme precipitation events and ditches that cross drainages modifying the local surface hydrology.

Telephone and fiber-optic cable installation would disturb an average of 36 acres per year, or about 720 acres during the planning period. Power lines would disturb 20 acres per year, or about 400 acres during the planning period. Pipeline construction would disturb an average of 329 acres per year. Approximately 95 percent of this disturbance is associated with oil or gas distribution lines. Thus, disturbance from transmission pipelines and water lines would be approximately 15.5 acres per year and a total of 311 acres during the planning period. The "split trench" method of construction would be used in most cases to install telephone and fiber optic cable and would cause localized short-term effects on water and soil until the disturbed area is reclaimed, generally within a year. Impacts from surface disturbance would include short-term erosion, long-term changes in local surface hydrology, decreased soil productivity from compaction, and removal of vegetative cover. Two track roads would be used or constructed to access power lines and pipeline compressor stations, and impacts would be the same as the assumption for analysis for roads. Utility corridors crossing perennial water features or wetland/riparian areas would be evaluated for individual impacts and mitigated to reduce effects to surface water features.

Non-oil and gas related road construction would disturb 42 acres for the 7 miles of road construction or improvement planned per year, or about 140 miles during the planning period. Impacts from road

construction would include short-term erosion and long-term, but localized, changes in surface hydrology and decreased soil productivity from compaction and removal of vegetative cover.

Livestock management actions would include the implementation of the Standards for Healthy Rangelands (BLM 1997), which requires the evaluation of grazing practices on a watershed scale and includes the evaluation of impacts to water resources. Livestock grazing would reduce vegetation cover and cause surface disturbance though hoof action and compact soils in localized areas. These impacts would result in increased sediment and salt loads, increased surface runoff, and less storage and retention of waters in wetland areas. Use of uplands by livestock reduces vegetation and might indirectly affect water quality, especially in areas with highly erosive soils. Livestock grazing would have localized impacts on water quality, watershed, and soil resources. Implementation of livestock management to achieve Standards for Healthy Rangelands (BLM 1997) would minimize impacts on water quality, watershed and soil resources.

Range improvements would be designed to improve range health conditions by increasing livestock distribution. These developments and improvements serve to distribute livestock within the allotment and prevent livestock concentration and overgrazing of specific areas increasing soil erosion and sediment loading. In the long term, these improvements would reduce accelerated soil erosion and enhance water quality by making wetland/riparian areas less prone to erosion and protecting streamside vegetation. The immediate area around range improvements would be subjected to erosion resulting from construction and livestock concentration around water developments and along fence lines. Range improvements would be designed with full consideration of water resources. With proper planning and effective management of range improvements, any impacts on water resources would be minimized to acceptable levels.

No coal mining is anticipated. Reclamation would occur on a small area in Hanna Basin. Roughly 5 acres per year would be reclaimed. These reclamation activities would improve local watershed and soil conditions by stabilizing soil, improving local surface hydrology, and reducing the potential for erosion.

Construction of well pads, proper disposal practices, proper casing and cementing, and reclamation of drilling reserve pits in accordance with BLM guidelines would minimize soil erosion, sediment loading, and potential groundwater contamination from drilling operations (Appendixes 1, 13, and 27).

Hydrologic investigations would be conducted before extensive CBNG development to determine whether any connection exists between surface waters and the coalbed that would be dewatered. Hydrologic investigations would include an evaluation of potential impacts to other groundwater resources, such as shallow aquifers that would be used for drinking water supplies or stock watering. These investigations would result in modification of monitoring requirements and long-term modeling of the various aquifers. Documented impacts on the various aquifers would result in management actions such as modification of pumping rates, changes in disposal options, or compensation programs for loss of water wells.

Construction of oil and gas pipelines would result in a short-term disturbance of about 18,700 acres. The net disturbed acreage is estimated to be 2,000 at the end of 20 years, considering that reclamation is achieved within 3 years. Pipeline construction and installation would cause localized short-term effects on water and soil resources until the disturbed area is reclaimed. Impacts would include short-term erosion during construction, changes in local surface hydrology, decreased soil productivity from compaction, and removal of vegetative cover. Pipeline corridors that cross surface water features or wetland/riparian areas would be evaluated for individual impacts and would be mitigated to reduce effects to surface water features. If new roads were needed to access the area, impacts from road construction would include short-term erosion and long-term changes in surface hydrology.

Locatable minerals exploration and development involve the use of vehicles and heavy equipment, which would cause compaction and physical disturbance of soils and removal of vegetation, leading to changes in local surface hydrology. Site-specific mitigation requirements and reclamation of these areas would reduce the long-term impacts on water, such as increased erosion, sedimentation in streams and rivers, channelization, and ponding of surface runoff.

Construction and maintenance of access routes and roads, especially near wetland/riparian areas would have long-term effects. Increased erosion, sedimentation, and bank instability would occur from compaction, removal of vegetative cover, and channelization of surface runoff in ruts and road ditches. In addition, road-surfacing chemicals would possibly contaminate nearby streams and water sources. Road design, including proper drainage design and culvert sizing, would lessen identified long-term impacts from road construction and maintenance; however changes in surface hydrology are likely to cause impacts such as increased erosion and sedimentation to streams and rivers. If a road design results in significant impacts to water quality and watershed health, the design would be evaluated to determine if changes in routes or design would mitigate impacts (Appendix 26).

Recreation and OHV use would result in localized soil compaction, vegetation removal, and stream bank instability, thereby increasing erosion and sedimentation loads to streams and rivers. Recreational activities and OHV use during periods of high soil moisture conditions would accelerate localized erosion and result in vegetation damage in some areas.

Paleontological resource excavations would cause local and short-term impacts, including surface disturbance, soil compaction, and vegetation removal.

The management actions for SMA would generally maintain or improve water and soil resources. Protections aimed at conserving vegetation, and limitations on surface disturbing and other disruptive activities, would maintain soil productivity and minimize erosion and sediment loading.

Vegetation management actions aimed at protecting vegetation would maintain soil productivity and minimize erosion by slowing and filtering overland flow while reducing erosive forces. Improving and diversifying vegetation has an indirect benefit of improving watershed health by reducing peak flows, hilslope and channel erosion, and sediment loading.

VRM classifications restrict visual intrusions, such as surface disturbance, which would indirectly help to maintain vegetative cover and soil productivity and minimize erosion, soil compaction, and sediment loading.

The water quality, watershed, and soils management actions would maintain or improve water and soil resources. Specifically, actions aimed at improving water bodies listed on the State's 303d list (e.g., changes in grazing management and limitations on surface disturbing activities) would maintain vegetation and minimize erosion. These activities would have the indirect benefit of improving watershed health by reducing peak flows, hillslope and channel erosion, and sediment loading.

Concentrations of wild horses in the immediate area surrounding water within HMAs would decrease vegetation cover and increase erosion. However, these effects would be minimal and highly localized. Further, the implementation of Standards for Healthy Rangelands (BLM 1997) would help ensure proper management of wild horses and serve to minimize effects on watershed and soil resources.

Wildlife and fish habitat management actions maintain and enhance wetland/riparian areas, improve vegetative cover, and reduce surface disturbance. Actions to improve wildlife and fish habitat involve the protection of water sources and the promotion of diverse plant communities that are better able to slow

and filter overland flow, reduce erosive forces, and improve water quality. These activities would have the indirect benefit of improving watershed health by reducing peak flows, hillslope and channel erosion, and sediment loading.

4.17.2 Impacts Under Alternative 1: Continuation of Existing Management

The protection or preservation of cultural sites benefits water and soil resources by limiting or excluding surface disturbing activities on or near such sites. The area within one-quarter mile or the visual horizon, whichever is closer, of the cultural resources if the historic setting contributes to NRHP eligibility would be an avoidance area for surface disturbing activities. These avoidance areas would reduce activities that cause surface disturbance. It is likely that these avoidance areas would change the individual locations and not the number of acres of surface disturbance.

Approximately 84,000 acres over 20 years would be disturbed by fire management actions. Managing wildland fires with AMR would allow wildland fire to function in its natural ecological role as much as possible. Suppression impacts would also be limited, and fire lines would be rehabilitated with water bars and seeded as necessary to reduce impacts.

Managing forests and woodlands using natural processes, prescribed fire, chemical, mechanical, and biological treatments would reduce canopy cover and increase erosion in the short term. A total of 25,900 acres would be available for harvest of commercial wood product under this alternative. As roads are upgraded to provide access to commercial products, impacts would include changes in surface hydrology and increased erosion in some areas. Included in this acreage would be 6,700 acres of sensitive areas including steep slopes and riparian areas. Intensive mitigation of timber harvest would be required, but in the short term these actions would increase erosion and change surface hydrology.

Managing forests and woodlands using natural processes, prescribed fire, and chemical, mechanical, and biological treatments would reduce canopy cover and increase erosion in the short term. Although the remaining understory would continue to protect the surface from rain splash, clear-cut treatments would have localized impacts to adjacent drainages. During the long term, soil erosion would be reduced from forest management actions that effectively improve the health and vigor of the forest and thereby reduce the chance of widespread loss of trees through insects, disease, and wildland fire. Although, the potential for short-term acceleration of erosion above acceptable levels would be high in areas of intense forest product management, proper timber harvest techniques would minimize these effects.

A total of 25,900 acres would be available for harvest of commercial wood product. As roads are upgraded to provide access to commercial products, impacts would include changes in surface hydrology and increased erosion in some areas. Included in this acreage would be 6,700 acres of sensitive areas including steep slopes and riparian areas. Intensive mitigation of timber harvest would be required, but in the short term these actions would increase erosion and change surface hydrology. Mitigation measures would reduce long-term impacts; however, because of the sensitive nature of these areas, there would still be increased sediment and surface runoff in downstream waterbodies as a result of timber harvesting activities.

Wind energy facilities, utility facilities, transportation systems, and communication sites would not be placed in certain areas. These areas are slopes greater than 25 percent, identified 100-year flood plains, and areas that are 500 feet from perennial surface water, wells, springs, wetland/riparian areas, and ephemeral channels (Table 2-5). Construction of facilities in these areas would increase erosion, sediment loading, and runoff and would change surface hydrology. If it becomes necessary for facilities to be placed within avoidance areas, effects would be intensively managed, which would reduce short- and long-term impacts.

Under this alternative, an estimated 45 acres per year of surface disturbance would occur as a result of range improvement projects. Range improvements would be designed to maintain or improve desired range conditions. Range improvements should serve to distribute livestock within the allotment and prevent livestock concentration and overuse of forage that lead to increased soil erosion. Planned range improvements would be designed with full consideration of water resources. Grazing systems and range improvements would be designed to achieve the management goals for livestock grazing and would serve as the primary means of improving or maintaining desired range condition, which would minimize impacts to water resources. In the short term, the immediate area surrounding range improvements would generally be subjected to erosion resulting from construction disturbances and livestock concentrations around water developments and along fence lines. With proper planning and effective management of range improvements, any impacts on water resources would be minimized to acceptable levels.

Range improvements projects include 10 reservoir or pit developments per year, totaling 200 over 20 years. Because water rights in the Platte River Basin (Map 3-11) make new reservoirs or pit impractical in this basin, the majority of these projects would be built in the Colorado River or the great Divide Basin. Depending on the number of these projects that are instream structures and the capacities of individual projects, impacts on the natural hydrology in drainages in which they are located would occur. Before the project is approved or built, these impacts would be evaluated with regard to fish populations, wetland areas and other important downstream resources. Salinity can increase below instream earthen structures in which the native material contains salts that are easily dissolved; therefore, some of these reservoirs and pits would increase salt loading downstream. Potential effects to downstream values from these projects would be evaluated and mitigated when possible. Water depletions and salt loading in the Colorado and Platte River Basins would be considered on a project specific basis.

Oil and gas management actions would result in approximately 61,895 acres of short-term surface disturbance and 16,538 acres of long-term surface disturbance. Reclamation procedures would reduce the long-term impacts on water and soil resources, such as increased erosion and channelization of surface runoff caused by pad construction and other short-term disturbance (Appendix 15). Long-term disturbance, including some roads that would be left in place after development, would have long-term impacts on surface hydrology. Impacts of this disturbance would be significant in some locations under this alternative.

Closing approximately 8,105 acres to locatable mineral entry would prevent impacts such as increased erosion, sedimentation in streams and rivers, channelization, and ponding of surface runoff on these lands. However, impacts would be minimal because historic and projected production from locatable minerals is negligible within the RMPPA.

Recreation activities and OHV use on existing roads and vehicle routes would result in localized soil compaction, vegetation removal, and bank instability, thereby increasing erosion and sedimentation loads to streams and rivers. Recreation activities and OHV use during periods of high soil moisture conditions would accelerate localized erosion and result in vegetation damage in some areas. Recreation activities and OHV use to retrieve wildlife kills and access campsites would be allowed, further contributing to vegetation damage and localized erosion from pioneered roads and vehicle routes. Use of the North Platte River by boaters could increase levels of bacteria or other pollutants to surface waters, though these impacts would be minimal.

Impacts from SMA designations would usually be minimal and vary by management restrictions. The prohibition on surface disturbing activities within WSAs would maintain water quality, watershed, and soils resources in these areas. Encampment River was identified as the only Potential WSR, the one-quarter mile buffer as part of the designation will afford some protection to this river, by precluding new water developments and limiting surface disturbance.

Increased access and vehicular use within the RMPPA as a result of acquiring new easements would increase the potential for vegetation removal and accelerated soil erosion. Impacts would be greatest if these newly acquired easements remained as two-track roads. Upgrading roadways would require installation of erosion control structures, which would mitigate soil erosion and reduce impacts.

Vegetation management actions—including the maintenance, improvement, and restoration of wetland/riparian areas to enhance forage conditions and provide wildlife habitat—and weed control would improve water quality, watershed, and soil resources. Healthy wetland/riparian vegetation decreases bank erosion and serves as a filter to remove and recycle nutrients, remove chemical and organic wastes, and reduce sediment loads reaching streams and water sources. Vegetation management on the uplands would also improve watershed health by improving the vigor of native plants and increasing surface cover, which decreases rainfall impact and overland flow rates.

Landscape scale vegetation treatments, about 2,500 acres per year or 50,000 acres over 20 years, would have short-term impacts on water and soil resources. These impacts would include increased localized erosion, changes in water quality, decreased vegetative cover, and changes in surface and subsurface hydrology. These projects would include an evaluation of water resource impacts and would be weighed with the potential for long-term beneficial impacts. Mitigations, such as timing, and location of the treatments would minimize these impacts.

Burning within prescription areas would generally have a long-term positive effect on water quality and watershed health and are designed to reduce fuel loading and decreased risk of wildland fire. In localized areas, there some erosion would occur as a result of loss of canopy cover and changes to water quality in the first 2 years following the fire. The significance of impact caused by prescribed fire would depend on the soil type, amount of area burned, intensity and severity of fire, and rate of revegetation.

Surface discharge of produced water is regulated by the State of Wyoming through NPDES permits and has been authorized in the North Platte, Great Divide, and Colorado River Basins. Produced water from natural gas reservoirs located in coal formations can result in high volumes of water as compared with conventional natural gas. Produced water quality from coal formations within the RMPPA have ranged from 400 milligrams per liter (mg/L) of total dissolved solids (TDS) to 3,000 mg/L. Although unusual, produced water from coal seams can be more than 10,000 mg/L TDS. However, produced water with salinity levels this high would not be considered for surface discharge and would most likely be injected as a result of state water quality standards. Produced water disposal options are highly dependent on water quality and economics (BLM 2003b).

Where it occurs, the surface discharge of produced water during natural gas or oil extraction would change the physical hydrology of ephemeral drainages in some areas and would create additional temporary water sources or evaporation/percolation pits that would need reclamation. Water management plans for surface discharges would address reclamation strategies, would require monitoring to address changes in ephemeral channels, and should minimize impacts to watershed health. NPDES permits would be required by the State of Wyoming and regulate water quality changes beyond the designated beneficial uses of surface waters. Produced water discharges would change water quality in some areas.

Avoiding surface disturbing activities in identified 100-year flood plains, areas within 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and areas 100 feet from the inner gorge of ephemeral channels would stabilize stream banks, reduce erosion and sediment loads, promote vegetative cover, and enhance water quality.

Management actions designed to maintain and improve water quality and watershed health would indirectly enhance soil resources. Designation of avoidance areas near water sources, protections of

wetland/riparian areas, and specific limitations on surface disturbing activities would all help maintain vegetative cover, reduce runoff and erosion, and enhance soil productivity.

Wildlife and fish habitat management actions maintain and enhance wetland/riparian areas, improve vegetative cover, and reduce surface disturbance. Actions to improve wildlife and fish habitat involve the protection of water sources and the promotion of diverse plant communities that are better able to slow and filter overland flow, reduce erosive forces, and improve water quality. These actions would affect natural water resources by lessening surface disturbance and reducing the potential for soil erosion and sediment loading.

Summary

Water quality, watershed, and soils resources are susceptible to compounded impacts from multiple BLM program activities, which cause surface-disturbance or water quality degradation. Under Alternative 1, the combined input from surface disturbing activities on a watershed scale would at some point and in some locations degrade water quality beyond the designated use of receiving water bodies. This is most likely to occur in the Colorado River Basin or in the North Platte above Seminoe Reservoir as a result of minerals development and of surface discharge of produced water combined with surface disturbing activities. Overall, these impacts from surface discharge of produced water and surface disturbing activities would result in significant impacts to water quality and watersheds.

Soil disturbing activities would result in significant impacts to soils under this alternative. Localized disturbance and a regional increase in development would result in soil loss above natural levels, which would exceed 2 tons per acre.

4.17.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts resulting from cultural resource management, lands and realty management, OHV management, recreation management, transportation and access management, water quality, watershed, and soils management, and fish and wildlife management would be the same as those found in Alternative 1 (Section 4.17.2).

Fire and fuels management would emphasize suppression resulting in fewer acres impacted by wildland fire during the planning period. Greater suppression efforts would result in increased impacts from such activities including the use of heavy machinery, which would create short-term preferential flow paths and localized erosion. About 60,000 acres over 20 years would be disturbed by fire management actions. This alternative would result in an accumulation of fuels and increase the likelihood of high-intensity watershed-damaging wildland fires, which would reduce canopy and ground cover, thereby exposing soils to wind and water erosion and increased runoff potential, and could adversely affect the soil's physical properties reducing infiltration. These impacts would affect sediment loading and downstream water quality depending on the severity of the fire and location within the watershed.

Impacts resulting from forest management would be the same as those of Alternative 1, except increased commercial timber harvest activities under this alternative would increase the potential for erosion damage and sediment runoff due to the removal of more vegetative cover from forest and woodland areas during the short term.

Grazing systems and range improvements would be implemented to maximize livestock production (such as increased weight gain of cattle, improving distribution, and increasing water developments). Range improvement projects would focus on water developments and would increase the number of reservoir,

pits, wells and pipelines constructed annually. An additional 5 pits or reservoirs (50-percent increase) per year would be constructed under this alternative, leading to 300 pits or reservoirs over 20 years. The increase in water developments serve to distribute livestock within the allotment and prevent livestock concentration and overuse of forage that leads to increased soil erosion and salt and sediment loading. Construction of range improvements would disturb about 1,140 acres over 20 years. The immediate area around range improvements would be subjected to erosion resulting from construction and livestock concentration around water developments.

Oil and gas management actions would result in approximately 63,649 acres of short-term surface disturbance and 17,013 acres of long-term surface disturbance. Reclamation procedures would reduce the long-term impacts on water and soil resources, such as increased erosion and channelization of surface runoff (Appendixes 1, 13, and 15); however, these impacts would be significant in localized areas and initially after disturbance.

Approximately 8,825 acres would be closed to locatable mineral entry as opposed to 8,105 acres under Alternative 1. Closing these areas to locatable mineral entry would prevent impacts, such as increased erosion, sedimentation in streams and rivers, channelization, and ponding of surface runoff on these lands. However, impacts would be minimal because historic and projected production from locatable minerals is negligible within the RMPPA.

Impacts resulting from SMA management would be the same as those in Alternative 1, except there would be greater opportunity for impacts from surface disturbance activities as a result of less restrictive management for many of the existing and proposed SMAs.

Impacts from the proposed Rawlins OHV SRMA would include soil compaction and removal of vegetation. However, impacts from the proposed Rawlins OHV SRMA to water quality and watersheds would be negligible because the proposed SRMA is located in a basin. The SRMA would be bermed to prevent erosion from occurring outside the area and contain sediment loading. The recreation area would still contribute windborn sediment to the adjacent Hogback Lake. If the berm is breached or recreational users go outside the designated area, impacts on water quality and hydrologic function would occur in Hogback Lake.

Vegetation management would use vegetation treatments such as chemical, mechanical, or prescribed fire for the benefit of commodity production. Vegetation treatments would occur on about 24,400 acres per year or 488,000 acres over 20 years. These treatments would result in more homogenous disturbance and therefore would be more susceptible to windborne erosion and surface runoff events in the short term. In the long term, such actions would result in more vegetation cover and reduced erosion rates.

Summary

Water quality, watershed, and soils resources are susceptible to compounded impacts from multiple BLM program activities, which cause surface-disturbance or water quality degradation. Under Alternative 2, the combined input from surface disturbing activities on a watershed scale would at some point and in some locations degrade water quality beyond the designated use of receiving water bodies. This potential is more likely under Alternative 2 when compared with the other alternatives. This is most likely to occur in the Colorado River Basin or in the North Platte above Seminoe Reservoir because of minerals development and as a result of surface discharge of produced water combined with surface disturbing activities.

Soil disturbing activities would result in significant impacts to soils under this alternative. Localized disturbance and a regional increase in development would result in soil loss above natural levels, which would exceed 2 tons per acre.

4.17.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts resulting from recreation management and wildlife management would be the same as those found in Alternative 1.

Impacts from the management of cultural resources would be similar to those described under Alternative 1, except the areas identified would not allow surface disturbance one-quarter mile or the visual horizon, whichever is closer, of the cultural resources if the historic setting contributes to NRPH eligibility. Because the mitigation measures are very restrictive, it is possible that projects might need to be relocated in areas that are sensitive from a soils or watershed perspective.

Fire and fuels management would emphasize natural processes resulting in more acres impacted by wildland fire during the planning period. Approximately 212,000 acres over 20 years would be disturbed by fire management actions. This alternative would result in less accumulation of fuels than under Alternatives 1 and decrease the likelihood of high intensity watershed-damaging wildland fires.

There would be no commercial timber harvest. Management actions on 25,900 acres of commercial forestlands would be allowed to enhance forest health and meet public demand for minor wood products, which would minimize the need to improve existing roads and impacts from road construction on water quality and watersheds. Impacts from such improvements would be less than those described for Alternatives 1.

Areas such as slopes greater than 25 percent, identified 100-year flood plains, 500 feet from perennial surface water, wells, springs, wetland/riparian areas, and ephemeral channels (Table 2-5) would be avoided where possible for the placement of wind energy facilities and closed to placement of utility facilities, transportation systems, and communication sites. This management action would prevent impacts from construction of facilities in these areas such as erosion, sediment loading, and runoff, and surface hydrology changes. If it becomes necessary for facilities to be placed within avoidance areas, effects would be intensively managed, which would reduce short- and long-term impacts.

Impacts resulting from livestock management would be similar to those of Alternative 1, except grazing systems and range improvements would be implemented to enhance wildlife, watershed, and riparian values, instead of designing improvements to achieve livestock management objectives. Actions to enhance watershed and riparian values would reduce erosion and sediment loading to nearby streams, maintain adequate vegetative cover and enhance soil productivity. Meeting DPC objectives would result in improved site-specific management; improve soils health and watershed function. Construction of range improvements would disturb about 420 acres over 20 years. Impacts for reservoir and pit range improvements would be the same as those described for Alternative 1. Range improvement projects would include an increase in fence conversion and no pipeline construction for livestock water; this would result in more concentrated livestock distribution in specific areas increasing impacts to specific watersheds.

Oil and gas management actions would provide the greatest protection of water and soil resources. Oil and gas management actions would result in approximately 56,505 acres of short-term surface disturbance and 15,489 acres of long-term surface disturbance. Reclamation procedures would reduce the long-term

impacts on water and soil resources, such as increased erosion and channelization of surface runoff (Appendices 1, 13, and 15).

Approximately 402,280 acres would be closed to locatable mineral entry as opposed to 8,105 acres under Alternative 1. Closing these areas to locatable mineral entry would prevent impacts, such as increased erosion, sedimentation in streams and rivers, channelization, and ponding of surface runoff on these lands. However, impacts would be minimal because historic and projected production from locatable minerals is negligible within the RMPPA.

Impacts resulting from OHV management would be similar to those of Alternative 1, except OHV use would be restricted to designated roads and vehicle routes to access campsites or retrieve wildlife kills. This would most likely result in fewer pioneered roads and vehicle routes, thereby reducing localized erosion.

Impacts resulting from SMA management would be similar to those of Alternative 1, except there would be less opportunity for surface disturbance as a result of more restrictive management for many of the existing and proposed SMAs. Increased protection of water and soil resources would result from restrictions placed on surface disturbing activities as compared with other alternatives because a greater amount of land area would be subject to NSO requirements, closed to oil and gas development, closed locatable mineral entry, and limited OHV use. Management actions that limit the extent of surface disturbing activities would help minimize impacts such as erosion, sediment loading to waterways, compaction of soils, loss of soil productivity and reduction of vegetation.

The boundaries of the Encampment River Potential WSR would extend to the visual horizon above the river; however, the average buffer would be less than one-quarter mile. This would provide some additional protection for water quality and watershed health, particularly if Congress releases the WSA from wilderness consideration.

Impacts resulting from transportation and access management would be similar to those of Alternative 1, except there would be additional priority areas for obtaining public access to BLM lands, which would increase the potential for vegetation removal and accelerated soil erosion.

Vegetation management would use vegetation treatments such as biological treatments or prescribed fire to meet multiple-use objectives with emphasis on Special Status Species. Vegetation treatments would occur on 11,800 acres per year of 236,000 acres over 20 years. These treatments would result in more heterogeneous disturbance (mosaic patterns) and therefore the areas would be less likely to experience windborne erosion and surface runoff events. Increased erosion would occur on the borders of prescribed fires as a result of greater line disturbance to create smaller treatment units.

Rangeland areas would be managed to achieve DPC, which would improve soil productivity, reduce potential erosion, improve vegetative cover, and enhance watershed health.

Produced water would be injected in the Colorado River Basin, and there would be fewer oil and gas wells. Produced water in the North Platte and Great Divide Basins would be surface discharged if it meets specific BLM resource management objectives. In the North Platte and Great Divide Basins, the emphasis on meeting BLM resource objectives would require development of more water management infrastructure such as pipelines, impoundments, or created wetlands. This infrastructure would require additional efforts to provide water sources after oil and gas production ceases. These restrictions on the disposal of produced water would generally maintain or enhance existing water quality and natural hydrological conditions.

Management actions (e.g., surface disposal of produced water from oil and gas activities, impoundment of water, and surface disturbing activities) that result in salt loading to the Colorado River system from sources in the Muddy Creek watershed would not be allowed. This management action would maintain or enhance water quality and watershed health by preventing salts from contaminating water bodies reducing salt loading in the Colorado River System.

Eliminating surface disturbing activities in identified 100-year flood plains, areas within 500 feet of perennial waters and wetland/riparian areas, and areas 100 feet from the inner gorge of ephemeral channels would stabilize stream banks, reduce erosion and sediment loads, promote vegetation cover, and enhance water quality. This management action would reduce erosion and sediment loads in these sensitive areas.

In the Muddy Creek watershed (USGS HUC 14050004), no management actions would be approved that lead to more than 1 acre-foot per year of depletion of water to the Colorado River system per project. This action would maintain current flow conditions in the Muddy Creek watershed and would result in fewer changes to flow conditions in the Colorado River system (Map 2-20).

Management actions for the Encampment River watershed (USGS HUC 1018000205) would protect municipal drinking water sources. These actions are designed to maintain current water quality characteristics of surface waters used as drinking water sources by towns in the Upper North Platte River valley (Map 2-20).

Road crossings and drainages that potentially support fish for a portion of the year would be designed to simulate natural stream processes. These stream channel crossings would be sized to pass a 100-year storm event. This would allow the stream to naturally adjust to amount of water and sediment provided by the watershed, even during extreme storm events. Allowing for these unimpeded processes would most likely result in sediment deposition in flood plains and improvements in channel structure that would improve water quality and riparian function in the long term.

Impoundments and instream structures would not be permitted where negative effects on habitat quality, habitat quantity, or the life history requirements of populations of special status fish species would occur. This action would maintain current flow and sediment transport conditions.

Summary

Water quality, watershed, and soils resources are susceptible to compounded impacts from multiple BLM program activities, which cause surface disturbance or water quality degradation. Under Alternative 3, the combined input from surface disturbing activities on a watershed scale would at some point and in some locations degrade water quality beyond the designated use of receiving water bodies. These impacts are most likely to occur as a result of minerals development and other surface disturbing activities. Because the discharges of produced water from minerals actions would be limited in the North Platte River Basin and restricted to injection in the Colorado River Basin, there is likely to be only minor impact on water quality as a result of the discharge of produced water from oil and gas activities.

Soil disturbing activities would result in significant impacts to soils under this alternative. Localized disturbance and regional areas with increased development would result in soil loss above natural levels, which would exceed 2 tons per acre.

Under Alternative 3, oil and gas activities would be minimized and would result in fewer impacts to water and soil resources areas than under Alternatives 1. Therefore, Alternative 3 would result in moderate impacts for the significance criteria regarding water and soil resources.

4.17.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from fire and fuels management, recreation management, transportation, and access management would be the same as those of Alternative 1.

Impacts resulting from cultural resource management would be the same as those of Alternative 3.

Managing wildland fires with AMR would allow wildland fire to function in its natural ecological role as much as possible. Fire suppression activities would be limited; therefore, impacts from such activities would be less than other alternatives. Fire lines would be rehabilitated with water bars and seeded as necessary to further reduce soil erosion.

Impacts from forest management would be the same as Alternative 1, except a total of 19,200 acres, or 6,700 acres less than Alternative 1, would be available for harvest of commercial wood product. Changes in surface hydrology and increased erosion in some areas would result from road improvements to access commercial timber products. Eliminating timber harvest on 6,700 acres of steep slopes and riparian areas would protect these sensitive areas from erosion and downstream water quality from impacts resulting from commercial timber harvest.

Wind energy facilities, utility facilities, transportation systems, and communication sites would not be placed in certain areas. Areas are slopes greater than 25 percent, identified 100-year flood plains, and areas that are 500 feet from perennial surface water, wells, springs, wetland/riparian areas, and ephemeral channels (Table 2-5). Construction of facilities in these areas would increase erosion, sediment loading, and runoff and change surface hydrology. If it becomes necessary for facilities to be placed within avoidance areas, effects would be intensively managed, which would reduce short- and long-term impacts.

Impacts resulting from livestock management would be similar to those of Alternative 1, except emphasis would be placed on achieving DPC. Actions to achieve DPC would reduce erosion and sediment loading to nearby streams, improve vegetative cover, and enhance soil productivity. Construction of range improvements would disturb about 920 acres over 20 years. Range improvement projects would include an increase in fence conversion and pipeline construction for livestock water; this would result in greater livestock distribution in specific areas increasing impacts to specific watersheds.

Oil and gas management actions would result in approximately 57,819 acres of surface disturbance during the planning period. The majority of this disturbance would be reclaimed, resulting in a total long-term disturbance of 15,472 acres. Reclamation procedures would reduce the long-term impacts on water and soil resources, such as increased erosion and channelization of surface runoff.

Impacts resulting from locatable mineral management would be less than those of Alternative 1. Approximately 28,724 acres would be closed to locatable mineral entry as opposed to 8,105 acres under Alternative 1. Closing these areas to locatable mineral entry would prevent impacts, such as increased erosion, sedimentation in streams and rivers, channelization, and ponding of surface runoff on these lands. However, impacts would be minimal because historic and projected production from locatable minerals is negligible within the RMPPA.

OHV use on existing roads and vehicle routes would result in localized soil compaction, vegetation removal, and bank instability, thereby increasing erosion and sedimentation loads to streams and rivers. OHV use during periods of high soil moisture conditions would accelerate localized erosion and result in vegetation damage in some areas. OHV use to retrieve wildlife kills and access campsites would be

allowed within 300 feet of designated roads and vehicle routes, which would likely result in less pioneered roads and vehicle routes and less localized disturbance.

Impacts resulting from SMA management would be similar to those of Alternative 1, except there would be less opportunity for surface disturbance as a result of more restrictive management for many of the existing and proposed SMAs. Alternative 4 would provide protection to water and soil resources from surface disturbing activities because of the acres subject to NSO requirements, closed to oil and gas development, closed to locatable mineral entry, and limited vehicle use. Management actions that limit the extent of surface disturbing activities would help minimize impacts such as erosion, sediment loading to waterways, compaction of soils, loss of soil productivity, and reduction of vegetation.

Vegetation treatments, such as mechanical, biological, chemical, and prescribed fire, would be applied to meet Standards for Healthy Rangelands (BLM 1997), watershed function and to achieve DPC with consideration for Special Status Species. Vegetation treatments would occur on about 16,400 acres per year or 328,000 acres over 20 years. This emphasis would result in larger treatments and a more heterogeneous disturbance (mosaic patterns). Consequently, these areas would be more likely to experience windborne erosion and surface runoff events on some areas.

Rangeland areas would be managed to achieve DPC, which would improve soil productivity, reduce potential erosion, improve vegetative cover, and enhance watershed health.

Surface discharge of produced water would not be allowed in the Colorado River Basin, and there would be fewer oil and gas wells that require the disposal of produced water. Surface discharge of produced water in the North Platte and Great Divide Basins would be allowed if it meets state water quality standards. These actions would maintain water quality in these basins.

Any activities that result in salt loading to the Colorado River system from sources in the Muddy Creek watershed would be intensively managed, which would reduce salt loading in the Colorado River system. Activities that result in salt loading include surface disposal of produced water from oil and gas activities, impoundment of water, and surface disturbing activities.

Avoiding surface disturbing activities in identified 100-year flood plains, areas within 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and areas 100 feet from the inner gorge of ephemeral channels would stabilize stream banks, reduce erosion and sediment loads, promote vegetative cover, and enhance water quality.

Actions that would cause new water depletions within the Colorado River system would comply with the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. This action would maintain flow conditions in the Colorado River system needed for the recovery program administered by the U.S. Fish and Wildlife Service (USFWS).

Management actions for the Encampment River watershed (USGS HUC 1018000205) would protect municipal drinking water sources. These actions are designed to maintain current water quality characteristics of surface waters used as drinking water sources by the towns in the Upper North Platte River valley (Map 2-20).

Management actions would place priority on meeting DPC, which would improve wetland/riparian areas, vegetative cover, and soil productivity, and thereby enhance watershed health. Actions to improve wildlife and fish habitat involve the protection of water sources and the promotion of diverse plant communities that are better able to slow and filter overland flow, reduce erosive forces, and improve

water quality. These actions would affect natural water resources by lessening surface disturbance and reducing the potential for soil erosion and sediment loading.

Road crossings and drainages that potentially support fish for a portion of the year would be designed to simulate natural stream processes. This would allow the stream to naturally adjust to the amount of water and sediment provided by the watershed, even during extreme storm events. Allowing for these unimpeded processes would most likely result in sediment deposition in flood plains and improvements in channel structure that would improve water quality and riparian function in the long term.

Impoundments and instream structures would be allowed but designed to minimize impacts, such as changes in water quality and natural hydrological conditions, to special status fish species and their habitats.

Summary

Water quality, watershed, and soils resources are susceptible to compounded impacts from multiple BLM program activities, which cause surface disturbance or water quality degradation. Under Alternative 4, the combined input from surface disturbing activities on a watershed scale would at some point and in some location degrade water quality beyond the designated use of receiving water bodies. These impacts are most likely to occur in the Colorado River Basin or in the North Platte River Basin above Seminoe Reservoir as a result of minerals development with surface disturbing activities. This potential is less likely under Alternative 4 than under Alternative 1.

Management actions would emphasize achieving DPC, which would provide more protection to water and soil resources than Alternative 1. Therefore, Alternative 4 would result in minor impacts for the significance criteria regarding wetland/riparian areas and could result in long-term beneficial impacts.

Soil disturbing activities would result in significant impacts to soils under this alternative. Localized disturbance and regional areas with increased development would result in soil loss above natural levels, which would exceed 2 tons per acre.

4.18 Wild Horses

This section describes the potential impacts to wild horses and their habitat from other resource programs. The affected environment of wild horses is presented in Section 3.18.

Significance Criteria

Impacts to wild horses would be considered significant if the following were to occur:

- Available forage, water, or other habitat components were not sufficient to achieve or maintain the Appropriate Management Level (AML) in a given HMA (Map 2-21).
- Viability of wild horse populations cannot be maintained.
- The wild, free-roaming character of a wild horse herd in an HMA was lost.

Methods of Analysis

Impacts on wild horses are generally the result of activities that affect forage, water availability, available habitat, and the wild and free-roaming nature of a herd. Impact analyses and conclusions are based on

interdisciplinary team knowledge of resources and the project area, spatial analysis, review of existing literature, and information provided by other agencies. Effects are quantified where possible or described in qualitative terms in the absence of quantitative data.

This analysis is based on the following assumptions:

- The number of wild horses would increase about 20 percent annually.
- Wild horse removals (gathers) would occur about every 3 to 4 years.
- Maintenance of wild horse populations at AMLs within existing HMAs would be accomplished through removals and selected application of other population control practices.
- Wild horse gathers would use existing trap locations for the most part. About 30 acres have been disturbed from the development of existing traps.
- The amount of livestock use on public lands is anticipated to remain stable at the 10-year average.
- RFDs and RFAs can be found in Appendix 33.

4.18.1 Impacts Common to all Alternatives

Cultural resource management activities, such as inventory, excavation, and monitoring, would create negligible short-term localized direct impacts to wild horses. The most likely impact to wild horses from such management would be the temporary displacement of wild horses while the management activity occurs at a localized site. Even under the most intense cultural resource management (i.e., excavation), the amount of acreage disturbed would be very small relative to the size of HMAs.

The impacts of wildland fires would be direct and indirect, and most likely short term and localized. Wildland and prescribed fires would result in a temporary displacement of wild horses and short-term reduction in available forage. However, burned areas would provide improved forage production in the long-term and create a mixture of vegetative communities with diverse species, cover, and age classes.

Wildland fire suppression activities, such as fire lines and staging areas, would also result in short-term forage losses. However, these impacts would be negligible and localized given the limited amount of acreage ultimately disturbed by these activities. In addition, these areas would be reseeded or fenced, where necessary, until the vegetation recovers.

As with wildland fire, implementation of fuels management activities would create short- and long-term impacts to wild horses. In the short term, fuels reduction activities would temporarily displace wild horses from a localized area, resulting in a negligible impact. In the long term, fuels reduction treatments, including returning fire to its natural role in the ecosystem, would result in improved forage production for wild horses and other grazing animals.

There would be no impacts from the sale or disposal of public lands to wild horses. No lands would be identified for disposal within existing HMAs.

Direct impacts to wild horses from new utility and transportation system development actions would be negligible and short-term impacts localized to the area of development. Wild horses would be temporarily displaced during the development and maintenance actions and use of new roads. There would be no long-term loss in forage because effects of utility and transportation development would be revegetated.

Extensive development of utility and transportation systems outside existing developments would affect the wild and free-roaming nature of wild horses. Locating new utility and transportation systems next to existing facilities whenever possible would reduce the potential to fragment of wild horse habitat.

Impacts to wild horses from livestock grazing management would be indirect and would occur across each HMA. Because adjustments to grazing use occur after monitoring indicates such an adjustment is necessary, some isolated cases of increased competition for or overuse of forage and water could occur during periods of drought or other adverse conditions affecting overall productivity within the HMAs. The extent of the competition or overuse, and thereby the intensity of the impacts, would vary based on the time between monitoring findings and adjustments to grazing use. Monitoring of grazing use by all grazing animals would ensure that there would be no long-term impacts to wild horses. Wild horses might be excluded from riparian habitat to meet Standards for Healthy Rangelands (BLM 1997), which would limit some water and forage availability.

Short-term direct impacts to wild horses would be caused by proximity to OHV use, whether recreational OHV use or recreational wild horse observation. Recreational OHV use within HMAs would result in temporary displacement of wild horses from preferred habitats.

Fugitive dust from vehicle use settles on forage adjacent to existing roads, making it unpalatable for consumption. This would reduce the available forage for livestock, wildlife, and wild horses, and increase competition for remaining forage. This effect would be short term and would coincide with the displacement of and stress to wild horses from human activity.

Implementation of paleontology resource management activities would create negligible short-term, localized impacts to wild horses. The most likely impact on wild horses from even the most intense management activities (excavation) would be the temporary displacement of wild horses while the management activity occurs at a localized site. The amount of acreage disturbed would be very small relative to the size of HMAs.

Recreation management would result in localized short-term impacts. Specifically, wild horses would be temporarily displaced from preferred locations as a result of direct human disturbance, such as recreational wild horse viewing, hiking, and camping.

The management of four SMAs within the RMPPA would result in localized, minimal impact on HMAs. Two trails—the Rawlins to Fort Washakie historic trail and the Continental Divide National Scenic Trai—transect the Stewart Creek HMA. Two other SMAs—the Cherokee historic trail and the Adobe Town WSA—coincide with portions of the Adobe Town HMA. Potential impacts to wild horses resulting from the management of these SMAs would be negligible and restricted to the SMA and to areas directly adjacent to the historic trails. Restrictions on development in the SMAs preclude, restrict, or require mitigation for surface disturbing activities.

The recreational opportunities provided by historic trails and the Continental Divide National Scenic Trail would encourage recreational use. Such use would cause temporary displacement of wild horses from some preferred foraging areas. Such impacts would be short term and minimal as a result of the limited use these trails receive.

Management actions designed to enhance vegetative conditions would increase vegetative diversity and forage production. Vegetation treatments and manipulation projects would cause temporary vegetation removal and displacement; however, during the long term, forage production and availability would be enhanced.

The management of special status plant species, such as fencing, could impact the wild and free-roaming character of the wild horses and could limit the amount of available forage. However, fenced areas would be relatively small in comparison to the acreage available in the HMAs. Therefore, the impacts would be minimal.

Impacts to wild horses from VRM would be minimal. Available forage for wild horses would not be impacted by development and associated surface disturbance because the VRM Class I designation of the Adobe Town WSA precludes development.

Impacts to wild horses from water quality, watershed, and soils management would be minimal during the long term. Management actions aimed at reducing erosion in watersheds and improving water quality would provide long-term impacts to wild horses by enhancing habitat and increasing forage production. Riparian management actions ensure that forage and water remain available for wild horses in the HMAs.

Gathering excess wild horses would result in a reduced amount of resource competition for remaining horses. Gathers would subject all horses to stress and potential injury. The rate of injury has proven to be low (less than 1 percent). Horses removed to maintain AML would be adopted and would lose their wild, free-roaming nature. The wild horses that remain would have more forage, water, and space available, and be healthier and more viable.

If wild horse populations are maintained at a level greater than 100 competent breeding adult animals, there should be little (genetic) concern in the short term (BLM 2001b). Although meta-populations surrounding the Lost Creek HMA would exceed this number, the AML in the Lost Creek HMA is not high enough to maintain genetic viability in isolation. As noted in Chapter 3, movement between meta-populations is fairly common.

There is potential that competition for resources between wild horses and big-game species would occur. However, because there is a limited amount of crucial wildlife range within the HMAs, this impact would be negligible. Management actions to improve wildlife habitat would decrease competition for forage and other habitat components between wildlife and wild horses if improvements took place in an HMA.

4.18.2 Impacts Under Alternative 1: Continuation of Existing Management

Limitations on surface disturbing activities on and near cultural sites would result in indirect, minimal impacts to wild horses. Limitations on surface disturbing activities would protect vegetation resources associated with the cultural sites.

In addition to impacts from fire and fuels management common to all alternatives, use of wildland fire for resource benefit would increase the size of theses fires. These areas would decrease short-term forage availability; however, forage availability and diversity would be increased over the long term. Management problems arising following wildland fires would increase, making wild horse management more difficult for a period.

Although the woodlands in the RMPPA would remain open to minor wood products, potential impacts to wild horses, if they occur, would be negligible, localized, and restricted to the juniper woodlands in the Adobe Town HMA. The only impacts to wild horses from forest management would be short-term localized displacement from the area of use (post and pole harvest in the juniper woodland).

Treatment of noxious and invasive weeds (2,800 acres and year) would reduce competition with native vegetation, which would provide increased forage for wild horses in treated areas. However, weed infestations that are left untreated would continue to reduce available forage for wild horses.

Livestock grazing management would result in the maintenance and improvement of the range condition, as directed by Standards for Healthy Rangelands (BLM 1997). Range improvements, such as stock ponds and vegetative treatments, would cause long-term impacts by increasing the availability of water and forage.

Long-term, indirect impacts from motorized vehicle use would result from vegetation loss as a result of game retrieval and travel to campsites. The amount of vegetation loss attributed to OHV use is currently negligible and would not increase in an appreciable amount.

Under this alternative, the Lost Creek AML would be 70. Genetic viability of wild horses in all HMAs would be maintained; however, the New World Iberian genotype associated to horses from the Lost Creek HMA would not be guaranteed.

Seasonal wildlife stipulations and avoidance areas (see Table 2-10) would preclude, restrict, or require mitigation for surface disturbing activities. This would impact wild horses by maintaining available forage, and reducing human disturbance, where protected habitats coincide with existing HMAs.

Summary

Wild horses would be temporarily displaced from preferred locations by human presence and activities such as oil and gas development or dispersed recreation in HMAs.

Habitat components, such as forage and water, would be impacted by various actions. Range improvements, such as stock ponds and vegetative treatments, would cause long-term impacts by increasing the availability of water and the productivity of the range. Wildland fire, vegetation treatments, and ROW development would temporarily reduce forage conditions. Long-term forage conditions would be stable to increasing in quality and quantity.

Genetic viability of wild horses in all HMAs would be maintained, however, the New World Iberian genotype associated to horses from the Lost Creek HMA would not be guaranteed.

4.18.3 Impacts Under Alternative 2: Emphasis on Development of Resources

Impacts from cultural resource management, forest management, and OHV management would be the same as those identified in Alternative 1.

In addition to impacts from fire and fuels management that are common to all alternatives, additional fire suppression efforts would possibly maintain existing forage in HMAs that would otherwise burn in wildland fires.

Livestock grazing management would have similar impacts to wild horses as under Alternative 1, except more water development actions would occur, which would increase the availability of water for wild horses.

Impacts from treatment of noxious and invasive weeds would be similar to Alternative 1, except that more acreage (25,786 acres/year) would be treated, which would provide increased forage for wild horses in treated areas. However, weed infestations that are left untreated would continue to reduce available forage for wild horses, but would be less likely under this alternative.

Impacts to wild horses from minerals management would be the same as under Alternative 1, except there would be fewer stipulations from other resource values, such as cultural resources, Special Status Species habitat, big-game winter range, raptor concentration areas, to reduce the impact of oil and gas development. As such, the pace at which oil and gas wells are developed might increase, leading to a greater loss of wild, free-roaming nature of wild horses.

Impacts from wildlife management are the same as Alternative 1.

Summary

Increased mineral development and a reduction in SMAs would increase the short-term displacement of wild horses and decrease available forage. Leading to a greater loss in the wild and free-roaming nature of wild horses than any other alternative.

As under Alternative 1, genetic viability of wild horses in all HMAs would be maintained; however, the New World Iberian genotype associated to horses from the Lost Creek HMA would not be guaranteed.

4.18.4 Impacts Under Alternative 3: Emphasis on Protection of Resources

Impacts from cultural resource, livestock grazing, SMAs, and wildlife management would be the similar as those of Alternative 1.

Impacts from fire and fuels management would be similar to those under Alternative 1, except wildland fire for resource benefit would be used to improve forage condition in HMAs when they occur. As a result, more vegetation would be burned during the life of the plan, thereby increasing the likelihood of maintaining vegetation in an early seral stage and improving the condition of the forage.

Impacts resulting from OHV management would be the same as those in Alternative 1, except wild horses in the Adobe Town WSA would not be impacted by OHV use, either through vegetation loss or temporary displacement. In addition, limiting OHV use to designated roads and vehicle routes, even for game retrieval or campsite access, would reduce long-term vegetation loss.

Impacts from treatment of noxious and invasive weeds would be similar to Alternative 2.

Under this alternative, the population would be allowed to increase to an AML of 165. If wild horse populations are maintained at a level greater than 100 competent breeding adult animals, there should be little (genetic) concern in the short term (BLM 2001b). Ensuring the viability of horses within the Lost Creek HMA would also preserve the genetically significant New World Iberian genotype and associated phenotype.

Summary

Increased restrictions on surface disturbing activities would reduce human activity, thereby preserving the wild and free-roaming nature of wild horses. Increased restrictions from wildlife and vegetation management would decrease activities that result in short-term reductions in forage while providing for activities that result in long-term forage increases.

Similar to Alternative 1, range improvements, such as stock ponds and vegetative treatments, would cause long-term impacts by increasing the availability of water and forage.

The viability of horses within the Lost Creek HMA would be ensured. Ensuring the viability of these horses would also preserve the genetically significant New World Iberian genotype and associated phenotype.

4.18.5 Impacts Under Alternative 4: Preferred Alternative

Impacts from cultural resources, forest, SMA, and wildlife management on wild horses would be the same as those identified in Alternative 1.

Impacts from fire and fuels management would be similar to those under Alternative 1, except the number of fuel treatments would increase four to eight times resulting in an overall shift in plant communities to more early and mid-seral conditions in treated areas.

Impacts resulting from OHV management would be the same to those under Alternative 1, except vegetation loss related to game retrieval and campsite access would be reduced to just 300 feet from designated roads and vehicle routes.

Management of wildlife habitat for DPC within an HMA would provide improved forage to meet the AML.

Summary

Impacts under this alternative are similar to Alternative 1. Wild horses would be temporarily displaced from preferred locations by human presence and activities such as oil and gas development or dispersed recreation in HMAs.

Habitat components, such as forage and water, would be impacted by various actions. Range improvements, such as stock ponds and vegetative treatments, would cause long-term impacts by increasing the availability of water and forage. Wildland fire, vegetation treatments, and ROW development would temporarily reduce forage conditions. Long-term forage conditions would be stable to increasing in quality and quantity.

Genetic viability of wild horses in all HMAs would be maintained, however, the New World Iberian genotype associated to horses from the Lost Creek HMA would not be guaranteed.

4.19 Wildlife and Fish

This section presents potential impacts to wildlife and fish from other management actions. Existing conditions concerning wildlife and fish are described in Section 3.19.

Significance Criteria

Impacts to wildlife and fish would be considered significant if any of the following were to occur:

- Substantial loss of habitat function or disruption of life history requirements of a species or population segment that would make them eligible for listing under the Endangered Species Act (ESA).
- Decreased viability or increased mortality of threatened and endangered (T&E), proposed, and/or candidate species or adverse alteration of their Critical habitats.

- Management actions that result in substantial disruption or irreplaceable loss of vital and high-value habitats as defined in the Wyoming Game and Fish Department Mitigation Policy.
- Substantial loss of habitat function or disruption of life history requirements of Special Status Species that would preclude improvement of their status.

Methods of Analysis

Impact analyses and conclusions are based on interdisciplinary team knowledge of resources and the RMPPA, review of existing literature, and professional judgment of experts within BLM and other agencies. Effects are quantified where possible. In the absence of quantitative data, best professional judgment was used. Impacts are sometimes described using ranges of potential impacts or in qualitative terms if appropriate.

The analysis is based on the following assumptions:

- BLM would continue to manage fish and wildlife habitats in coordination with the WGFD.
- In cooperation with WGFD, BLM would continue to manage species listed on BLM Wyoming State Director's Sensitive Species List in accordance with BLM manual 6840.
- USFWS would have jurisdiction over the management of threatened and endangered fish and wildlife populations.
- The health of fisheries within the RMPPA is directly related to the overall health and functional capabilities of riparian and wetland resources, which in turn are a reflection of watershed health. Any activities that affect the ecological condition of the watershed and its vegetative cover would directly or indirectly affect the aquatic environment. The degree of impact attributed to any one disturbance or series of disturbances is influenced by location within the watershed, time and degree of disturbance, existing vegetation, and precipitation. As riparian systems adjust in response to the removal of vegetation or changes in hydrologic conditions, the availability of habitats required to fulfill the life history requirements of fish populations might be affected.
- RFDs and RFAs can be found in Appendix 33.

4.19.1 Impacts Common to All Alternatives

Cultural Resource Management

Authorized excavation of cultural sites and cultural inventories would have only local and short-term impacts on wildlife and their habitats. The short- and long-term impacts associated with these actions would not be detrimental to wildlife and their associated habitat given the limited footprint of such actions on the landscape. Land acquisitions intended to preserve cultural resources would generally benefit fish and wildlife resources as a result of the consideration of fish and wildlife habitat requirements during acquisition analysis.

Any proposed wildlife habitat enhancement project would require a cultural clearance before beginning the project. If cultural sites are found at proposed locations of wildlife habitat enhancement projects, projects would have to be reevaluated, site adjustments would have to be made, and the projects might have to be redesigned.

Fire and Fuels Management

Wildland fire suppression activities and fuel reduction (WUI) projects would be conducted according to the appropriate fire management requirements. Wildland fire could be beneficial and detrimental to wildlife and their habitats. For example, fire reduces dense understory that has mixed values for various species of wildlife. Fire also acts as a rejuvenator by returning nutrients to the soil. In late-successional vegetation communities, fire would return the vegetative community to an earlier stage of succession. The conversion of some late-seral stage stands to early and mid-seral would provide diversity in habitat, forage and cover. This conversion could negatively affect species adapted to late-seral forest types.

The use of wildland fire as a component of the ecosystem would promote the return of fire to its natural role of maintaining habitat for a diversity of wildlife. Wildland fires usually occur in summer and early fall when conditions for fire are optimum as a result of the combination of low humidity and higher temperatures. Over the past several decades, human intervention in fire suppression has led to increased fuel loading that might allow wildland fires to burn with greater intensity resulting in greater consumption of vegetation. Fire-sensitive vegetation like bitterbrush, which is an important browse species for big game, are often killed and their composition within the plant community reduced. On rare occasions, these fires have the potential to burn exceptionally hot, resulting in sterilization of soils. Sterilization of the soils could delay revegetation for many years depending on the severity of the fire. This delay could result in the long-term loss of wildlife habitat.

Periodic random wildland fires would rejuvenate overmature, decadent shrub communities and would remove vegetation, forage, hiding cover, and thermal cover. Historically, less intense fires that did not affect entire wildlife populations created mosaics resulting in more variability in vegetation seral stage, species composition, vertical stratification, and improved herbaceous understory. This would benefit species that prefer open habitats, such as mountain plover, mountain bluebirds, and species that benefit from increases in fire-responding vegetation, such as sharp-tailed grouse.

In the short term, any fire would cause the loss of less mobile wildlife that might not be able to avoid the fire's path. However, these species would normally recolonize burned areas fairly quickly. For example, amphibians are not as mobile as other animal orders. If wildland fires occurred in areas of important amphibian populations there would be a detrimental impact to local populations. Debris flows, increased siltation, and loss of riparian/wetland vegetation as a result of wildland fires would impact amphibian populations by temporarily altering the suitability of aquatic habitats. For fragmented amphibian populations that lack sufficient recolonization potential, these impacts might be significant at the population scale. For amphibian populations that do not exhibit fragmentation, rapid vegetative responses following wildfire would allow habitats to be recolonized from neighboring populations.

The importance of landscape scale disturbances resulting from wildland fire, to aquatic and riparian ecosystems, has recently received additional attention (Bisson et al. 2003). Natural disturbance regimes maintain the diversity of riparian ecosystems, resulting in a healthier habitat (Naiman et al. 1993). An example of this affect would be the response of desirable riparian vegetation such as willow in areas exhibiting encroachment by upland species to occasional fire. However, these disturbances can also include fire-related flooding, debris flows, landslides and increased siltation, all of which would affect the riparian ecosystem (Dwire and Kauffman, in press). Additional changes to riparian ecosystems can result from the response of vegetation to fires outside the riparian zone. A key example of this influence is the regeneration of quaking aspen that can result from the top-killing of aspen during a fire. This would result in cloning new growth from the roots of the remaining viable trees. Additional aspen growth would then be available for in-stream uses by beaver, which would generally improve habitat conditions for various fish and wildlife species.

Additions of carbon to aquatic systems resulting from wildland fires can alter water quality characteristics and affect fish populations and their habitats. However, given sufficient recolonization routes and vegetative succession, aquatic populations can benefit from increased inputs of carbon that can result from fires.

Fire suppression activities occurring in fish and amphibian habitats would potentially harm populations of these species as a result of the application of toxic fire-fighting chemicals in riparian/wetland areas. In addition, roads or other surface disturbance associated with fire suppression activities might increase sedimentation rates into riparian/wetland habitats.

Forest Resource Management

Impacts resulting from forest management activities and its associated infrastructure would include direct habitat loss or decreased suitability and disturbance of wildlife from increased noise and traffic. For example, wildlife, specifically big game species, avoids areas adjacent to access roads and timber harvest areas because of the associated increase in activity. Forest management practices, which convert late-seral stage stands to early and mid-seral, would negatively affect species adapted to late-seral forest types. Forest management practices would create a diversity of seral stages for different wildlife species habitat requirements, thereby increasing species diversity and richness. The harvesting of wood products, such as poles, firewood, and wildings (local term for small shrubs and brush) is minimal at present, and it is expected to remain at the current level and would have a minimal effect on wildlife resources.

Roads created for commercial timber harvesting would be closed and rehabilitated as soon as possible after the end of timber harvesting. Closing and rehabilitating roads has benefits to big game by eliminating disturbance from vehicles, reestablishing vegetation for forage and cover, and eliminating the roads as erosion/sediment sources.

Short- and long-term impacts on big game habitat would be minimized if timber harvests were effectively executed. The layout and timing of timber sales would largely determine the degree of impacts to wildlife habitat. Intensive management and harvest of mature timber areas most often is naturally reseeded; regeneration of commercial forest provides habitat of varying size, age class and habitat for various species that change as the forest matures. This natural succession happens over an 80- to 100-year period. Potential short-term impacts include loss of security and calving cover and displacement of elk to other portions of the habitat. Long-term impacts to security cover in the areas would also be caused by timber harvest.

Upgrade of existing access roads for logging operations would temporarily affect aquatic habitats by concentrating streamflow, increasing erosion rates, and fragmenting habitats. Removal of forest vegetative cover would alter aquatic habitats by changing the time of peak discharge following precipitation events and increasing sediment transport from upland sources to the stream channel until revegetation has occurred.

Logging within or near riparian zones can result in more severe erosion and greater danger of reducing the water quality of the associated aquatic zone, which can in turn alter the suitability of aquatic habitats for aquatic species including fish, macroinvertebrates, and amphibians.

Lands and Realty Management

Impacts to wildlife and fish management from lands and realty management would be moderate. Habitat loss, degradation, fragmentation, and species displacement from linear features (e.g., power lines, roads, and pipelines) and other permitted facilities (e.g., wind turbines) would occur. These activities primarily

affect big sagebrush, short grass, saltbush steppe, and greasewood habitat types, which are all common in the RMPPA, which affect the diversity of species found in these habitat types. ROW-approved actions for power lines, communication sites, and wind turbines would also include injury and death to bats, raptors and other migratory birds as a result of collisions. Increased road density and human presence would act to increase stress levels of wildlife during sensitive time periods (e.g., breeding, migration, wintering) and increase edge effects. In addition, continual noise emissions, such as from compressor stations, located close to active leks, would interfere with the mating success of birds. For example, this would reduce the reproductive success of Greater sage-grouse by interfering with the ability of female sage-grouse to locate leks (LaGory et al. 2001; Dantzker et al. 1999).

As requests for ROW actions related to new water diversions are generated, NEPA analysis of potential adverse impacts would be required before authorizing actions that might affect the functionality of streams, riparian areas and associated fish habitats. Water diversions have had negative impacts to fisheries and fish habitat in the past. In some cases, streams have been completely dewatered for periods of time rendering the stream unusable as fish habitat and in some cases making the riparian area nonfunctional.

The crossing of riparian areas by roads can fragment fish populations by limiting the movement of aquatic species. Review of road design criteria and incorporation of fish passage needs would minimize this impact. Roads also would affect aquatic populations by creating additional flow paths, concentrating streamflow, and increasing erosion rates.

Livestock Grazing Management

Management of BLM lands to meet Standards for Healthy Rangelands (BLM 1997) would minimize impacts from livestock grazing. The impact from livestock grazing management on fish and wildlife habitat includes direct competition for forage, water, and space, indirect effects of habitat alteration, and the effect of management tools such as range improvements. Livestock grazing creates competition for grass and forb food sources for big game and avian species (e.g., sage-grouse). Livestock tend to congregate near water sources potentially compromising stream bank stability and causing erosion.

Livestock grazing practices occurring during the winter on crucial winter range would contribute, to varying degrees, to indirect impacts to wildlife when they are most vulnerable. Removal of vegetation by livestock reduces vertical structure, which provides visual security to upland nesting birds. This might lead to increased predation and lower nesting success. Overuse of desired plant species by livestock results in a change in species composition, which generally negatively affects wildlife. For example, loss of shrubs in riparian plant communities limits the use of these habitats by neotropical birds. Conversely, livestock grazing in short-grass habitats would benefit or have little effect on species such as the mountain plover. Appropriate use levels under the right environmental conditions could have beneficial impacts to wildlife habitat T&E, candidate, and proposed sensitive plant populations. Appropriate use levels of grazing might help to improve the palatability of forage for elk. Ute ladies'-tresses have been shown to respond favorably to moderate grazing intensity in riparian areas. Cattle use of sedges and grasses increases the proportion of succulent forbs found in the plant community but reduces the stability of riparian systems.

The impacts of livestock grazing management on stream processes and fish habitats have been well documented (Armour 1991, White 1996, Rinne 1999). These impacts include the loss of stabilizing riparian vegetation, which can lead to stream instability and an associated loss of habitat complexity; the loss of shading vegetation, which can lead to elevated stream temperatures and increased sediment delivery; and the loss of stream channel complexity provided by fluvial process and woody debris. These

impacts can range from negligible to significant depending on livestock grazing intensity, site characteristics, and species habitat requirements.

Livestock improvements designed to alter grazing distribution and use of pastures, such as fences can impact wildlife. Fences would create travel barriers, cause stress and energy loss, and might cause death from entanglement to big game species. In addition, fences have altered the distribution of big game species. They create obstructions for birds to fly into and perches for predator species. The indirect benefit of fences on wildlife is the control provided to livestock management for utilizing the vegetation resource while minimizing impacts to wildlife habitat. Fences built to BLM standards would decrease impacts on big game movements by incorporating design elements that reduce injury and entanglement. When replaced or repaired, existing fences will be built to current BLM fence standards. The conversion of fences to meet BLM standards would reduce injury and entanglement rates of wildlife and decrease stress and energy loss. Fencing of riparian areas to protect water sources and riparian areas would help to maintain or improve habitat conditions supportive of fish and other aquatic species populations.

The use of water developments for the purpose of livestock management or wildlife habitat enhancement has variable affects on fish and wildlife populations. Given proper design and management of water developments, increased management flexibility afforded to livestock operations can help to decrease grazing impacts to riparian areas or other high-priority habitats.

Water developments for livestock have expanded the range of wildlife into areas that formerly lacked water sources and were only seasonally utilized. Water improvements that lack water controls (e.g., reservoirs), located in the big game crucial winter range, would retain big game in these areas longer in the spring; consequently, the quantity and quality of available forage would be decreased the following winter. These new water developments also bring livestock use into previously unused areas, which further decrease available forage.

Impoundments change the hydrologic regime of the watershed and impact fish habitats by altering water temperatures and the timing and volume of flow, minimizing the effects of flushing flows, and altering sediment transport within the system. In addition, impoundments constructed on streams containing populations of fish, invertebrates, or amphibians would limit movement among required habitats. Due to their highly regulated environment, reservoirs often contain habitat for introduced fishes that would otherwise be unable to survive in an unregulated system. These impoundments can, in turn, act as sources of undesirable species within areas containing sensitive native fishes. Reservoirs that exhibit habitat characteristics sufficient to support salmonid populations would increase habitats available for potential trout fisheries. Consideration of alternative water development designs such as wells and guzzlers would help to minimize the adverse impacts that impoundments can have on upstream and downstream fish populations.

The use or implementation of grazing BMPs (Appendix 15) would help to maintain or restore habitat conditions for various fishes and increase the availability of angling opportunities.

Minerals Management

Factors affecting wildlife species (especially big game) associated with minerals management actions within the RMPPA include the reduction in usable habitat and disruption of movements among crucial habitats (e.g., crucial winter range), transitional areas, and parturition areas associated with the construction of access roads, facilities, or other surface disturbances (Map 2-53–2-56). Habitat fragmentation occurs when a contiguous habitat is broken up (fragmented) by disturbing activities, causing a reduction in usable ranges and the isolation of smaller, less mobile species; a loss of genetic integrity from within species or populations; and an increase in abundance of habitat generalists that are

characteristic of disturbed environments (i.e., competitors, predators, and parasites) (Harris 1991). Management actions to minimize disturbances to wildlife during sensitive life cycles can be found in Table 2-10 (Seasonal Wildlife Stipulations for all Surface Disturbing Activities).

Within the RMPPA, approximately 357,930 acres of leased land has high potential for oil and gas and CBM that overlaps with crucial winter range. In addition, roughly 707,590 acres of leased land has moderate potential for oil and gas and CBNG development that overlaps with crucial winter range. Impacts of human activity on big game crucial winter range include direct impacts of loss of habitat and forage occurring from surface disturbing and other disruptive activities at any time of the year and indirect impacts of displacement and physiological stress occurring from human presence and activity during the winter. The disturbed big game animal incurs a physiological cost either through excitement (preparation for exertion) or locomotion. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to poorer (lower) quality habitat. If the disturbance becomes chronic or continuous, these costs can result in reduced animal fitness and reproductive potential (Geist 1978). Operational activity from oil and gas development, mining, and salable minerals extraction occurring during the winter on crucial winter range all contribute, to varying degrees, to indirect impacts to wildlife when they are most vulnerable.

Initially, an estimated 7.1 acres of habitat would be lost for each well. After the well becomes a producer, the disturbance drops to 4.5 acres per well on average. However, reclamation efforts do not guarantee that habitat will return to its original function. Reclaimed areas might be more vulnerable to invasion of noxious weeds and might not provide the same habitat, forage, or cover that the original area provided. In addition, reclamation of surface disturbances must be viewed from the perspective of vegetative succession. Sites are often initially stabilized with early successional species, but given sufficient time, these species should be replaced by late successional species such as sagebrush. Therefore, these habitats would usually return to late successional plant communities supportive of species favoring these habitat types. Occasionally, drilling of multiple well bores from a single well pad would reduce impacts to wildlife by reducing the number of surface locations and surface area disturbance. In addition, some wells are dry holes or abandoned producers and these areas are reclaimed.

Impacts on surface water resources from groundwater extraction are variable, depending on the connectivity of surface water resources to the target groundwater aquifer. If a connection occurred, there would be potential to dewater both lentic and lotic systems that might be of importance to aquatic populations. Based on the depth of targeted coal formations (1,200 feet to 5,500 feet) and high pressures in most reservoirs, it is improbable that a connection to surface waters would exist.

The crossing of riparian areas by roads can act to fragment populations of aquatic species by limiting movement among required habitats. Habitat fragmentation has been shown to interfere with the metapopulation dynamics of many fish populations. When extirpations occur as a result of localized environmental variation, restrictions of fish passage eliminate the possibility of the area being recolonized from a neighboring population. Review of road design criteria and incorporation of fish passage needs would minimize this impact (Appendix 26). Additional impacts of roads would include alteration of local hydrologic conditions resulting from additional flow paths. This alteration would possibly affect the suitability of habitats for aquatic species by increasing sediment delivery to streams.

Surface disturbing and other disruptive activities associated with well pad construction would increase sediment delivery to stream and standing water systems, which might interfere with the life history strategies of fish. For example, clean gravels are required by many fish species for successful spawning. Increased sediment delivery can embed these gravels and render spawning efforts unsuccessful.

The estimate for the amount of water needed to drill and complete each well is 3.2 acre-feet. These depletions would effectively decrease the usable habitat available to fish populations or decrease the suitability of available habitats by altering hydrologic conditions responsible for the creation and maintenance of instream habitat features.

The impacts resulting from coal mining activities would only include the reclamation of the currently disturbed lands in the Hanna Basin area. Short-term impacts would include displacement of wildlife as a result of human activities and heavy equipment operations. Long-term benefits would include enhanced and more diversified vegetative cover providing for better habitat for wildlife.

Common variety mineral extraction would result in short-term and direct impacts to wildlife and associated habitat, however impacts would be minimal because disturbances are generally small.

Potential impacts of fluid mineral development on Greater sage-grouse populations include: direct habitat loss from well, road, pipeline, and transmission line construction; increased human activity and associated pumping noise causing displacement; increased legal and illegal harvest; and direct mortality associated with evaporation ponds and increased exposure to predation (Braun 1986, TRC Mariah Associates Inc. 1997). Studies conducted on Greater sage-grouse indicate that noise might be adversely affecting strutting and nesting grouse (Map 2-57) (LaGory et al. 2001; Dantzker et al. 1999).

Off-Highway Vehicle Management

In general, OHV management activities that result in increased human presence would have a moderate localized impact on wildlife and fish species. Impacts would include increased displacement of wildlife, increased stress during critical time periods, and degradation of habitats. OHV use can alter the seasonal use patterns of many wildlife species. Of particular concern are raptor and Greater sage-grouse nesting sites, sage-grouse leks and brood rearing areas, big game parturition areas, and all winter habitats. The reduction of designated road densities would decrease disturbance to wildlife and their habitat.

Over-the-snow vehicles would impact wintering wildlife by increasing displacement and stress during critical time periods. Several closures and seasonal restrictions exist to minimize this impact (SMA discussion).

Impacts of human activity on big game crucial winter range include direct impacts of loss of habitat and forage occurring from surface disturbing and other disruptive activities at any time of the year and indirect impacts of displacement and physiological stress occurring from human presence and activity during the winter. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to lower quality habitat. If the disturbance becomes chronic or continuous, these costs can result in reduced animal fitness and reproductive potential (Geist 1978). Management actions to minimize disturbances to wildlife during sensitive life cycles can be found in Table 2-10 (Seasonal Wildlife Stipulations for all Surface Disturbing Activities).

Paleontological Resource Management

Management actions for paleontological resources likely would provide various degrees of wildlife and fish protection through habitat preservation that minimizes vegetation loss and erosion by restricting surface disturbing and other disruptive activities. Wildlife disturbances could occur if the public interpretation facilities generate increased human presence during sensitive seasonal periods (e.g., breeding, nesting or migration); it is not likely that significant human presence would occur during the winter period. It is expected that adverse impacts associated with paleontological management would be limited to relatively small areas.

Recreation Resource Management

Recreation management activities that result in increased human presence would have a moderate localized impact on wildlife and fish species. These activities include hiking, biking, camping, boat use, fishing, hunting and sightseeing. Impacts of human activity on big game crucial winter range include direct impacts of loss of habitat and forage occurring from surface disturbing and other disruptive activities at any time of the year and indirect impacts of displacement and physiological stress occurring from human presence and activity during the winter.

Human disturbance of big game, whether it is intentional (e.g., harassment) or unintentional, results in increased energy costs to the alerted animal (Bromley 1985). The disturbed big game animal incurs a physiological cost either through excitement (preparation for exertion) or locomotion. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to lower quality habitat. If the disturbance becomes chronic or continuous, these costs can result in reduced animal fitness and reproductive potential (Geist 1978).

Special Management Areas

The management actions afforded to SMAs would result in beneficial impacts to wildlife. Protections aimed at conserving vegetation, and limitations on surface disturbing and other disruptive activities, would benefit wildlife by enhancing overall habitat conditions. Developments, uses, and facilities would be managed spatially to minimize loss or alteration of wildlife habitat of higher value. Additionally, Plans of Operations are required for all development.

WSAs would benefit wildlife and fish species and associated habitat by restricting surface disturbing and other disruptive activities and preserving wilderness characteristics.

Implementation of management actions to reintroduce the Colorado River cutthroat trout and other native fishes to portions of their historic range within the Muddy Creek watershed would restore habitat conditions and help to ensure the persistence of the native Colorado River Basin fish fauna. Improvement of habitat conditions resulting from implementation of these actions also would expand habitats that are suitable to coldwater fishes and therefore increase angling opportunities.

Transportation and Access Management

Transportation routes tend to fragment habitats and can act as barriers to some species, especially in severe winter conditions. Migration routes could be altered or eliminated, changing some traditional use patterns on a local level. Seclusion areas for wildlife would become smaller and more dispersed in some areas. Transportation routes could also increase public accessibility to areas that previously have been somewhat inaccessible to vehicles during the winter and spring, this would become more important and increase adverse effects to wildlife as increased demands for use of public lands occur. Existing leases within the RMPPA might not provide the specific mitigation measures needed to protect important wildlife habitats (e.g., major highway routes).

Impacts of human activity on big game crucial winter range include direct impacts of loss of habitat and forage occurring from surface disturbing and other disruptive activities at any time of the year and indirect impacts of displacement and physiological stress occurring from human presence and activity during the winter.

Vegetation Management

Vegetation manipulation to improve wildlife habitat would include prescribed burns, livestock grazing strategies, and biological, chemical, and mechanical controls. These treatments provide diverse habitats for various species of wildlife. Vegetation management would be beneficial to wildlife and their habitats; however, there would be short-term impacts on habitat and displacement of wildlife until vegetation communities reestablished themselves.

Prescribed fires are usually conducted during the spring or fall. These fires are generally "cooler" than summer wildland fires. The short-term effect of these fires is the loss of habitats and displacement of wildlife. Prescribed fires would improve the diversity of vegetation age classes and lead to greater herbaceous vegetation production and forage quantity and quality, improving palatability for some wildlife species. Conversely, the loss of late successional vegetative communities would result in a reduction of habitats available to species requiring expansive tracts of contiguous late-successional habitat.

Vegetative treatments in upland areas might occasionally increase water yields and affect fish habitats. These effects are likely to be highly variable depending on local hydrologic characteristics and fish community interactions.

Treatments in upland areas often divert livestock and wildlife use away from riparian and wetland areas, thus increasing the vigor and structural diversity of these plant communities. This would lead to increased growth of woody and herbaceous riparian vegetation that, in turn, would increase channel stability, stream shading, and introduction of woody debris. This would improve habitat conditions for fishes. Additional impacts to aquatic species and their habitats resulting from large-scale prescribed fires would likely be similar to those described under the Wildland Fire and Fuels Management heading.

Visual Resource Management

In some cases, moving project locations to comply with visual resource management directives might have positive or negative impacts on wildlife and fish habitat. These impacts are expected to be negligible.

Water Quality, Watershed, and Soils Management

The management of wetland/riparian areas to improve their PFC rating would improve fish habitat conditions. Because the PFC assessment methodology does not incorporate the habitat requirements of fishes, additional management would be necessary to ensure that habitats provide conditions suitable to meet the life history requirements of fishes. Watershed management would provide benefits to wildlife by maintaining or restoring habitat conditions through the establishment of DPC objectives, buffer zones placed around riparian areas, and restrictions on surface disturbance within riparian areas and flood plains. Actions that would maintain or improve watershed conditions would generally benefit the ecological condition of wildlife and fish habitats.

Management actions designed to improve water quality and watershed health would indirectly benefit wildlife and fish species. Water quality, watershed, and soils management provides benefits to wildlife by maintaining or restoring habitat conditions through the establishment of avoidance zones around riparian areas and surface use requirements within flood plains. Many of the wildlife species present within the RMPPA have adaptations to current water quality and quantity conditions; therefore, maintaining these conditions would generally maintain habitat for these species. With Special Status Species, this could be extremely important in maintaining viable populations. Management actions

designed to remedy water quality impairments listed on the 303d list of impaired water bodies would, in some cases, result in increased habitat suitability for native fishes.

Wild Horse Management

Competition between wildlife, specifically big game species, and wild horses for forage and habitat would occur. Wild horses tend to dominate water sources and drive wildlife away. Wild horse use of desert riparian and wetland areas would decrease the value of these areas for fish and wildlife by affecting habitat complexity and stability.

Wildlife and Fish Management

Maintaining, enhancing, and restoring wildlife habitat with the RMPPA, in coordination with the WGFD, USFS, USFWS, and other agencies, would benefit wildlife species by improving forage quality and quantity, increasing hiding cover, and reducing stress during critical time periods. Conservation measures for T&E species, proposed and candidate species, sensitive species, and other wildlife would be implemented to promote sound management to conserve and preserve the species and their associated habitat, comply with Section 9 of the Endangered Species Act, and promote recovery as identified in the provisions of the ESA and BLM sensitive species policies. Impacts to threatened and endangered, candidate, and proposed species have been analyzed in the Biological Assessment (BLM 2004b).

Greater sage-grouse populations have been declining during the last half of the century as a result of such factors as habitat degradation, fragmentation, and loss (Chapter 3). As oil and gas development and other surface disturbing activities increase, impacts to Greater sage-grouse, raptor, and big game populations have increased. Intensive management, such as seasonal and timing restrictions and buffers, would be implemented for sage-grouse and raptor species to minimize impacts. Mitigation measures applied during critical time periods would also reduce disturbances to big game parturition and winter habitat. Fence modifications would reduce impacts to big game migration by reducing injury and entanglement.

A guzzler/water development specifically designed for wildlife would increase usable habitat for some big game species. Impoundments change the hydrologic regime of the watershed and impact fish habitats by altering water temperatures and timing and volume of flow, minimizing the effects of flushing flows, and altering sediment transport within the system. Because of their highly regulated environment, reservoirs often contain habitat for introduced fishes that would otherwise be unable to survive in an unregulated system. These impoundments can, in turn, act as sources of undesirable species within areas containing special status or desirable fishes. In addition, impoundments, instream structures, or linear crossings constructed on streams containing populations of fish, invertebrates, or amphibians would in some cases limit movement among required habitats. Where negative effects on habitat quality, quantity, or the life history requirements of fishes resulting from the construction of impoundments, instream structures, and linear crossings cannot be mitigated, fragmentation and impairment of fish habitats would result. Management actions to minimize disturbances to wildlife during sensitive life cycles can be found in Table 2-10 (Seasonal Wildlife Stipulations for all Surface Disturbing Activities).

4.19.1 Impacts Under Alternative 1: Continuation of Existing Management

Fire and Fuels Management

Fire management would impact about 84,000 acres during the 20-year planning period. The response to a wildland fire would be based on an evaluation of risk to firefighter and public safety, the circumstances under which the fire occurs, including weather and fuel conditions, and resource values. This response

will allow not only for protection of natural and cultural resources but also for fire to fulfill its ecological role.

Forest Resource Management

Impacts to wildlife and fish management from a harvest level of 10 million board feet (MMBF) from 25,900 acres would have positive and negative impacts to fish and wildlife habitats, depending on the habitat requirements and life history characteristics of individual species. Approval of harvest activities within areas of steep slopes and riparian areas on a case-by-case basis might occasionally result in the loss or degradation of fish and wildlife habitats.

The use of a multitude of forest management tools would give more flexibility to wildlife and fish habitat management efforts. The application of a multitude of forest management tools would occasionally decrease the possibility of catastrophic events with the potential to negatively affect wildlife and fish habitats. In all timber sales, the needs of fish and wildlife would be considered so that habitat conditions would be maintained or improved. In addition, limitation of clear-cuts to 10 acres or less with irregular edges would help to ensure adequate cover for elk and deer. Intensive management of about 6,700 acres that include steep slopes, riparian habitats, and associated buffer zones would help ensure that the habitat requirements of wildlife and fish species are considered during project development.

Lands and Realty Management

Lands and Realty management would impact about 5,794 acres during the 20-year planning period. The disposal of approximately 61,010 acres of BLM-administered public lands would result in a loss of wildlife or fish habitats from public ownership. The limited ability to manage isolated tracts identified for disposal under this alternative (Maps 2-22 through 2-25 and Appendix 7) makes these tracts less effective wildlife and fish habitats than BLM-administered lands located in areas of blocked ownership. The use of exchange as the preferred method of disposal, consolidation, or acquisition would allow the value wildlife and fish habitats to be compared before change in ownership. Consideration of sensitive or high-value wildlife and fish habitats in designing avoidance areas for the placement of wind energy developments, facility placement, new communication sites, or other permitted actions would help maintain the suitability of habitats for fish and wildlife. Intensive management of disturbing or disruptive activities would include potential timing and spatial stipulations to minimize impacts to wildlife and their associated habitat.

Livestock Grazing Management

Under Alternative 1, roughly 900 acres would be used for constructing and/or developing range improvements during the 20-year planning period. Cattle grazing and sheep browsing would be managed in accordance with Standards for Healthy Rangelands (BLM 1997). This action will improve or maintain desired range conditions that support a diversity of wildlife and fish. In addition, this will result in the improvement or maintenance of habitats sufficient for listed species to not only recover and be delisted but also to avoid or prevent additional species becoming listed as well as to provide habitats for a diversity of native plant and animal species.

Minerals Management

Surface disturbing activities would be intensively managed. Leases would be issued with stipulations to protect resources and acreages. Impacts from minerals management that would occur on wildlife and fish species and associated habitat include habitat loss, degradation, fragmentation, and species displacement from oil and gas development (e.g., roads, pipelines, well pads, and associated facilities) on

approximately 16,538 acres during the planning period. These impacts to wildlife and fish management from oil and gas management would be moderate based on existing protective measures.

A combination of 857,040 acres of federal oil and gas leasable lands open to leasing consideration and subject to standard lease stipulations and 3,321,600 acres of federal oil and gas leasable lands open to leasing consideration and subject to lease stipulations, such as seasonal restrictions, would cause some impacts to wildlife species. Species displacement can be short term and long term. These activities primarily affect big sagebrush, short grass, saltbush steppe, and greasewood habitat types, which are all common in the RMPPA. Big game, raptors, grouse, mountain plover, prairie dogs, and other sagebrush-obligate species are the principal wildlife species affected.

A combination of 343,140 acres of federal oil and gas leasable lands open to leasing consideration and subject to lease stipulations such as NSO and 66,120 acres of federal oil and gas leasable lands closed to leasing should benefit wildlife species. NSOs would protect species that are dependent on specific habitat types. About 7,660 acres also would be closed to locatable mineral entry under proposed withdrawals, which would benefit wildlife species in these areas.

In addition, some wells are dry holes or abandoned producers, and these areas are reclaimed. After reclamation, these areas would remain dominated by herbaceous species, with desirable shrubs reestablishing in the long term. Early seral habitats would benefit wildlife species, such as mountain plover and prairie dogs, before use by wildlife dependent on shrubs.

Surface discharge of produced water that meets state standards for water quality would be allowed in the Colorado River Basin. Individual projects would be considered on a site-specific basis. Surface discharge of produced water that meets state standards and beneficial use for water quality would be allowed in the North Platte River Basin and Great Divide Basin.

Impacts of surface discharge of produced waters on the habitats of fish are variable. Both the quantity and quality of discharged waters could determine how fish habitats would be influenced. Discharge of produced waters resulting from natural gas extraction from coal seams would affect fish habitats by altering local hydrologic conditions of receiving waterbodies. For example, the discharge of large volumes of water into ephemeral drainages would lead to stream channel adjustments such as incision that might simplify channel geometry and reduce the diversity of habitats required by fish life stages (i.e., juvenile rearing habitat, spawning habitats, and refuge habitats). If the discharged water were of poor quality, fish might be affected either directly (e.g., through increased water temperatures) or through the processes of bioaccumulation. Fish adapted to highly turbid rivers would be impacted by the discharge of waters with little turbidity. In addition, decreasing the intermittence of flows might favor introduced fish over native fish that had evolved in the presence of a highly variable environment.

Off channel evaporation and percolation reservoirs for water disposal would replace upland wildlife habitats and require future reclamation. As these reservoirs dry in response to decreased water disposal they could potentially concentrate salts and trace metals to the point of toxicity for migratory birds and aquatic organisms.

Off-Highway Vehicle Management

In the Dune Ponds cooperative management area, OHV use is authorized in open sand areas west of Carbon County road 351 and existing roads and vehicle routes in the remainder of the area. Impacts to big game species, specifically pronghorn, would be moderate and include displacement and increased stress during critical time periods. The use of OHVs in the gathering of shed antlers would cause many

deer and elk undue stress if OHV operators harass them. Areas closed to OHV use (Map 2-5) would help avoid impacts associated with the disruption of wintering big game.

The authorized new roads would lead to increased OHV use in areas previously inaccessible, which would lead to displacement of wildlife and increased stress during critical time periods.

Special Management Areas

Intensive management of surface disturbing and other disruptive activities associated with existing oil and gas leases would reduce disturbance to wildlife and loss or alteration of their habitat and could be mitigated on a case-by-case basis. Developments, uses, and facilities would be managed spatially to minimize loss or alteration of wildlife habitat of higher value. In addition, Plans of Operations are required for all development. This will result in surveying of land before surface disturbing or disruptive activity begins and potential mitigation measures to minimize impacts. Therefore, quality habitat would be preserved while allowing for multiple-use.

Management of wetland areas within the High Savery Dam area (530 acres) would benefit wetland-dependent species such as waterfowl and neotropical migratory birds as well as wildlife species that use these areas to fulfill a portion of their habitat requirements. The management of riparian habitats within the High Savery Dam area (under the current MOU) would provide habitats supportive of a recreational stream fishery for trout below the reservoir site. Big game species would benefit from existing seasonal closures by eliminating displacement or harassment caused by motor vehicle use during critical time periods.

Management of the Sand Hills ACEC (7,960 acres) would emphasize the preservation of the unique vegetation community to support wintering mule deer and elk.

The other areas proposed as SMAs (Stratton Sagebrush Steppe Research Area, Chain Lakes, Laramie Peak, Red Rim/Daley, Wick-Beumee, Pennock, Laramie Plains Lakes, historic trails, Blowout Penstemon, Upper Muddy Creek Watershed/Grizzly, White-Tailed Prairie Dogs, Rawlins OHV SRMA) would be managed for multiple uses similar to the remainder of the RMPPA and would be subject to all standard mitigation measures. These measures prohibit disturbance to wildlife during critical time periods but afford no protection to the habitat.

Vegetation Management

Vegetation treatments would be designed to provide diverse habitats for various species of wildlife. For example, in vegetative climax communities, fire would return the vegetative community to an earlier stage of succession that is beneficial to some wildlife species. However, the low amount of acres treated annually (2,500 acres) would still result in a dominance of mature-decadent habitats available to wildlife.

Conifer encroachment into shrublands, aspen, and riparian habitat would be controlled to maintain a mixture of plant communities and vegetative structure to support a diversity of wildlife.

Noxious and invasive weeds are expanding and would need to be controlled to prevent their spread into native plant communities. Spread of noxious and invasive weeds would impact wildlife through loss of habitat, reduction in habitat diversity and forage, and increased foraging by wildlife into other areas that might have lesser-value habitat. Approximately 2,800 acres would be treated annually to control noxious and invasive weeds. This would not be sufficient to control the spread of noxious and invasive weeds into all wildlife habitats, but would reduce these impacts in treated areas.

Visual Resource Management

Impacts from visual resource management on wildlife and fish species and associated habitat would be negligible.

Water Quality, Watershed, and Soils Management

Discharge of waters produced from CBNG development within the Colorado River and Platte River Basins would have variable effects on populations of aquatic species. Within the Colorado River Basin, discharge of produced waters would alter receiving waters within the Muddy Creek watershed that contain populations of four species listed as sensitive by BLM Wyoming: Colorado River cutthroat trout, flannelmouth sucker, bluehead sucker, and roundtail chub. With the exception of the Colorado River cutthroat trout, these species have adapted to the highly variable environmental conditions typical of the Colorado River Basin. This highly variable environment is typified by dramatic annual fluctuations in streamflow (floods) and turbidity (sediment transport). These conditions are thought to favor these native fishes over introduced competitors. Discharge of produced waters would act to moderate annual fluctuations in streamflow and decrease turbidity, thereby decreasing the variability of these systems.

Additional impacts associated with the discharge of waters produced from CBNG development in the Colorado River and Platte River Basins would include changes to stream channel geometry (i.e., channel incision) resulting from increased streamflow. These changes to channel geometry would in some cases result in simplified channel geometry lacking the diversity of instream habitat features required to meet the habitat requirements of fishes.

Avoidance of surface disturbing and other disruptive activities within 100-year flood plains, 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and 100 feet from the inner gorge of ephemeral channels would act to preserve habitats for various fish and wildlife species occurring in or downstream of these areas.

Water depletions within the Muddy Creek watershed would result in a reduction of instream habitat available to species listed as sensitive by BLM Wyoming. The magnitude of this impact would be dependent on the volume of water depleted and the location of the depletion within the watershed in relation to the distribution of sensitive fishes.

Wild Horse Management

Ensuring that proper herd objectives are maintained would help reduce the competition between wild horses and wildlife species and improve the suitability of riparian and wetland habitats for various fish and wildlife species.

Wildlife and Fish Management

Mitigation measures during critical time periods reduces disturbance to breeding, nesting, and wintering raptors. Intensive management actions within RCAs would reduce physical disturbance of raptor habitat and disturbance of the birds. The seasonal restrictions for active raptor nests from February 1 through July 31 would reduce impacts to most nesting raptors. Raptor nesting restrictions would be applied within a buffer of three-quarters of a mile to 1 mile, depending on the species affected. Surface disturbing and other disruptive activities would not be authorized within 825 feet of active raptor nests, and within 1,200 feet of active ferruginous hawk nests, which would reduce disturbance to most nesting raptors, increasing nesting success. These restrictions do not reflect species-specific requirements and do not adequately protect nesting goshawks and burrowing owls.

Seasonal restrictions within bald eagle winter habitats between November 15 and April 30 would reduce disturbance to this species during this critical time period. Surface disturbing and other disruptive activities are not prohibited within 2 miles of a communal roost from February 1 to July 15, potentially increasing disturbance to bald eagles and loss of roost trees.

Development that is located within one-quarter mile of an active Greater sage-grouse lek has the potential to displace strutting males and interfere with the social dynamics of the breeding birds. In addition, elevated artificial noise levels audible at the lek, such as from compressor stations and well drilling, would interfere with females locating the leks. This would reduce the reproductive success of the Greater sage-grouse using these leks. Locating facilities and maintenance activities away from the lek, as well as the use of mufflers on compressor stations, decreases this impact. Surface disturbing and other disruptive activities would be allowed within one-quarter mile of Columbian sharp-tailed and Greater sage-grouse leks in the least disruptive location from the lek on a case-by-case basis. In addition, surface disturbing and other disruptive activities within 2 miles of Greater sage-grouse leks and 1 mile of Columbian sharp-tailed leks would not be allowed between March 1 and June 30. No surface disturbing and other disruptive activities would be allowed within grouse winter concentration areas from November 15 to April 30. These restrictions would reduce potential impacts to both breeding and nesting grouse and their habitat.

Although rare, development activities would not be allowed within identified big game parturition areas between May 1 and June 30, which would eliminate disturbance of these species during this period.

Surface disturbing and other disruptive activities associated with development are potentially disruptive to wintering big game species would not be allowed between November 15 and April 30. This would reduce the stress to big game during these critical times. Crucial winter range would be protected from surface disturbing and other disruptive activities during critical time periods; however, loss or alteration of this habitat outside these periods would not be restricted. This prohibits disturbance to the big game during critical time periods but affords no protection to the habitat. On occasion, exceptions are granted based on a site-specific analysis, to allow for activities in these areas that would not impact big game species.

Proposals for conducting yearlong surface disturbing and other disruptive activities in seasonally sensitive habitats would not be considered. This would benefit various wildlife species by protecting them from disturbances during critical periods of their annual cycle. During these critical time periods, wildlife depend on the ability to use limited habitats to fulfill their life history requirements.

Modification of fences that have been identified as impacting the migrations of big game to BLM standards would help minimize the rate of injury and entanglement of these species. Although any new fences constructed within these corridors would be designed to BLM standards, they would still restrict movement of these species.

The management of wetland/riparian areas to improve their PFC rating would improve habitat conditions for various fish and wildlife species. Because the PFC assessment methodology does not incorporate the habitat requirements of fish and wildlife, additional management would be necessary to ensure that habitats provide conditions suitable to meet the life history requirements of various fish and wildlife species.

The use of BMPs for neotropical migratory birds, other migratory birds, and waterfowl and their habitats to mitigate the impacts of surface disturbing and other disruptive activities would help to maintain habitats suitable to meet the life history and habitat requirements of these species (Appendix 26).

Avoiding surface disturbing and other disruptive activities in identified 100-year flood plains, areas within 500 feet of perennial waters, springs, wells, and wetlands and areas 100 feet from the inner gorge of ephemeral drainages would help to maintain the functionality of aquatic ecosystems for various fish and amphibian species.

Under this alternative, road crossings would be designed to BLM standards, which do not consider the movement of aquatic species or the hydrologic connectivity of stream systems. The crossing of riparian areas by roads can act to fragment populations of aquatic species by limiting movement among required habitats. Habitat fragmentation has been shown to interfere with the metapopulation dynamics of many fish populations. When extirpations occur because of localized environmental variation, restrictions of fish passage eliminate the possibility of the area being recolonized from a neighboring population.

Attempts to minimize the impacts of impoundments and instream structures on fish populations would cause occasional adverse impacts to special status or desirable fish populations as a result of habitat alteration, habitat fragmentation, and spread of exotic fishes.

Summary

Under Alternative 1, there would be significant impacts from vegetation and weed treatments, which would benefit species, but low levels allow proliferation of noxious and invasive weeds, which would allow habitats to be dominated by late-successional plants. In addition, minerals development would continue to impact wildlife and fish through loss, alteration, and fragmentation of habitats and displacement of wildlife. The increased number of roads and pipelines anticipated would lead to increasing habitat loss and fragmentation. In addition, surface disposal of waters from oil and gas activities would alter local hydrologic processes and fish habitats.

Moderate impacts would result from livestock management, minerals development, OHV activities, wild horse use, and vegetation management in riparian and wetlands areas to meet PFC objectives, road crossings, impoundments, and in-stream structures.

Although the degree of impacts might vary from significant to moderate, impacts would result in habitat alteration, fragmentation, and disturbance to wildlife from their daily activities (i.e., feeding, breeding, and sheltering).

4.19.2 Impacts Under Alternative 2: Emphasis on Development of Resources

Fire and Fuels Management

Impacts to wildlife and fish habitats from fire and fuels management would be similar to Alternative 1, except that suppression activities would emphasize suppression of all wildland fires regardless of ignition source. This would lead to positive and negative impacts to wildlife species. At the local level, fire suppression would benefit species that depend on that site-specific area. However, in general, wildland fire is a natural component of the ecosystem and provides for a diversity of habitat that different species depend on. Suppression activities decrease the opportunity for wildland fire to maintain its natural role in the ecosystem.

Forest Resource Management

Impacts would be similar to Alternative 1, except that the allowable MMBF removed by timber harvest would double, which would lead to increased wildlife habitat associated with early seral plant

communities and decreased wildlife habitat associated with late seral plant communities. This level would have a moderate effect on wildlife resources in forest and woodland environments. The maximum clear-cut size would increase from 10 to 100 acres and select-cut size would increase from 20 to 200 acres. This would open larger spaces in the forest, which would impact some wildlife species. In addition, timing restrictions for big game species, including crucial winter range and parturition areas, and grouse species, including breeding, nesting, and wintering areas, would be removed, which would allow activities that would potentially disrupt these species during critical time periods. The lack of NSO around raptor nests and grouse leks would negatively impact these species if timber harvest activities occurred during critical time periods. There would be an increase in multiseral stages, aspen, and associated understory, which would provide better habitat for prey base species. Raptor timing restrictions within one-half mile of nests have been modified to reflect the needs of individual species; therefore, timber harvest activities would not disturb nesting raptors.

The increase in cut size would increase open areas in the forest benefiting elk, bighorn sheep, and deer by providing forage and increasing edge-effect. In addition, these cuts would improve big game movement through timber by decreasing timber and downed logs and increasing visual security.

Impacts under this alternative would be similar to impacts under Alternative 1, except that increased harvest rates would lead to a greater magnitude of impacts to fish habitats found in forest ecosystems. This would negatively affect the suitability of habitats for coldwater fishes such as trout and would reduce the availability of recreational angling opportunities.

Lands and Realty Management

Types and acreage of disturbance would be the same as under Alternative 1, except some activities would be restricted to designated ROW corridors, which would reduce new loss or alteration of habitat, and displacement or mortality of wildlife.

Livestock Grazing Management

Roughly 1,140 acres would be used for livestock and range improvements under Alternative 2. Under this alternative, additional impacts resulting from an emphasis on livestock production would occur. Examples of impacts on fish and wildlife include increased impacts from water developments, pasture fencing, and direct competition for forage and space. This alternative would impede progress toward meeting objectives for fish and wildlife habitats.

Minerals Management

Impacts would be similar to Alternative 1, except that there would be no timing and spacing restrictions to surface disturbing and other disruptive activities located in crucial winter range, parturition habitat, and Greater sage-grouse/Columbian sharp-tailed grouse breeding, nesting and wintering habitat. Development activities in these habitats would result in loss or alteration of Critical habitats and increase stress, displace species, and lower reproductive success of wildlife. Development activities within migration/transition ranges would be considered before authorization to prevent the loss of and/or to reduce stress to big game species. In addition, there would be no NSO restrictions around raptor nests and the distance restrictions for timing stipulations for raptor nesting decreases to one-half mile from three-quarters to 1 mile, increasing the potential to disturb nesting raptors leading to possible nest abandonment. Therefore, impacts from minerals management that would occur on wildlife and fish species and associated habitat would be significant and would include habitat loss, degradation, fragmentation, and species displacement from oil and gas development.

A combination of 1,382,470 acres of federal oil and gas leasable lands open to leasing consideration and subject to standard lease stipulations and 2,880,710 acres of federal oil and gas leasable lands open to leasing consideration and subject to lease stipulations, such as seasonal restrictions would cause some impacts to wildlife species. Species displacement can be short term and long term. These activities primarily affect big sagebrush, short grass, saltbush steppe, and greasewood habitat types, which are all common in the RMPPA. Big game, raptors, grouse, mountain plover, prairie dogs, and other sagebrush-obligate species are the principal wildlife species affected.

A combination of 258,110 acres of federal oil and gas leasable lands open to leasing consideration and subject to lease stipulations such as NSO and 66,610 acres of federal oil and gas leasable lands closed to leasing should benefit wildlife species. NSOs would protect species that are dependent on specific habitat types. In addition, about 8,390 acres would be closed to locatable mineral entry under proposed withdrawals, which would benefit wildlife species in these areas.

Surface discharge of produced water that meets state standards for water quality would be allowed in the Colorado River Basin. Individual projects would be considered on a site-specific basis. Surface discharge of produced water that meets state standards and beneficial use for water quality would be allowed in the North Platte River Basin and Great Divide Basin.

Locatable and common variety mineral extraction activities are on a relatively small scale as compared with leasable mineral development and as such, impacts would be minimal to wildlife species.

Off-Highway Vehicle Management

Impacts from OHV management under this alternative would be the same as under Alternative 1.

Special Management Areas

Under this alternative, existing NNLs, and two of the SRMAs remain designated, whereas the High Savery Dam (530 acres), and the Chain Lakes management area (30,470 acres) would be managed under the current MOU, therefore, impacts are the same as Alternative 1. Without the special management designations, the previously designated ACECs with special wildlife values would need additional emphasis of cooperative management to maintain or enhance the values for wildlife. In areas of mixed land ownership patterns, wildlife habitat management objectives might not be compatible among all affected interests. All other impacts to wildlife would be the same as the remainder of the RMPPA.

Transportation and Access Management

Under Alternative 2, easements would be pursued for transportation and access around WSAs, some SMAs, and HMAs, which would increase human use in these areas and would increase displacement of wildlife.

Vegetation Management

There would be an increase in vegetation acres treated (about 24,400 acres annually). The size of the treatments would be larger, and landscape-scale, compared with Alternative 1. This would result in a mixture of early, mid- and late-seral condition classes of vegetation. This would benefit those species requiring larger expanses of early succession habitat, while still providing other seral classes communities to support all wildlife. The rejuvenation of older, decadent shrub communities increases plant vigor, species composition, and age class structure that benefit species such as mule deer and Greater sage-grouse. Conversely, the loss of late succession vegetative communities would result in a reduction of habitats available to species requiring expansive tracts of contiguous late-successional habitat such as the

sage thrasher and sage sparrow. Other species requiring more edge effect and smaller mosaics of vegetation diversity would be negatively impacted. Management of aspen to promote early seral conditions would benefit wildlife species that utilize the herbaceous component and young aspen trees. Conversely, wildlife, which uses older and larger trees, such as cavity nesting species, would be negatively impacted through the removal of these trees.

Noxious and invasive weeds would expand and would need to be controlled to prevent their spread into native plant communities. Spread of noxious and invasive weeds would impact wildlife through loss of habitat, reduction in habitat diversity and forage, and increased foraging by wildlife into other areas that might have lesser-value habitat. Roughly 25,646 acres would be treated annually to control noxious and invasive weeds, which would maintain and improve wildlife habitat.

Visual Resource Management

Impacts under this alternative would be the same as those described under Alternative 1.

Water Quality, Watershed, and Soils Management

Impacts under this alternative would be the same as those described under Alternative 1.

Wild Horse Management

Impacts under this alternative would be the same as those described under Alternative 1.

Wildlife and Fish Management

There would be no timing and spacing restrictions to surface disturbing and other disruptive activities located in crucial winter range, parturition habitat, and Greater sage-grouse/Columbian sharp-tailed grouse breeding, nesting, and wintering habitat. Development activities in these habitats would result in loss or alteration of Critical habitats and increased stress, displacement of species, and lower reproductive success of wildlife. In addition, there would be no NSO restrictions around raptor nests and the distance restrictions for raptor nesting decreases to one-half mile from three-quarters to 1 mile, increasing the potential to disturb nesting raptors. Timing stipulations would vary for species-specific needs, and provide protection during sensitive life cycles. The decrease in distance restrictions would lead to nest abandonment and lower fledgling reproduction. The seasonal restrictions for active raptor nests would change from February 1 through July 31 to February 1 through September 15. However, species-specific timing restrictions would also be altered to better reflect the individual species' requirements, which would increase protection for burrowing owls and goshawks during critical periods. Winter disturbance in Greater sage-grouse/Columbian sharp-tail grouse winter concentration areas would be authorized, potentially increasing stress to these species during winter.

Avoiding surface disturbing and other disruptive activities in identified 100-year flood plains, areas within 500 feet of perennial waters, springs, wells, and wetlands and areas 100 feet from the inner gorge of ephemeral drainages would help to maintain the functionality of aquatic ecosystems for various fish and amphibian species.

Under this alternative, road crossings would be designed to BLM standards, which do not consider the movement of aquatic species or the hydrologic connectivity of stream systems. The crossing of riparian areas by roads can act to fragment populations of aquatic species by limiting movement among required habitats. Habitat fragmentation has been shown to interfere with the metapopulation dynamics of many fish populations. When extirpations occur because of localized environmental variation, restrictions of fish passage eliminate the possibility of the area being recolonized from a neighboring population.

Attempts to minimize the impacts of impoundments and instream structures on fish populations would cause occasional adverse impacts to special status or desirable fish populations as a result of habitat alteration, habitat fragmentation, and spread of exotic fishes.

Summary

It is anticipated that a larger number of acres of land would be disturbed under Alternative 2. Significant impacts would result from surface disposal of waters from oil and gas activities and mineral development.

Moderate impacts would result from livestock management, vegetation, fuels and weed treatments, OHV activities, wild horse use, and habitat alteration and fragmentation from road crossings, impoundments, and instream structures.

4.19.3 Impacts Under Alternative 3: Emphasis on Protection of Resources

Fire and Fuels Management

Impacts to wildlife and fish habitats from fire and fuels management would be negligible. Wildland fire suppression activities and fuel reduction (WUI) projects would be conducted according to the appropriate fire management requirements with an emphasis on the use of wildland fire for resource benefit for all natural ignitions. Approximately 10,600 acres would be burned annually from wildland fire as a result of decreased suppression activities, which would increase the influence of wildfire in natural ecological processes. This would benefit a diversity of wildlife habitats by improving habitat diversity.

Forest Resource Management

Management designed to promote forest health under this alternative would utilize a multitude of management tools with an emphasis on natural processes. Approximately 28,210 acres would be disturbed from treatment and woodland product harvest. This management approach would result in forest conditions most similar to natural conditions in which wildlife and fish populations have evolved.

Lands and Realty Management

Types and acreage of disturbance from lands and realty management to wildlife habitat management would be the same as Alternative 1, except additional Critical habitat would be protected. Also, construction activities restricted to designated ROW corridors would reduce displacement or mortality of wildlife and loss or alteration of habitat. The elimination of land disposal under this alternative would have either positive or negative effects on wildlife and fish habitats. The exchange of isolated tracts for lands located in areas of blocked BLM ownership might increase the effectiveness of wildlife and fish habitat management efforts in these areas. However, maintaining valued wildlife and fish habitats located in isolated tracts in public ownership might contribute to the ability to provide suitable habitats for species of management concern. Closure of areas of important resource values to new facility placement and routes and collocation of communications would help to avoid conflicts with sensitive wildlife and fish habitats resulting from these actions.

Livestock Grazing Management

Under Alternative 3, about 420 acres would be disturbed during the 20-year planning period. Livestock grazing management would emphasize achieving DPC objectives, which would incorporate consideration of wildlife and fish habitat requirements; thus increasing the suitability of the habitat for use by wildlife

and fish. There would be an emphasis on fence modifications to BLM standards and small-scale water developments. The fence modifications would reduce stress to wildlife during movement and migrations. Small-scale water developments would be designed to benefit wildlife, as well as livestock. There would be no new water developments constructed in crucial winter range. This would reduce forage competition between big game and livestock where diet overlap occurs in these areas. Limiting livestock management options in big game crucial winter range would possibly lead to increased herbaceous dominance and decreased shrub cover reducing the value of the habitat.

The establishment of vacant allotments would increase the flexibility afforded to livestock grazing systems and would allow for sensitive fish and wildlife habitats in other areas to receive rest if needed to accomplish habitat objectives as identified by BLM.

Modification of all existing fences to BLM standards would reduce injury, entanglement, and entrapment of big game. Herding of domestic sheep in areas where BLM standard fence is inadequate to control use would result in more dispersed use of vegetative resources. This would reduce impacts on wildlife and fish habitats associated with localized sheep grazing.

Minerals Management

Under Alternative 3 surface disturbing and disruptive activities would be intensively managed to provide maximum protection for wildlife and fish habitat and sensitive life cycles. Leases would be issued with stipulations to protect wildlife and fish species sensitive life cycles and their associated habitat. Overall, surface disturbing and disruptive activities from mineral developments would be more restricted from both temporal and spatial stipulations. This would reduce disturbance to wildlife and their habitats. Leases would be issued with stipulations to protect resources and acreages. Impacts from minerals management that would occur on wildlife and fish species and associated habitat include habitat loss, degradation, fragmentation, and species displacement from oil and gas development (e.g., roads, pipelines, well pads and associated facilities) during the planning period. These impacts to wildlife and fish management from oil and gas management would be moderate based on identified protective measures.

A combination of 642,100 acres of federal oil and gas leasable lands open to leasing consideration and subject to standard lease stipulations and 2,407,810 acres of federal oil and gas leasable lands open to leasing consideration and subject to lease stipulations, such as seasonal restrictions would cause some impacts to wildlife species. Species displacement can be short term and long term. These activities primarily affect big sagebrush, short grass, saltbush steppe, and greasewood habitat types, which are all common in the RMPPA. Big game, raptors, grouse, mountain plover, prairie dogs, and other sagebrush-obligate species are the principal wildlife species affected. Protection measures on additional acreage would reduce impacts to wildlife species.

A combination of 1,417,630 acres of federal oil and gas leasable lands open to leasing consideration and subject to lease stipulations such as NSO and 120,360 acres of federal oil and gas leasable lands closed to leasing should benefit wildlife species. NSOs would protect species that are dependent on specific habitat types. In addition, about 272,350 acres would be closed to locatable mineral entry under proposed withdrawals, which would benefit wildlife species in these areas. Management actions to minimize disturbances to wildlife during sensitive time periods can be found in Table 2-10 (Seasonal Wildlife Stipulations for all Surface Disturbing Activities).

Off-Highway Vehicle Management

Impacts under this alternative would be the same as under Alternative 1, except that OHV use to retrieve big game kills and to access campsites would be limited to roads and vehicle routes, except where roads and vehicle routes are closed. Further reduction of designated road densities would decrease disturbance to wildlife and their habitat.

Recreation Resource Management

The Adobe Town fringe (31,510 acres) and West Ferris Mountain (5,270 acres) were found to have wilderness qualities. The restriction of permitted uses in the west Ferris Mountains and the Adobe Town fringe would protect habitat conditions for fish and wildlife in these areas from surface disturbances.

Special Management Areas

All WSAs would be closed to motorized vehicle traffic, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use.

Intensive management of surface disturbing and other disruptive activities within the Como Bluff NNL (1,690 acres) would have minimal impacts to wildlife and fish habitats. Impacts would be addressed on a case-by-case basis and appropriate mitigation actions would be taken. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Land tenure adjustments to block-up public lands would be beneficial to wildlife habitat protection. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use.

Intensive management of surface disturbing and disruptive activities within Como Bluff NNL associated with existing oil and gas leases would reduce impacts to wildlife habitats and could be mitigated on a case-by-case basis. Once existing leases expire, there would be no new disturbance to wildlife or their habitat, except from reclamation. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitat from vehicle use.

The existing Sand Hills ACEC (7,960 acres) boundaries would be expanded to include the JO Ranch acquisition (total 12,700 acres). Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use. Seasonal closure of the Sand Hills ACEC and JO Ranch Expansion area to motorized vehicles, limiting access to designated roads and vehicle routes, and closing the area to over-the-snow vehicles use would significantly benefit big game and other wildlife species by reducing the amount of human-wildlife conflicts that could occur. This would provide big game with a secure environment from disturbance, especially during winter. No new fences would be allowed and existing fences would be modified to meet BLM standards, which would improve big game movements and migrations through the area. Livestock grazing in the ACEC would emphasize enhancing the unique vegetation community and its value as crucial winter range for wildlife species. AMR for wildland fire would emphasize suppression, as well as the use of fuel breaks along existing roads and vehicle routes to minimize the size and impact of wildland fire on the unique vegetation community and crucial winter range. Surface disturbing and other disruptive activities would be prohibited (subject to valid existing rights) that would further protect the values for which this ACEC was designated.

Maintaining the integrity of the Jep Canyon Wildlife Habitat Management Area (13,810 acres) to protect crucial winter habitat for elk and nesting raptor pairs would have beneficial impacts for wildlife and their habitats. Intensive management of surface disturbing and other disruptive activities associated with existing oil and gas leases would reduce impacts to wildlife habitats and could be mitigated on a case-by-case basis. The area would be closed to new oil and gas leasing. Once existing leases expire, there would be no new disturbance to wildlife or their habitat, except from reclamation. Limiting access to designated roads and vehicle routes and closing the area to over-the-snow vehicles use would significantly benefit big game and other wildlife species by reducing the amount of human-wildlife conflicts that could occur. This would provide big game with a secure environment from disturbance, especially during winter. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Land tenure adjustments to block-up public lands would be beneficial to wildlife habitat protection. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use.

Maintaining the integrity of the Shamrock Hills Wildlife Habitat Management Area (18,400 acres) to protect nesting raptors and short-grass/big sagebrush obligate species would have beneficial impacts for these wildlife and their habitats. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use.

In the Stratton Sagebrush Steppe Research ACEC (5,530 acres), intensive management of surface disturbing and other disruptive activities associated with existing oil and gas leases would reduce impacts to wildlife habitats and could be mitigated on a case-by-case basis. The area would be closed to new oil and gas leasing. Once existing leases expire, there would be no new disturbance to wildlife or their habitat, except from reclamation. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use.

Management of the Chain Lakes Wildlife Habitat Management ACEC (30,470 acres) would provide benefits to wildlife, waterfowl, and shorebirds. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions, would reduce impacts to wildlife and their habitats, including the unique, alkaline desert wetlands, and could be mitigated on a case-by-case basis. The area would be closed to new oil and gas leasing. Once existing leases expire, there would be no new disturbance to wildlife or their habitat, except from reclamation. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Land tenure adjustments to block-up public lands would be beneficial to wildlife habitat protection. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use. The Chain Lakes Wildlife Habitat Management ACEC would be managed as a vacant allotment. This would allow grazing to be used when necessary to meet the upland and wetland/riparian objectives and wildlife life history requirements.

Management of the Laramie Peak Wildlife Habitat Management ACEC (18,940 acres) would provide benefits to wildlife by allowing protection of crucial winter range habitats for mule deer, elk, and big horn sheep. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing would reduce impacts to wildlife habitats and could be mitigated on a case-by-case basis. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Land tenure adjustments to block-up public lands would be beneficial to wildlife habitat protection. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use.

Plans of operation for locatable (except casual use) and material minerals, regardless of acreage, would address wildlife habitat disturbances and mitigation activities on a case-by-case basis.

Management of the Red Rim-Daley ACEC (15,980 acres) would provide benefits to wildlife by allowing protection of crucial winter range habitat for pronghorn, as well as seasonal habitat for Greater sage-grouse, mule deer, and other wildlife. Plans of operation, regardless of acreage, for locatable (except casual use) would address wildlife habitat impacts and mitigation activities on a case-by-case basis, which would reduce impacts to wildlife. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Land tenure adjustments to block-up public lands would be beneficial to wildlife habitat protection.

Management of the Shirley Mountain Bat Cave as an ACEC (520 acres) would provide protection to the hibernaculum for the several bat species found within the cave system. Timber harvesting would not be allowed within one-half mile of the bat cave complex, which would allow the riparian area to remain undisturbed, protecting habitat values important to bat species. Withdrawals of these lands from public land tenure adjustments would ensure that they are retained in public ownership and managed to benefit wildlife habitat. Land tenure adjustments to block-up public lands would be pursued and would be beneficial to wildlife habitat protection. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions, would reduce impacts to bats and their habitats, and could be mitigated on a case-by-case basis. The area would be closed to new oil and gas leasing. Once existing leases expire, there would be no new disturbance to wildlife or their habitat, except from reclamation. Closure to locatable mineral entry and mineral material sales also would occur, which would benefit wildlife species. Seasonal closure of Cave Creek Cave to human use from November 1 to March 31 would protect the existing bat hibernaculum. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use.

Management of the Laramie Plains Lakes ACEC (1,291 acres) would provide not only for benefits to potential crucial habitat for the endangered Wyoming toad but also for protection to habitats for big game, migratory waterfowl, and shorebirds. Withdrawals of these lands from public land tenure adjustments would ensure that they are retained in public ownership and managed to benefit wildlife habitat. Land tenure adjustments to block-up public lands and easements would be actively pursued and would be beneficial to wildlife habitat protection. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions would reduce impacts to potential Wyoming toad habitat and other wildlife habitats and could be mitigated on a case-by-case basis. The area would be closed to new oil and gas leasing. Once existing leases expire, there would be no new disturbance to wildlife or their habitat, except from reclamation. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use. Livestock grazing would be managed to meet ACEC objectives, which would maintain and enhance potential Wyoming toad habitat.

Management of Historic Trails ACEC (41,000 acres) on wildlife and fish management would benefit wildlife habitat by closing areas within one-quarter mile of contributing portions of the trail to locatable mineral entry and mineral material sales. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions would reduce disturbance to wildlife and their habitats and could be mitigated on a case-by-case basis.

Management of the Blowout Penstemon ACEC (4,020 acres) would provide benefits to habitat for the endangered blowout penstemon, as well as upland and riparian habitats used by big game, Greater sage-

grouse, and other wildlife species. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions, would reduce impacts to habitat and could be mitigated on a case-by-case basis. Land tenure adjustments to block-up public lands and easements would be actively pursued and would be beneficial to wildlife habitat protection. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use. Fire management activities would be used to maintain early-seral conditions to maintain or enhance blowout penstemon habitat, which would also enhance habitat for wildlife.

Management of the Upper Muddy Creek Watershed/Grizzly ACEC (27,533 acres) would provide benefits to fish and wildlife by pursuing expansion of reintroduction efforts for native warmwater and coldwater fishes into adjacent habitats and promoting the enhancement of seasonal and crucial winter range habitats for big game in this area. Intensive management of surface disturbing and other disruptive activities associated with existing oil and gas leases, and other authorized actions, would reduce impacts to habitat and could be mitigated on a case-by-case basis. There would be an NSO on new oil and gas leases within ¼ mile of intermittent and perennial streams, which would eliminate adverse alteration of riparian habitats resulting from these activities that might alter the suitability of fish habitats. Surface disturbance would be avoided within one-quarter mile of all stream channels to minimize impacts to riparian habitats and associated fish and wildlife species. Where disturbance from linear features in these areas cannot be avoided, intensive management would be applied to minimize disturbance to fish and wildlife habitat. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Land tenure adjustments to block-up public lands and easements would be actively pursued and to increase the effectiveness of fish and wildlife habitat management efforts. Plans of operation for locatable (except casual use) and material minerals, regardless of acreage, would address wildlife habitat disturbances and mitigation activities on a case-by-case basis. Removal, reconstruction, or retrofitting instream structures that are found to interfere with the movement of native fishes would help to ensure that the upper Muddy Creek watershed functions as a series of connected habitats supporting the diversity of habitats necessary for native fishes to meet their life history and habitat requirements. Designation of the Upper Muddy Creek Watershed/Grizzly area as an ACEC would, through management prescriptions and habitat objective setting, significantly contribute to the conservation of four of the five BLM sensitive fishes found in the RMPPA. Pursuing opportunities to expand reintroduction efforts for Colorado River cutthroat trout and other native cold and warm water fishes into adjacent habitats within the Muddy Creek watershed would further act to ensure the viability of native Colorado River Basin fish populations.

Management of the White-tailed Prairie Dog ACEC would be the same as the remainder of the RMPPA, except Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Land tenure adjustments to block-up public lands and easements would be actively pursued and would be beneficial to wildlife habitat protection. Minerals development would be restricted to a maximum of four surface locations per section. Drilling of multiple well bores from a single well pad would reduce impacts to prairie dogs by reducing the number of surface locations and surface area disturbance. This reduces stress to prairie dogs and affords greater protection to the complexes from habitat loss and alteration. Surface disturbing and other disruptive activities would not be allowed within 164 feet of identified white-tailed prairie dog towns. In addition, aboveground facilities would not be allowed within one-quarter mile of prairie dog towns unless they are equipped with anti-raptor perching devices. These would minimize disturbance and potential predation to prairie dogs.

Management of the High Savery Dam and Reservoir ACEC (520 acres) would be similar to those of Alternative 1, except that this area would be closed to locatable mineral entry and mineral material sales, which would reduce disturbance to fish and wildlife and their habitat. Managing this area as a vacant

allotment would allow grazing to be used when necessary to meet the upland and wetland/riparian objectives and wildlife life history requirements. The area would be closed to land tenure adjustments, which would ensure these areas remain as public wildlife habitat.

Impacts of the Continental Divide National Scenic Trail SRMA on wildlife and fish management would be negligible.

Impacts of the North Platte River SRMA (3,550 acres, including the one-quarter mile area on either side of the river) on wildlife and fish management would be the same as those of Alternative 1, except that surface disturbing and other disruptive activities would be intensively managed within one-half mile of the river corridor, which would minimize disturbance to wildlife and their habitat.

Impacts of the Rawlins OHV SRMA (480 acres) on wildlife and fish management on wildlife and fish management would be negligible.

Impacts of NNLs on wildlife and fish management would be the same as those of Alternative 1.

Impacts of the Encampment River Proposed WSR on wildlife and fish management would be the same as those of Alternative 1.

Transportation and Access Management

Impacts from Transportation and Access Management under this alternative would be the same as under Alternative 1.

Vegetation Management

Vegetation management would emphasize achieving DPC objectives, which would incorporate consideration of wildlife and fish habitat requirements, thus increasing the suitability of the habitat for use by wildlife and fish. There would be a fivefold increase in vegetation acres treated (11,800 acres annually) under this alternative. The size of the treatments would be smaller and more numerous, with an emphasis on edge effect and mosaic pattern application. This would result in habitat alteration that would benefit the highest population of wildlife species. The proportion of early and mid-seral condition classes of vegetation would increase; however, the amount of late-seral condition classes would be higher than desired to benefit wildlife.

Noxious and invasive weeds would expand and would need to be controlled to prevent their spread into native plant communities. This would benefit wildlife habitat by maintaining natural species diversity, cover, structure, and nutritional value. Approximately 28,542 acres would be treated annually to control noxious and invasive weeds, to meet wildlife habitat objectives.

All other impacts would be the same as Alternative 1.

Visual Resource Management

Impacts under this alternative would be same as those described under Alternative 1.

Water Quality, Watershed, and Soils Management

Injection of waters produced from CBNG development in the Colorado River Basin would preserve natural hydrological conditions, thereby maintaining the highly variable environment in which several

sensitive fishes have evolved. The discharge of waters produced from CBNG development in the North Platte River drainage would have impacts to fish habitats similar to those described under Alternative 1.

The management of wetland/riparian areas toward their DPC would improve habitats for various fish and wildlife species dependent on these areas by incorporating habitat requirements into DPC objectives.

By restricting water development projects that would lead to depletions in the Colorado River system, natural hydrologic conditions would be preserved, which would maintain the quantity of fish habitats at their present levels.

The exclusion of surface disturbing and other disruptive activities within 100-year flood plains, 500 feet from perennial waters, springs, wells, and wetland/riparian areas, and 100 feet from the inner gorge of ephemeral channels would act to preserve habitats for various fish and wildlife species occurring in or downstream of these areas.

The protection afforded the Encampment River Watershed would act to preserve habitats for various fish and wildlife species that use this area.

Wild Horse Management

Impacts under this alternative would be the same as under Alternative 1, except there would be an increase in AML of 95 horses in the Lost Creek HMA. This would increase competition with wildlife for water, forage, and habitat requirements in this area. Increase in wild horse populations would further exasperate riparian/wetland habitat degradation, thereby reducing the suitability of these habitats for wildlife and fish species.

Wildlife and Fish Management

The elimination of animal damage control by APHIS on public lands would have localized impacts on predator/prey relationships from a reduction in the removal of targeted species (e.g., mountain lions, coyotes, prairie dogs) and benefit populations of targeted predators and prey species.

The disturbance zone for active raptor nests would be increased to 1.5 miles from three-quarters to 1 mile. This would incrementally decrease disturbance to nesting raptors. There would be an NSO within one-quarter mile of active raptor nests. Species-specific timing restrictions would be altered to better reflect the individual species' requirements that would increase protection for burrowing owls and goshawks during critical periods. An NSO would be applied within one-half mile of bald eagle communal roost sites. There would be a timing restriction on surface disturbing and other disruptive activities in bald eagles communal winter roost sites between November 1 and April 1. There would also be a timing restriction on surface disturbing and other disruptive activities in bald eagles communal roost sites between February 1st and July 15th. No disturbance would be allowed within raptor concentration areas on new leases; thus, no impacts would occur to the raptors from mineral development actions on new leases. Existing leases within RCAs would be intensively managed to minimize disturbance to raptors from minerals development. These restrictions would reduce disturbance to raptors.

There would be NSO for surface disturbing and other disruptive activities within one-quarter mile from the perimeter of Columbian sharp-tailed and Greater sage-grouse leks. Human activity would be avoided with one-quarter mile of this perimeter between 6:00 p.m. to 9:00 a.m. from March 1 to May 20. In addition, surface disturbing activities within 2 mile of Greater sage-grouse leks and 1 mile of Columbian sharp-tailed grouse leks would not be allowed between March 1 and July 15. Within the Rawlins to Baggs geographic area, the buffers around leks are expanded to 4 miles for Greater sage-grouse and 2

miles for Columbian sharp-tailed grouse. Once nesting habitat is identified in the RMPPA, the distances (buffers) would be revised to reflect actual nesting habitat boundaries, and those areas would all be protected. These restrictions would better reflect breeding and nesting periods, which would reduce potential disturbance and habitat loss, and increase reproductive success of grouse. No surface disturbing and other disruptive activities would be allowed within grouse winter concentration areas from November 15 to March 14. There would be no high profile structures within 1 mile of active grouse leks or one-quarter mile of white-tailed prairie dog towns. There would be an NSO of 164 feet from the perimeter of prairie dog towns. These restrictions would reduce habitat alteration, predation, and disturbance to grouse and prairie dogs.

There would be an NSO for identified big game parturition areas and T&E habitat that would protect these areas from disturbance. Development activities within migration/transition ranges would be managed on a case-by-case basis before authorization to prevent the loss of and/or reduce stress to big game species.

Surface disturbing and other disruptive activities associated with development are potentially disruptive to wintering big game species would not be allowed between November 15 and April 30. This would reduce the stress to big game during these critical times. Crucial winter range would be protected from surface disturbing and other disruptive activities during critical time periods; however, loss or alteration of this habitat outside these periods would not be restricted. This prohibits disturbance to the big game during critical time periods but affords no protection to the habitat. On occasion, exceptions are granted based on a site-specific analysis, to allow for activities in these areas that would not impact big game species.

Proposals for conducting yearlong surface disturbing and other disruptive activities in seasonally sensitive habitats would not be considered. This would benefit various wildlife species by protecting them from disturbances during critical periods of their annual cycle. During these critical time periods, wildlife depends on the ability to use limited habitats to fulfill their life history requirements.

All fences would be modified to meet BLM standard and more guzzlers/water developments would be constructed. This would allow for easier migration of big game and more reliable water sources in wildlife habitat areas, and reduce injury or entanglement of big game.

The management of wetland/riparian areas to achieve their DPC rating would improve habitat conditions for various fish and wildlife species. Establishment of DPC for wetland/riparian areas would consider the set of habitat conditions necessary to support desired fish and wildlife species.

The use of BMPs for neotropical migratory birds, other migratory birds, and waterfowl and their habitats to mitigate the adverse effects of surface disturbing and other disruptive activities would help to maintain habitats suitable to meet the life history and habitat requirements of these species (Appendix 26).

Exclusion of surface disturbing and other disruptive activities from identified 100-year flood plains, areas within 500 feet of perennial waters, springs, wells, and wetlands and areas 100 feet from the inner gorge of ephemeral drainages would maintain the functionality of aquatic ecosystems for various fish and amphibian species.

Under this alternative, road crossings would be designed to simulate natural stream processes (Appendix 26) and would be designed to allow for the unimpeded movement of aquatic species and hydrologic connectivity of stream systems.

Under this alternative, impacts associated with habitat alteration, habitat fragmentation, and spread of exotic fishes resulting from the construction of impoundments on streams known to support populations of native fishes would not occur.

Summary

Under Alternative 3, the greatest amount of protection for wildlife and fish species, associated habitats, and sensitive life cycles.

Moderate impacts would result from vegetation management in riparian wetland areas to meet DPC, livestock management, minerals management, OHV activities, and wild horse use. Fire and fuels management would displace wildlife but would provide natural disturbance regimes to maintain diversity.

4.19.4 Impacts Under Alternative 4: Preferred Alternative

Fire and Fuels Management

Under Alternative 4, there would be about 212,000 acres of disturbance from fire and fuels management. In addition, there would be a greater emphasis on the use of wildland fire for resource benefit. The use of wildland fire for resource benefit would provide benefits to wildlife habitats by increasing the influence of fire in natural ecological processes.

Forest Resource Management

A reduction in timber harvest activities on 6,700 acres of riparian areas and steep slopes would reduce disturbance to fish and wildlife from these activities. All other activities would have the same impacts as Alternative 1.

Lands and Realty Management

Types and acreage of disturbance from lands and realty management to wildlife habitat management would be the same as Alternative 1, except Critical habitat for grouse leks would be protected. In addition, construction activities restricted to designated ROW corridors and additional intensive management practices would reduce displacement or mortality of wildlife and loss or alteration of habitat.

Livestock Grazing Management

Under Alternative 4, about 920 acres would be disturbed during the 20-year planning period. Wildlife habitat objectives would be considered for all surface disturbing and disruptive activities. Priority would be given to meeting Standards for Healthy Rangelands (BLM 1997) and to meeting desired plant community. Livestock grazing management and Standards of Healthy Rangelands (BLM 1997) would emphasize achieving DPC objectives, improving range conditions, and achieving rangeland standards. These actions would incorporate consideration of wildlife and fish habitat requirements, thus increasing the suitability of the habitat for use by wildlife and fish.

The establishment of vacant allotments would increase the flexibility afforded to livestock grazing systems and would allow for sensitive fish and wildlife habitats in other areas to receive rest if needed to accomplish habitat objectives as identified by BLM.

Herding of domestic sheep in areas where BLM standard fence is inadequate to control use would result in more dispersed use of vegetative resources. This would reduce impacts on wildlife and fish habitats associated with localized sheep grazing.

Minerals Management

Impacts under this alternative are similar to those described under Alternative 1, except that the acreages available for oil and gas development activities are different. Surface disturbing activities would be intensively managed. Leases would be issued with stipulations to protect wildlife and fish species sensitive life cycles and their associated habitat.

A combination of 853,690 acres of federal oil and gas leasable lands open to leasing consideration and subject to standard lease stipulations and 3,279,670 acres of federal oil and gas leasable lands open to leasing consideration and subject to lease stipulations, such as seasonal restrictions, would cause some impacts to wildlife species. Species displacement can be short term and long term. These activities primarily affect big sagebrush, short grass, saltbush steppe, and greasewood habitat types, which are all common in the RMPPA. Big game, raptors, grouse, mountain plover, prairie dogs, and other sagebrush-obligate species are the principal wildlife species affected.

A combination of 377,590 acres of federal oil and gas leasable lands open to leasing consideration and subject to lease stipulations such as NSO and 76,950 acres of federal oil and gas leasable lands closed to leasing should benefit wildlife species. NSOs would protect species that are dependent on specific habitat types. In addition, approximately 28,724 acres would be closed to locatable mineral entry under proposed withdrawals, which would benefit wildlife species in these areas.

Off-Highway Vehicle Management

Impacts to wildlife species associated habitat from OHV management would be the same as Alternative 3.

Special Management Areas

All WSAs would be closed to motorized vehicle traffic (except Adobe Town [34,220 acres] would be restricted to designated roads and vehicle routes), which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use.

Intensive management of surface disturbing and other disruptive activities within the Como Bluff NNL (1,690 acres) would have minimal impacts to wildlife and fish habitats. Impacts would be addressed on a case-by-case basis and appropriate mitigation actions would be taken. However, opening the area to mineral material sales could have an impact on wildlife habitat, although it would be minor and would be mitigated. Land tenure adjustments to block-up public lands would be beneficial to wildlife habitat protection.

Seasonal closure of the Sand Hills ACEC and JO Ranch Expansion area (12,700 acres total) to motorized vehicles, limiting access to designated roads and vehicle routes, and closing the area to over-the-snow vehicles use would significantly benefit big game and other wildlife species by reducing the amount of human-wildlife conflicts that could occur. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing would reduce impacts to wildlife habitats and could be mitigated on a case-by-case basis. This would provide big game with a secure environment from disturbance, especially during winter.

Livestock grazing in the Sand Hills/JO Ranch ACEC would emphasize enhancing the unique vegetation community and its value as crucial winter range for wildlife species. AMR for wildland fire would emphasize suppression, as well as the use of fuel breaks along existing roads and vehicle routes, to minimize the size and impact of wildland fire on the unique vegetation community and crucial winter range.

Maintaining the integrity of the Jep Canyon Wildlife Habitat Management Area (13,810 acres) to protect crucial winter habitat for elk and nesting raptor pairs would have beneficial impacts for wildlife and their habitats. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing would reduce impacts to wildlife habitats and could be mitigated on a case-by-case basis. Limiting access to designated roads and vehicle routes and closing the area to over-the-snow vehicles use would significantly benefit big game and other wildlife species by reducing the amount of human-wildlife conflicts that could occur. This would provide big game with a secure environment from disturbance, especially during winter. Land tenure adjustments to block-up public lands would be beneficial to wildlife habitat protection.

Maintaining the integrity of the Shamrock Hills Wildlife Habitat Management Area (18,400 acres) to protect nesting raptors and short-grass/big sagebrush obligate species would have beneficial impacts for these wildlife and their habitats. However, the area would be opened to mineral material disposal. Surface disturbing and other disruptive activities associated with this activity would result in increased human presence, possible habitat fragmentation and harassment of wildlife.

In the Stratton Sagebrush Steppe Research ACEC (5,530 acres), intensive management of surface disturbing and other disruptive activities associated with existing oil and gas leases would reduce impacts to wildlife habitats and could be mitigated on a case-by-case basis. The area would be closed to new oil and gas leasing. Once existing leases expire, there would be no new disturbance to wildlife or their habitat, except from reclamation.

Management of the Chain Lakes Wildlife Habitat Management Area (30,470 acres) would include other compatible multiple uses and would provide benefits to wildlife, waterfowl, and shorebirds. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions would reduce impacts to wildlife and their habitats, including the unique, alkaline desert wetlands, and could be mitigated on a case-by-case basis. The Chain Lakes Wildlife Habitat Management Area would be managed as a vacant allotment. This would allow grazing to be used when necessary to meet the upland and wetland/riparian objectives and wildlife life history requirements.

Management of the Laramie Peak Wildlife Habitat Management Area (18,940 acres) would include other compatible multiple uses and would provide benefits to wildlife by promoting the protection of crucial winter range habitats for mule deer, elk, and big horn sheep. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing would reduce impacts to wildlife habitats and could be mitigated on a case-by-case basis. Land tenure adjustments to block-up public lands would be beneficial to wildlife habitat protection.

Management of the Red Rim-Daley Area (15,980 acres) would include other compatible multiple uses and would provide benefits to wildlife by promoting the protection of crucial winter range habitat for pronghorn, as well as seasonal habitat for Greater sage-grouse, mule deer, and other wildlife. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions would reduce impacts to wildlife and their habitats, and could be mitigated on a case-by-case basis.

Management of the Shirley Mountain Bat Cave as an ACEC (240 acres) would provide protection to the hibernaculum for the several bat species found within the cave system. Timber harvesting would not be allowed within one-quarter mile of the bat cave complex, which would allow the riparian area to remain undisturbed, protecting habitat values important to bat species. Closure of these lands from public land tenure adjustments would ensure that they are retained in public ownership and managed to benefit wildlife habitat. Land tenure adjustments to block-up public lands would be pursued and would be beneficial to wildlife habitat protection. In addition, closure to locatable mineral entry and mineral

material sales would occur, which would benefit wildlife species. Seasonal closure of Cave Creek Cave to human use from October 15 to April 30 would protect the existing bat hibernaculum.

Management of the Laramie Plains Lakes ACEC (1,600 acres) would include other compatible multiple uses and would provide not only for benefits to potential crucial habitat for the endangered Wyoming toad but also for protection to habitats for big game, migratory waterfowl, and shorebirds. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions would reduce impacts to potential Wyoming toad habitat and other wildlife habitats and could be mitigated on a case-by-case basis. Closure of these lands from public land tenure adjustments would ensure that they are retained in public ownership and managed to benefit wildlife habitat. Public lands would be open to mineral materials disposals with adequate consideration to not degrade potential Wyoming toad habitat. Off-road vehicle travel for "necessary tasks" would not be allowed. Although exceptions might be authorized on a case-by-case basis, these would be done following an environmental analysis; therefore, wildlife species should benefit.

Management of Historic Trails Area (contributing segments within 41,000 acres of federal land) on wildlife and fish management would benefit wildlife habitat by closing areas within one-quarter mile of contributing portions of the trail to mineral material sales, thereby reducing disturbance to wildlife and their habitat.

Management of the Blowout Penstemon ACEC (4,020 acres) would provide benefits to habitat for the endangered blowout penstemon, as well as upland and riparian habitats used by big game, Greater sage-grouse, and other wildlife species. Closure to locatable mineral entry and mineral material sales would reduce disturbance to wildlife and loss or alteration of their habitat. Intensive management of surface disturbing and other disruptive activities associated with oil and gas leasing and other authorized actions, would reduce impacts to habitat and could be mitigated on a case-by-case basis. Land tenure adjustments to block-up public lands, and easements, would be actively pursued, and would be beneficial to wildlife habitat protection. Off-road vehicle travel for "necessary tasks" would not be allowed, which would reduce disturbance and stress to wildlife and eliminate alteration of habitats from vehicle use. Fire management activities would be used to maintain early-seral conditions to maintain or enhance blowout penstemon habitat, which would also enhance habitat for wildlife.

Management of the Upper Muddy Creek Watershed/Grizzly area (70,780 acres) would include other compatible multiple uses, and would provide benefits to fish and wildlife by pursuing expansion of reintroduction efforts for native warmwater and coldwater fishes into adjacent habitats and promoting the enhancement of seasonal and crucial winter range habitats for big game in this area. Public lands would be open to mineral materials disposals with adequate consideration to not degrade BLM sensitive fishes habitat. Perennial stream channels would be avoided within 500 feet and ephemeral channels would be avoided within 100 feet for surface disturbing and other disruptive activities, which would provide protection to the fish and wildlife habitat.

Management of the White-tailed Prairie Dog areas would be the same as the remainder of the RMPPA. Current stipulations would adequately protect white-tailed prairie dogs and their habitat.

Impacts to the High Savery Dam and Reservoir area (530 acres) would be similar to those of Alternative 1, except that these areas would be closed to locatable mineral entry and mineral material sales, which would benefit wildlife species. Managing this area as a vacant allotment would be a significant benefit for wildlife habitat. Land tenure adjustments consistent with the current MOU would be considered if beneficial to wildlife habitat protection.

Impacts of the Continental Divide National Scenic Trail SRMA on wildlife and fish management would be negligible.

Impacts of the North Platte River SRMA (5,060 acres) on wildlife and fish management would be the same as those of Alternative 1.

Impacts of the Rawlins OHV SRMA (480 acres) on wildlife and fish management on wildlife and fish management would be negligible.

Impacts of the Encampment River Proposed WSR on wildlife and fish management would be the same as those of Alternative 1.

Transportation and Access Management

Under Alternative 4, easements would be pursued for transportation and access around WSAs, some SMAs, and HMAs, which would increase human use in these areas and would increase displacement of wildlife.

Vegetation Management

Vegetation management would emphasize achieving DPC objectives, which would incorporate consideration of wildlife and fish habitat requirements, thus increasing the suitability of the habitat for use by wildlife and fish. Management for DPC objectives in riparian areas would result in a mixture of herbaceous and multi-aged woody species, which would improve habitats for diversity of wildlife species. There would be an increase in vegetation acres treated (about 16,400 acres annually). The size of the treatments would be a mixture of landscape-scale and smaller, mosaic pattern applications. This would result in a mixture of seral conditions that would benefit the greatest diversity of wildlife species.

Noxious and invasive weeds would expand and need to be controlled to prevent their spread into native plant communities. This would benefit wildlife habitat by maintaining natural species diversity, cover, structure, and nutritional value. About 25,000 acres would be treated annually to control noxious and invasive weeds, to meet wildlife habitat objectives.

Visual Resource Management

Impacts under this alternative would be the same as those described under Alternative 1.

Water Quality, Watershed, and Soils Management

Impacts under this alternative would be similar to those described in Alternative 1, except that not allowing surface discharge in the Colorado River Basin would preserve natural hydrologic conditions that support the diversity of native cold and warm water fishes. Protections afforded to the Encampment River Watershed would act to preserve current fish habitat conditions.

Wild Horse Management

Impacts under this alternative would be the same as under Alternative 1, except there would be an increase in AML of 95 horses in the Lost Creek HMA. This would increase competition with wildlife for water, forage, and habitat requirements in this area. Increase in wild horse populations would further exasperate riparian/wetland habitat degradation thereby reducing the suitability of these habitats for wildlife and fish species.

Wildlife and Fish Management

Under this alternative, the seasonal restrictions for active raptor nests changes from February 1 through July 31 to February 1 through September 15. However, species-specific timing restrictions would also be altered to better reflect the individual species' requirements, which would increase protection for burrowing owls and goshawks during critical periods. Intensive management actions within RCAs would reduce physical disturbance of raptor habitat and disturbance of the birds. Raptor nesting restrictions would be applied within a buffer of three-quarters to 1 mile depending on the species affected. Surface disturbing and other disruptive activities would not be authorized within 825 feet of active raptor nests, and within 1200 feet of active ferruginous hawk nests, which would reduce disturbance to most nesting raptors, increasing nesting success.

Surface disturbing and other disruptive activities associated with development are potentially disruptive to wintering big game species would not be allowed between November 15 and April 30. This would reduce the stress to big game during these critical times. Crucial winter range would be protected from surface disturbing and other disruptive activities during critical time periods; however, loss or alteration of this habitat outside these periods would not be restricted. This prohibits disturbance to the big game during critical time periods but affords no protection to the habitat. On occasion, exceptions are granted based on a site-specific analysis, to allow for activities in these areas that would not impact big game species.

Proposals for conducting year-long surface disturbing and other disruptive activities in seasonally sensitive habitats would not be considered. This would benefit various wildlife species by protecting them from disturbances during critical periods of their annual cycle. During these critical time periods, wildlife depend on the ability to use limited habitats to fulfill their life history requirements.

Although rare, development activities would not be allowed within identified big game parturition areas between May 1 and June 30, which would eliminate disturbance of these species during this period.

Modification of fences that have been identified as impacting the migrations of big game to BLM standards would help to minimize the rate of injury and entanglement of these species. Although any new fences constructed within these corridors would be designed to BLM standards, they would still restrict movement of these species.

Surface disturbing and disruptive activities would be prohibited within one-quarter mile of occupied Greater sage-grouse leks (Map 3-13). In addition, this area would be an avoidance area for all human activity from 6:00 p.m. to 9:00 a.m. daily from March 1 to May 20. The actual area to be avoided, usually within one-quarter to one-half mile of the lek, and appropriate seasonal limitations would be determined on a case-by-case basis. Seasonal limitations on surface disturbing and other disruptive activities from March 15 to July 15 would apply up to 2 miles from Greater sage-grouse leks (nesting and early brood-rearing habitat) on a case-by-case basis (Map 3-13). Nesting and early brood-rearing habitats would be protected from habitat degradation, and measures would be taken to improve habitat quality within 2 miles from Greater sage-grouse leks on an as needed basis.

Disruptive activities would be prohibited in Greater sage-grouse winter concentration areas (Map 3-13) from November 15 to April 30.

The use of BMPs for neotropical migratory birds, other migratory birds, and waterfowl and their habitats to mitigate the adverse effects of surface disturbing and other disruptive activities would help to maintain habitats suitable to meet the life history and habitat requirements of these species (Appendix 26).

The management of wetland/riparian areas to achieve their DPC rating would improve habitat conditions for various fish and wildlife species. Establishment of DPC for wetland/riparian areas would consider the set of habitat conditions necessary to support desired fish and wildlife species.

Avoiding surface disturbing and other disruptive activities in identified 100-year flood plains, areas within 500 feet of perennial waters, springs, wells, and wetlands and areas 100 feet from the inner gorge of ephemeral drainages would help to maintain the functionality of aquatic ecosystems for various fish and amphibian species.

Under this alternative, road crossings would be designed to simulate natural stream processes (Appendix 26) and would be designed to allow for the unimpeded movement of aquatic species and hydrologic connectivity of stream systems.

Attempts to minimize the impacts of impoundments and instream structures on fish populations would cause occasional adverse impacts to special status or desirable fish populations as a result of habitat alteration, habitat fragmentation, and spread of exotic fishes.

Summary

Under Alternative 4 moderate impacts would result from livestock management, minerals management, OHV activities, wild horse use.

Increased numbers of SMAs would benefit wildlife. Vegetation management in riparian and wetland areas to meet DPC would result in long-term benefits to wildlife, especially big game. In addition, fire and fuels management would displace wildlife, but provide natural disturbance regimes to maintain diversity.

4.20 CUMULATIVE IMPACTS

Cumulative impacts are the effects on the environment that result from the impact of implementing any one of the alternatives in combination with other actions outside the scope of this plan, either within the RMPPA or outside it. The CEQ regulations for implementing NEPA defines cumulative impacts as follows:

> *"...the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or Non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."*
>
> *—40 CFR 1500-1508*

Cumulative impact analysis is required because the environmental conditions are the result of many different factors that act together. The real effect of any single action cannot be determined by considering that action in isolation but must be determined by considering the likely result of that action when acting in conjunction with many others. The cumulative impact analysis for this Draft EIS evaluates the potential impacts associated with the Rawlins RMP management alternatives, in combination with the potential impacts associated with other relevant activities that have occurred, are occurring, or whose occurrence is considered likely in the vicinity of the RMPPA. Effects of past actions and activities on resources are manifested in the current condition of the resource, which is described in Chapter 3 (Affected Environment) for resources on lands administered by BLM within the RMPPA.

4.20.1 Impact Assessment Methodology

This cumulative assessment is a programmatic, broad scale, qualitative assessment. BLM makes decisions about management of resources in a tiered process. Beginning with planning-level decisions, each subsequent level of decisions is based in part on higher-level decisions and information used in higher level decision making. Note that the planning-level decisions that BLM will make regarding the Rawlins RMPPA are programmatic decisions based on analysis that can only be conducted on a broad scale because of the nature of available information. Analysis of planning level decisions is very speculative with respect to projecting specific activities. Subsequent tiered documents would generally contain a greater level of detail and are also subject to NEPA assessment and compliance. Subsequent tiered Activity Plans are more definitive than plans found in an RMP; however, they are broader in scope than a project level decision document. Activity Plan analyses are generally more localized and less speculative than the RMP analyses. Project-level plans contain specific proposed actions, and site or area-specific analysis is conducted. For example, individual oil and gas wells or groups of wells in an established field are analyzed for localized or site-specific effects based on APDs. An APD provides the site-specific detail of industry's proposal, including the type of development that would occur under the oil and gas lease. A NEPA document presents effects analysis for the proposed well(s). A documented project decision allows the wells to be drilled and completed with site-specific mitigation.

A cumulative impact analysis is based on numerous assumptions. CEQ guidance limits cumulative impact analysis to important issues of national, regional, or local significance. Therefore, this cumulative impact assessment focuses only on actions and impacts that would potentially be significant. Criteria determining the significance of cumulative impacts are the same as presented for each resource above. Therefore, not all issues identified for direct or indirect impact assessment in this EIS are analyzed for cumulative effects. Because of the wide geographic scope of a cumulative impact assessment and the variety of activities assessed, cumulative impacts are commonly examined at a more qualitative and less detailed level than are direct and indirect impacts presented previously in this chapter.

Public documents prepared by agencies of federal, state, and local government are the primary sources of information regarding past, present, and reasonably foreseeable future actions. Actions undertaken by private persons and entities are assumed to be captured in the information made available by such agencies.

It is important to understand that many of the reasonably foreseeable development and reasonably foreseeable actions covered in the Assumptions for Analysis Section are already "cumulative figures" for development within the RMPPA. As an example, the oil and gas figures include well numbers and surface disturbance for all related activities regardless of mineral ownership.

The potential cumulative impacts are described for each potentially affected resource within a defined cumulative impact analysis area (CIAA). The CIAA covers different geographic areas, depending on the specific resource being evaluated, and might vary from the ROIs described previously in this chapter. Evaluation of potential impacts considers incremental impacts that might occur from the proposed project, while also considering impacts from past, present, and reasonably foreseeable actions (RFA) within each of CIAA. RFAs are those future action activities that have been committed to or that are known proposals, which could take place within the 20-year planning period. RFA scenarios are projections made only for the prediction of future impacts; they are not actual planning decisions or resource commitments. Projections, which have been developed for analytical purposes only, are based on current conditions and trends and represent a best professional estimate of RFAs. Unforeseen changes in such factors as economics, demand, and federal, state, and local laws and policies could result in different outcomes than those projected for this analysis.

The CIAAs are described in each of the resource sections below. CIAAs are largely for resources that are mobile or migrate compared with resources that are stationary. For example, the air quality CIAA is large because it is based on the complex interaction between climatic factors, terrain, and the potential for significant impacts to occur in sensitive areas within the airshed. Smaller CIAAs were established for resources that are stationary such as fire, minerals, recreation, and visual resources. In some cases, these CIAAs might be the same as the RMPPA boundary. Activities and development that occur within or outside the CIAAs have the potential to create cumulative impacts to the specific resource being analyzed.

BLM considered the following factors in this cumulative impact assessment:

- Federal, nonfederal, and private actions
- The potential for synergistic effects or synergistic interaction among or between effects
- The potential for effects to cross political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- The comparative scale of cumulative impacts across alternatives.

Presentation of impacts to some resource topics presented above have been combined below as a result of the commonalities in potential impacts or minor potential for cumulative impacts.

4.20.2 Projects and Activities Considered

After review of available information, the following general types of activities were identified as having the greatest likelihood to generate potential cumulative impacts when added to activities associated with the Rawlins RMP management alternatives:

- BLM land management plans and activities outside the RMPPA boundary
- Regional oil and gas development activities (e.g., exploration, production, and pipeline development)
- Regional recreation activities (e.g., big game hunting, OHV use, dispersed recreation)
- Economic development activities in Albany, Carbon, Laramie, Fremont, and Sweetwater counties.

As shown from the impact assessment regarding mineral management presented earlier in this chapter, oil and gas development presents the highest likelihood for significant impacts. Decisions about managing oil and gas resources on public lands administered by BLM are made at two general levels. RMP level decisions include leasing decisions that result in issuance of oil and gas leases with the expectation that some exploration or development activity might be proposed some time in the future. Specific information for such actions are speculative. Project-level decisions encompass exploration and development decisions that result in more specific information such as spatial and temporal aspects of ground disturbance with wells, roads, and associated infrastructure.

Tables 4-5 and 4-6 lists existing and reasonably foreseeable oil and gas development, along with the number of producing wells and remaining wells that could still be developed for each of the projects, should development reach the ultimate level analyzed in its corresponding NEPA document. These numbers represent potential development based on the NEPA-approved totals. It is likely that these projects would not actually drill all the wells that are approved. For example, according to the Green River RMP and Final EIS (the RMP for the RMPPA to the west of the RMPPA), many existing wells will cease to produce based on historic records, with more than 70 percent of existing wells being plugged and abandoned by year 2010. However, it is anticipated that these would be replaced by new wells. In addition, the reasonably foreseeable development for oil and gas within the RMPPA takes into account the past well abandonment rates as well as new development in determining the level of surface

disturbance anticipated during the life of the plan. Other RFAs that would create the potential for cumulative impacts are listed in Table 4-6.

Table 4-5. Summary of Oil and Gas Development Projects Previously or Currently Subject to NEPA Analysis in Southwestern Wyoming

Project	Date ROD/DR Signed	Producing Wells	Remaining Wells that can Still Be Drilled
Riley Ridge	1/25/84	23	224
Burley	6/7/94	31	16
Jonah II Field	4/27/98	129	321
La Barge Coordinated Activity Plan Area	8/16/91	1,135	445
Soda Unit	4/12/89	3	18
Castle Creek	10/24/83	8	10
Moxa Arch	3/7/97	947	1,227
Hickey Mountain	5/13/87	26	50
Road Hollow	9/83	4	6
Fontenelle	8/16/96	1,052	1,141
Stagecoach	9/27/95	9	59
East LaBarge	5/29/92	19	9
Bird Canyon	6/25/93	6	8
Bravo Unit	7/20/95	7	4
Mulligan Draw[1]	9/23/92	17	23
Creston Blue Gap	10/4/94	181	94
Dripping Rock/Cedar Break[1]	4/3/85	24	34
Sierra Madre	9/21/87	35	11
Hay Reservoir	6/24/92	28	0
Jack Morrow Hills	Pending	46	205
Continental Divide/ Wamsutter II	5/24/00	864	1,366
Pinedale Anticline	7/27/00	85	616
South Baggs	8/8/00	12	38
Bitter Creek Shallow Gas Project Area	Pending	14	0
Pacific Rim Shallow Gas	Pending	0	150
Copper Ridge	Pending	0	89
Vermillion Basin	8/15/02	0	56
Jonah Infill	Pending	0	1,250
Desolation Flats	7/27/04	21	364
South Piney	Pending	0	210
Lower Bush Creek	Pending	0	22
Seminoe Road	Pending	0	0
Atlantic Rim	Pending	0	0
Atlantic Rim Coalbed Natural Gas Exploration Pods	Ongoing	44	156
Wolverine/Shell	Ongoing	0	1
Little Monument	Pending	0	31
Total	–	4,770	8,254

[1]Superseded by the Desolation Flats project

Table 4-6. Summary of Past, Present, and Reasonably Foreseeable Actions.

Title	Description
Carbon Basin Coal Lease	Projected surface mine life of 11 years with a production rate of initially 112 million tons per year reaching a maximum of 4.2 million tons per year with total reserves of 31.1 million tons. Underground mine life would occur simultaneously with surface mining lasting for about 17 years with an average reasonably foreseeable production of 6.6 million tons/per year. Total underground mining production would be 112 million tons. Projected reasonably foreseeable surface disturbance would be 288 acres per year for a total of 4896 acres of surface disturbance throughout the life of mine.
Bridger Coal Company, Coal Lease-by-Application	Conversion of surface mining operations to underground mining to extend the life of the mine.
Hay Reservoir Geophysical Project	The south boundary of the proposed project lies about 20 miles north of I-80. It extends northward past Hay Reservoir and ends 3 miles north of Five Fingers Butte. About 55% of the project area would lie within the BLM Rock Springs Field Office RMPPA, and 45% of the project would lie in the RMPPA.
Monell CO2 Pipeline Project	Proposed CO_2 pipeline and related facilities along an existing pipeline from the Exxon/Mobil Shute Creek CO_2 pipeline system in Sweetwater County, WY, to the existing Monell Federal Unit. Proposed facilities include metering equipment, a booster station, and cathodic protection.
Jim Bridger Flue Pond Expansion Project	Project is completed.
Quantum Geophysical Project	Project is completed.
Haystacks Geophysical Project	Geophysical operations in the Haystacks area. The project has been completed with the exception of minor cleanup planned for Spring of 2004.
Pioneer Pipeline Right-of-Way	Pioneer Pipeline has built a 12- to 16-inch refined petroleum pipeline across federal lands in southwest Wyoming. The pipeline extends from Sinclair, Wyoming, west to an existing block valve in Croydon, UT.
Grizzly and Chain Lakes WHMA Fence Modification (WGFD)	Fence modifications.
Daley and Chain Lakes WHMA Fence Construction (WGFD)	Fence construction.
Vegetation Treatments (WGFD)	Use of prescribed fire on private and state lands for the benefit of wildlife.
Seminoe and Ferris Mountain Area Wildlife Transplant (WGFD)	Transplant of big horn sheep to Seminoe and Ferris Mountain areas.
Livestock Grazing Management (WGFD)	Alteration of existing grazing strategies on state and private lands.
"AccessYes" Walk In Areas and Hunter Management Areas (WGFD)	Private acreage listed under the Walk-In program is increasing and often provides access to enclosed BLM lands as well as the private lands that are enrolled in the program.
Habitat Extension Services (WGFD)	Habitat treatments on private lands to benefit wildlife.
Native Fish Restoration (WGFD)	Restore native fish to traditional waterways on private, state, or WGFD lands.
Little Snake River Water Quality (LSFO)	Monitoring and evaluation of the Little Snake River in Colorado.
Sage-Grouse Conservation Plans	Wyoming Game and Fish Department and Colorado Division of Wildlife prepared plans for recovery of the Greater sage-grouse.
Wildlife Migration (LSFO)	Antelope and elk herd migration from Colorado to Wyoming, especially during severe weather. Exchange and movement of herds are anticipated. Possible influx of chronic wasting disease in elk herds into Wyoming.
Entrega Pipeline Project	Proposed pipeline would run from the Piceance Basin in Colorado to Wamsutter, WY (that portion of pipeline would be 36" in diameter). From Wamsutter, it would parallel Interstate 80 east toward Cheyenne before heading south to the Cheyenne Hub near Rockport, CO (that portion of pipeline would be 42" in diameter). Total length of pipeline would be 327 miles. An Environmental Impact Statement is being prepared for the project.
Wyoming Interstate Company Pipeline	Proposed pipeline would run from the Roan Cliffs Meter Station in Colorado to Wamsutter, WY. The proposed pipeline will be 24" in diameter and will follow an existing CIG pipeline.

Title	Description
Medicine Bow National Forest Land and Resource Management Plan (USFS)	16.3 miles of WSR designation on North Platte River within National Forest; 11.3 miles of WSR designation on portions of the Encampment River within National Forest. Recommends 27,963 acres for wilderness designation within Huston Park and Encampment River Wilderness Areas; Rock Creek area. 18,708 acres of designated Special Interest Areas (Ashenfelder, Cinnabar Park, Medicine Bow Peak, White Rock Canyon, Kettle Ponds, Tramway Train, Roper Cabin, Douglas Creek Tie Dam, Horse Creek Tie Dam, Muddy Park Tie Dam, Sunken Gardens, Centennial Ridge, Ribbon Forest). 15,476 acres of Research Natural Areas (Platte Canyon, Battle Mountain, Savage Run, LaBonte Canyon, Brown's Peak [Snowy Range]. 265,298 acres available for oil and gas leasing with lease stipulations that vary from standard stipulations to No Surface Occupancy. Snowy Range RNA withdrawn from mineral entry. Potential timber resource outputs of 22.8 million board feet (MMBF) per year Allowable Sale Quantity (ASQ). Clearcutting determined to be optimum method for regenerating lodgepole pine and openings will vary in size from less than 40 acres to 250 acres. 286,266 acres available for semiprimitive nonmotorized recreation and 223,056 acres available for semiprimitive motorized recreation. The addition of 1,364 acres of potential ski area expansion for Snowy Range Ski Area (no current proposals to expand, if a proposal submitted it will go through site-specific analysis).
Savery Oil Field (USFS and Carbon County)	Oil field on private land west of Sierra Madres.
Ferris Haggerty Mine Reclamation (USFS)	Mine reclamation on private land north of the Sierra Madres.
Sage Creek Road (Rawlins to Battle) [USFS]	Road paving operation.
Green Mountain Ski Area (USFS)	Proposed ski area on private land near the Sierra Madre Mountain Range.
Two Elks Power Plant (USFS)	Power plant proposed on private land in Campbell County south of the Power River Basin.
U.S. Fish and Wildlife Service National Wildlife Refuges	A Comprehensive Conservation Plan for the Arapaho National Wildlife Refuge complex satellites (Bamforth, Hutton Lake, Mortenson Lake, and Pathfinder National Wildlife Refuges) will be prepared starting in 2005.

4.20.3 Impacts by Resource

Air Resources

The potential impacts from the air emissions described in Section 4.2 are analyzed based on ROI that includes nearby air quality sensitive areas, such as national parks and wilderness areas. More details on regional areas of consideration and the specific locations of areas outside the RMPPA that were addressed are found in the Air Quality Technical Support Document (Appendix 4).

The CIAA used to access cumulative impacts on air quality is the same as the ROI mentioned above. Sources of potential cumulative impacts to air quality would include emissions from coalbed methane and conventional oil and gas development on existing and new leases within and outside the RMPPA. Wildland fires and prescribed burns that occurred within the CIAA would result in impacts to air quality

from emissions of particulates and polyaromatic hydrocarbons (PAH). Impacts from wildland fires would also result in reduced visibility. Vehicular activity would also produce emissions that could impact air quality primarily along the I-80 corridor.

Permitted stationary sources of air emissions would also continue to contribute to potential cumulative impacts to regional air quality. The Wyoming State-wide Emission Inventory conducted by TRC-Mariah indicates that there will be an increase of future emissions of NO_x, SO_2, PM_{10}, and $PM_{2.5}$ in the RMPPA and for the State of Wyoming. The Wyoming State-wide RFD emissions increases were calculated by subtracting the State-permitted emissions through June 30, 2003 from all NEPA authorized and other quantifiable emissions from June 30, 2004. The RMPPA emissions are 2003 base year emissions subtracted from 2023 emissions. Potential emissions increases are summarized in Table 4-7. (For further details, refer to Appendix 4).

Table 4-7. Summary of Emission Increases as Estimated by the Wyoming State-wide Emission Inventory and the BLM Emission Inventory

Air Pollutant	Emissions (tons per year)					
	Wyoming State-wide RFD[1]		BLM Sources[2]			
			RMPPA			
			Alternatives			
	Wyoming	RMPPA	1	2	3	4
NO_x	5,726	1,279	6,932	7,433	5.046	6,500
SO_2	115	<0.1	64	69	40	53
PM_{10}	741	<0.1	1047	1,132	699	934
$PM_{2.5}$	195	<0.1	397	429	275	368

[1] Reasonable Foreseeable Development (RFD) emission differences calculated by subtracting permitted emissions from authorized NEPA and other quantifiable emissions after June 30, 2003

[2] Emission differences calculated by subtracting base year (2003) RMPPA emissions from year 2023 RMPPA emissions (Tables A4-5 through A4-7 in the AQTSD, Appendix 4)

Particulate emissions estimated for the RMPPA (Tables A4-5 through A4-7 in Appendix 4) are much higher than the Wyoming State-wide RFD case, but this is expected because many of the particulate sources (for example, construction) do not require an air permit and would not be counted in the Wyoming State-wide RFD case, which takes into account the subtraction of NEPA and other quantifiable emissions from permitted emissions.

Ambient air monitoring data show low concentrations for criteria pollutants (except ozone) in the area (Chapter 3). Taking into account the emission information estimated for this analysis and project-specific air quality analyses conducted in the area, such as Desolation Flats, BLM concludes that increases in concentrations of carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), PM_{10}, and $PM_{2.5}$ in the RMPPA would not cause any exceedance of federal or state ambient air quality standards.

Because a quantitative relationship between expected air emissions calculated above and the subsequent potential cumulative impacts to ozone and the air quality values of visibility and atmospheric deposition are not known, it is not possible to quantify potential impacts to these air quality values from the sources in the ROI. These cannot be quantified because of the complex nature of the formation of ozone, the complexity of visibility impairment and atmospheric deposition in the atmosphere.

However, because air quality analyses from recent energy development projects such as the Desolation Flats project (BLM 2003b) estimate potential impacts to visibility, emissions described in Section 4.2

might contribute to significant impacts to visibility (Table 4-8). The sources modeled for Desolation Flats have some similarities to the Rawlins RMPPA analysis.

Table 4-8. Summary of Far-Field Air Quality Impacts from the Desolation Flats EIS

Air Quality Component	Comment
Potential Air Pollutant Concentrations	
Criteria Air Pollutants	• Far-Field total concentrations are in compliance with applicable NAAQS and WAAQS – Particulate matter concentrations 13–40% of standards – NO_2 concentration 10% of standard – SO_2 concentrations 4–8% of standards • Far-Field project concentrations are well below applicable PSD Class I increments – PM_{10} concentrations .002-.4% of increments – NO_2 concentration .4% of increment – SO_2 concentration .005–.07% of increments
Visibility	
Days with > 1.0 ΔdV	• Potential visibility impacts from the Desolation Flats project were less than the FLAG visibility threshold • Potential cumulative visibility impacts were greater than the FLAG visibility threshold – 7 days in Bridger Wilderness – 2 days in Fitzpatrick Wilderness – 0 days in Popo Agie Wilderness – 1 day in Wind River Roadless Area – 0–1 day in Dinosaur National Monument – 1 day in Savage Run Wilderness – 1 day in Mount Zirkel Wilderness – 0–1 day in Rawah Wilderness
Atmospheric Deposition	
Lake Chemistry Level of Acceptable Change (LAC)	• Decreases in ANC from the Desolation Flats project alone were less than the lake chemistry LAC (level of acceptable change) • Cumulative decreases in ANC were less than the lake chemistry LAC for sensitive lakes – 6% of LAC for Black Joe Lake – 7% of LAC for Deep Lake – 3% of LAC for Hobbs Lake – 2% of LAC for Ross Lake – 9% of LAC for Lower Saddlebag Lake – 13% of LAC for Seven Lake – 22% of LAC for West Glacier Lake – 5% of LAC for Island Lake – 9% of LAC for Rawah #4 Lake • Cumulative decreases in ANC were less than the lake chemistry LAC for very sensitive lakes – 46% of LAC for Upper Frozen Lake – 32% of LAC for Pothole A-8 – 32% of LAC for Upper Slide Lake

It would be inappropriate to infer RMPPA impacts directly from impacts estimated for the Desolation Flats project as a result of differences in such components as emission inventories. However, results of the quantitative analysis using modeling performed for the Desolation Flats EIS suggest that RMPPA activities could contribute to significant impact to visibility in Bridger, Fitzpatrick, Mount Zirkel, and Rawah Wilderness Areas.

Because monitoring of total nitrogen deposition in the Snowy Range shows deposition loading above the Forest Service voluntary guideline (Figure 3-27), emissions described in Section 4.2 might contribute to significant impacts to total nitrogen deposition. BLM plans to make quantitative estimates of these impacts for project-specific EISs.

BLM has chosen to describe potential air quality impacts in the Rawlins Resource Management Plan qualitatively. In the near future (about 2006), BLM plans to analyze RMP cumulative far-field air quality impacts quantitatively with screening dispersion modeling. This would be part of a statewide analysis BLM refers to as the "State of the Atmosphere" study.

This "State of the Atmosphere" will provide an annual summary of potential cumulative far-field impacts to criteria air pollutant concentrations, Class I visibility, and atmospheric deposition throughout the State of Wyoming. BLM plans to rely on dispersion model results from the "State of the Atmosphere," as well as air quality monitoring and project EIS modeling results, to describe potential cumulative far-field air quality impacts in future BLM Resource Management Plans.

Cultural

The cultural resource CIAA consists of the RMPPA and portions of adjacent viewsheds (maximum of 5 miles) of national historic trails that extend outside the RMPPA. This CIAA was identified because cultural resource management actions are specific to activities that would detract from the visual quality. Effects to cultural resources within the RMPPA are presented in Section 4.3 above.

Potential impacts to cultural resources would result primarily from surface disturbing and disruptive activities (within and outside the RMPPA) that result in erosion or vibration from traffic and/or machinery, soil compaction, and landscape alteration. However, impacts to cultural resources would usually be mitigated by legal protections afforded to them through restrictions on surface disturbing and disruptive activities, and through consultation processes with the State Historic Preservation Officer (SHPO) and with Native American tribal representatives. Vegetation treatments would benefit cultural resources in the long term by improving diversity of the vegetative community, soil stability, and therefore reducing erosion. However, short-term impacts to cultural resources would increase from vegetation removal and increase potential for soil erosion.

The majority of cumulative effects on cultural resources would also result from surface disturbing and disruptive activities on private, state, and other federal lands from mineral development and associated wells, roads, pipelines and facilities. In addition, livestock grazing improvements and dispersed recreation would impact cultural resources. Portions of each historic trail's physical integrity could also be affected by improved accessibility that result from increased oil and gas activity. However, it is anticipated that impacts to historic trails would be less than significant as a result of the protections afforded these resources by the NHPA.

Oil and gas development would cause the greatest amount of impact to cultural resources from construction of roads, pipelines, and well pads. Unanticipated subsurface discoveries (cultural resources discovered during project construction activities) occasionally occur from surface disturbing and disruptive actions. Unanticipated discoveries result in the irretrievable loss of some or occasionally all of the cultural resource involved. This potential loss would continue to occur under all the alternatives.

Impacts that occur on nonfederal lands with no federal involvement will continue to occur within the RMPPA. These development actions result in the damage or loss of some cultural resources through surface disturbing and disruptive or other construction activities. In addition, surface disturbing and disruptive activities that occur on properties adjacent to federal lands, especially within the checkerboard

landownership areas, potentially introduce visual intrusions to those sites where the setting contributes to the NRHP eligibility. This has resulted in a cumulative loss of the integrity of the setting of these sites and a fragmentation of larger sites such as the historic trails.

Under Alternatives 1 and 4, impacts to cultural resources would be avoided or mitigated by cultural resources management program actions and implementation of federal regulatory laws, actions, and guidelines designated to protect cultural resources. The greatest potential for impacts to cultural resources would occur under Alternative 2 because of increased surface disturbance activities and limited protection to cultural resources as a result of a decrease in restrictions from other programs. However, because of increased surface disturbance more acreage would be inventoried, potentially identifying cultural resources before development. The potential for impacts to cultural resources would be less under Alternative 3 because of increased restrictions placed on surface disturbance; however, less acreage would be inventoried than any other alternative.

Paleontology

The paleontology resource CIAA consists of the entire RMPPA because paleontological resource management is specific to the RMPPA and would not likely be influenced by activities occurring outside the RMPPA. Effects to paleontological resources from the RMP alternatives are presented in Section 4.10 above.

Potential impacts to paleontological resources would result from surface disturbing and disruptive actions. Under all RMP alternatives, impacts to paleontological resources would not be considered significant because of the policies associated with the paleontological resource management program, which require identification and mitigation of paleontological resources before surface disturbing and disruptive activities.

Activities such as vegetation treatments, habitat enhancements, and oil and gas development activity on private and state lands would likely result in significant impacts to paleontological resources attributed to a lack of legal protections afforded these resources and the amount of acreage these lands occupy within the RMPPA (about 5,310,000 acres or 47 percent of the RMPPA). These activities would increase the potential for surface disturbing and disruptive activities from traffic or machinery, soil compaction, erosion, and landscape alteration causing substantial direct and indirect damage or destruction to potentially important paleontological resources.

The potential for cumulative impacts to the Como Bluffs NNL also exists because large portions of the lands containing the NNL are private. Although Como Bluffs is designated an NNL, this designation does not impose restrictions on private or state lands. Therefore, the lack of protections afforded these resources could result in impacts to the paleontological resources in the NNL.

Because of the protections afforded paleontological resources, there are no substantial differences in the potential of cumulative impacts under any of the RMP alternatives.

Fire Management

The CIAA used to analyze cumulative impacts regarding fire management is limited to the RMPPA. As a result of noncontinuous fuels, low historic fire incidence, and significant fuel breaks (e.g., highways, farmland, and county roads), fire management activities within the RMPPA would be specific to the area and would not be significantly influenced by activities occurring outside the RMPPA. Effects to fire management within the RMPPA are presented in Section 4.4 above.

Potential impacts to fire management would result primarily from restrictions placed on vegetative treatments that would limit the reintroduction of wildland fire into fire-dependent ecosystems. Additional impacts would result from the spread of noxious and invasive weeds, and the dominance of older seral stages of vegetative communities. This is especially true near WUI areas.

Cumulative impacts on fire management would also result from increased development activities occurring within the RMPPA. As mineral development and other construction activities such as recreation facilities and urban development increase throughout the RMPPA, so do the potential for wildfire occurrence and the need for fire suppression activities. In addition, as increased development and associated infrastructure (e.g., power lines, compressors, pipelines, fuel tanks) occurs within the RMPPA, a corresponding need for increased fire suppression will also be needed within WUIs.

Cumulative impacts on fire management are not expected to be significant under any alternative. However, cumulative impacts would be greatest under Alternative 2 because of anticipated increases in development activities and access. Under Alternative 3, restrictions on development and access would reduce the potential for human-caused wildfires and wildland-urban interface situations, thereby minimizing potential cumulative impacts on fire management.

Forest Management

The CIAA used to analyze cumulative impacts regarding forest management includes the entire RMPPA, including USFS within and intersecting the RMPPA (Map 3-1). Impacts to forest management on public lands administered by BLM are presented in Section 4.5 above. Because fluid mineral development would take place mostly outside forest areas, cumulative impacts would be minimal. However, woodland forest communities occur in areas that have a higher potential for oil and gas development, thus creating the potential for impacts in these areas.

Potential impacts to forest management would result primarily from surface disturbing and disruptive activities. Under all RMP alternatives, impacts to forest management would not be considered significant. However, varying degrees of disturbance would occur depending on the level of development projected for each alternative. Land use restrictions and VRM classification would also impact forest management' however, the effects are not considered to be significant.

Resource development impacts on forestland might result from the removal of forested surface for roads and other surface infrastructure. Such activities would result in lands being removed from potential timber harvest production for the life of the mining. These impacts would be similar for leasable, locatable, and common variety minerals. However, such forms of mineral development are predominately located in nonforested to lightly forested areas of the RMPPA. Mineral resource development activity can also benefit forest management by providing opportunities for increased accessibility to potential harvest or management areas. The recommendation of 27,963 acres for wilderness designation within Huston Park and Encampment River Wilderness Areas would impact forest management by removing these areas from timber harvest production.

The actions and activities considered do not create substantive reductions in overall forest health values or substantially reduce the ability to harvest timber or minor wood products. Therefore, no significant cumulative impacts would be anticipated under any alternatives, and there would be no substantial difference in the intensity of cumulative effects across alternatives.

Lands and Realty

The CIAA for lands and reality management consists of the entire RMPPA. Impacts to lands and realty management on public lands administered by BLM are presented in Section 4.6 above.

Impacts to lands and realty would result from actions that limit community expansion opportunities and actions that affect the utility and transportation systems within the RMPPA. These actions are primarily the result of land use restrictions (e.g., VRM designations, sensitive resources, cultural protection) and the amount of land that is considered to be withdrawn from public land law and/or locatable mineral entry. Each action would limit or restrict where ROW or other realty actions would be permitted.

Oil and gas development and other surface disturbing and disruptive activities such as the construction of power and pipelines, communication sites, wind energy projects, and improvements of roads and highways would cause the greatest amount of cumulative effects to lands and realty management by increasing the demand for ROW authorizations.

Under Alternative 2, minimal cumulative impacts to lands and realty would occur because of negligible alignment restrictions. Fewer restrictions for the protection of sensitive resources within the RMPPA would also occur under Alternative 2 for ROW development (e.g., pipelines, power lines). It is anticipated that public access and use within the RMPPA would increase under Alternative 2 because of increased development. Under Alternative 3, cumulative impacts to lands and realty would be greatest because of increased restrictions placed on sensitive resources and reduced amounts of potential development. The greatest impacts to lands and realty would be in areas managed NSO areas and listed as avoidance or exclusion areas for ROWs.

Livestock Grazing

The CIAA used to analyze cumulative impacts to livestock grazing includes all allotments occurring either entirely or partially within the RMPPA (Map 3-3). Livestock is managed within the boundaries of these allotments and therefore could be affected by activities occurring in these areas. Effects from BLM actions on livestock grazing operations administered by BLM within the RMPPA are presented in Section 4.7 above.

Potential cumulative impacts to livestock grazing operations would occur from a combination of activities and land uses occurring within the CIAA. Such impacts would result primarily from surface disturbing and disruptive activities, human disturbance, and the presence of grazing wildlife and wild horses. These activities result in livestock displacement and direct removal and indirect degradation of forage. Reclamation efforts and vegetation treatments would reduce impacts to livestock grazing; however, roads, wells pads, and the presence of humans, wildlife, and wild horses would result in long term and/or permanent impacts.

Existing and future oil and gas development projects, recreation use areas, wild horses, and big game populations located within the CIAA would cause a cumulative increase in soil disturbance, vegetation removal, noxious and invasive weed proliferation, livestock displacement and in a reduction in available forage and AUMs. Impacts would be greater in areas with large populations of big game and wild horses. These impacts could result in substantial rangeland degradation and thereby jeopardize compliance with the Standards for Healthy Rangelands (BLM 1997) on some allotments. If livestock grazing is considered to be a factor in violating the standards, the responsible livestock operator might be required to alter grazing practices.

Oil and gas development activities and related construction of roads, pipelines, and well pads would be the primary cause of direct forage removal and weed proliferation. Impacts to forage resources and subsequently livestock operators would be more severe in the western portion of the CIAA where development is more intense. The implementation of BLM's Mitigation Guidelines, restrictions on surface use, continued implementation of Standards for Healthy Rangelands (BLM 1997), vegetation treatments, and monitoring efforts would provide protection to forage resources on federal lands and lands with federal subsurface minerals, which would help reduce overall effects to livestock grazing operations.

Cumulative impacts to livestock grazing operations would be considered significant under Alternatives 1, 3, and 4 because of substantial forage removal and/or loss of AUMs. Under Alternative 2, the increased use of vegetation and weed treatments would help to offset impacts from surface disturbing and disruptive activities and other uses. In addition, the reduction and elimination of wildlife mitigation measures regarding range improvements would increase flexibility in livestock management under Alternative 2. Under Alternative 1, surface disturbing and disruptive activities and other uses combined with minimal efforts to control noxious and invasive weeds would result in a loss of AUMs. Eliminating predator control measures and increasing the number of wild horses in the Lost Creek HMA under Alternative 3 would result in a loss of AUMs. Under Alternative 4, surface disturbing and disruptive activities and other uses combined with an increase in the number of wild horses allowed in the Lost Creek HMA would cause a loss of 2,445 permitted winter sheep AUMs.

Minerals Management

The CIAA for minerals management is composed of the RMPPA area because activities and resources occurring within the RMPPA are not expected to affect mineral resources outside the RMPPA. Effects to mineral management on public lands administered by BLM within the RMPPA are described above in Section 4.8.

Overall, impacts to mineral development from RMP alternatives would occur from surface use restrictions (closure or withdrawals, NSO, controlled surface use, and seasonal restrictions) that would decrease the number of oil and gas wells drilled during the planning period, withdrawal lands from locatable mineral entry, and close areas to salable minerals development. None of the RMP alternatives would result in significant impacts to mineral resources.

As detailed in Table 1-1, about 1,011,230 acres of federal mineral estate will not be covered by RMP decisions as a result of management of the land surface by other federal agencies such as the USFS, Bureau of Reclamation, and USFWS. These agencies dictate the land surface planning and management decisions for these lands, and BLM manages the federal mineral estate in coordination with these agencies on a case-by-case basis. The largest area within the RMPPA containing other federal surface ownership and BLM-administered federal mineral estate is the Medicine Bow National Forest, of which the majority is located in the south-central portion of the RMPPA. Those portions of the Medicine Bow National Forest within the RMPPA comprise about 970,990 acres. In its 2003 Medicine Bow Revised Land and Resource Management Plan, the USFS made 265,298 acres (27 percent) of the forest available for oil and gas leasing and indicated that the remaining 705,692 acres are either designated wilderness, have no known oil and gas potential, or require site-specific analysis. Surface use restrictions on lands available for lease within the forest include NSO, controlled surface use, and timing limitations similar to those of BLM. Although these restrictions are in place on 27 percent of the forest and the remainder of USFS lands are either designated wilderness or require site-specific analysis, minimal cumulative effects on mineral resources and development are expected because the majority of the land within the forest area has low to no potential and is still available for development.

No other current RFAs have been identified for other federal surface ownership lands; however, the USFWS will be revising its Comprehensive Conservation Plan for the Arapaho National Wildlife Refuge complex satellites (Bamforth, Hutton Lake, Mortenson Lake, and Pathfinder National Wildlife Refuges) starting in 2005. Consequently, no cumulative effects to mineral resources or development are expected from these lands as a result of the case-by-case nature in which BLM coordinates with other federal agencies for use of its federal mineral estate.

Another 1,247,130 acres of private and state land containing federal mineral estate is covered by RMP decisions; however, decisions are included for the federal mineral estate only, and surface land and resource uses and values are still under the jurisdiction of private and state entities. No cumulative effects to mineral resources or development are expected on these lands because BLM will coordinate with private and state entities on a case-by-case basis for use of its federal mineral estate.

The evaluation of cumulative impacts on mineral development activity includes consideration of the relative changes in the level of mineral resource development among the various alternatives in the RMPPA given the consideration of other RFAs. This level of mineral resource development might increase from well numbers projected in the RFD as a result of BLM's ability to develop its federal mineral estate on lands with other federal agency surface use jurisdiction; however, well projections are unknown as a result of the case-by-case nature in which BLM coordinates with these agencies. Given this consideration, oil and gas development is expected to continue under all RMPPA alternatives, with Alternative 2 having the greatest number of wells drilled during the planning period and Alternative 3 having the least because of restrictions for protection of sensitive resources.

The projects and activities considered are not anticipated to cause a substantial reduction in the development of locatable and common variety minerals or cause the costs of development and extraction to escalate to the point where the economics of mineral development would be marginal. Therefore, no cumulatively significant impacts to coal, locatable, or common variety minerals are anticipated.

Recreation Resources

The CIAA for recreation resources is composed of the RMPPA. Effects on recreation resources on public lands administered by BLM within the RMPPA are presented in Section 4.11 above.

Potential impacts to recreation would result primarily from surface disturbance actions. These impacts would primarily result from oil and gas development that would detract from certain types of recreational experiences through increased roads, industrial traffic, noise, and scenery degradation associated with industrial development. Short-term impacts would result from vegetation treatment by creating temporary closures and displacing recreational users from denuded areas. However, vegetation treatment would improve range condition, aesthetics and wildlife habitat in the long-term resulting in recreational benefits.

Cumulative impacts to recreation would potentially occur as a result of increased recreational demand and from a mixture of land uses that result in conflicts for unconfined dispersed recreational opportunities. Such impacts are a result of increased recreational activity occurring within and outside the RMPPA and because of conflicts generated from approved developments. Development activities would alter recreational settings, resulting in the degradation of some recreational experiences, caused by increased visual impacts, noise, and concerns of public health and safety. In areas in which development occurs, some hunting opportunities could also be diminished as a result of the displacement or loss of game animals. Development and restrictions could reduce recreational opportunities for some users by limiting certain types of recreational activities; however, the same restrictions, such as road closures, could also enhance the experience of other recreationalists seeking solitude or primitive opportunities.

Under Alternative 2, cumulative impacts on recreation would increase because of increased development activities and fewer restrictions placed on sensitive resources. Cumulative impacts on recreation would also increase under Alternative 2 in regard to public health and safety concerns as a result of additional roads and associated conflicts between users. Indirect significant cumulative impacts to recreation would potentially occur because of reduction in, or substantial impacts to, wildlife habitat creating a long-term reduction in recreation opportunities. Under Alternative 3, impacts on recreation would be less than those of Alternative 2 because of less development activities, increased land resource protections, and decreases in oil and gas development. Most of the identified impacts under Alternative 3 would benefit recreation management and primitive types of recreation.

OHV Management

The CIAA for OHV management is composed of the RMPPA. Effects of BLM actions on OHV management by BLM within the RMPPA are presented in 4.9 above.

Potential impacts to OHV use would result primarily from resource development occurring within the RMPPA, which increases the amount of roads available for OHV use. However, this could also result in the generation of additional roads in areas that previously had only primitive vehicle routes in open country, which are preferred to improved roads by many OHV users. Possible long-term significant impacts would result from conflicts between commercial and OHV use of these roads. Potential short- and long-term impacts to OHV use would also occur from land use restrictions within the RMPPA established to protect sensitive resources.

The majority of cumulative effects on OHV use within the CIAA would also result from surface disturbing and disruptive activities on private, state, and other federal lands that eliminate, reduce, or alter opportunities for OHV use or compromise public health and safety. Oil and gas development would cause the greatest amount of effects on OHVs through the addition of roads within the CIAA. In addition to roads other impacts from surface disturbing and disruptive activities include the construction of pipelines, towers, fences, transmission lines, and communication sites. Seasonal, temporary, and complete closures to OHV use in restricted areas within the CIAA would also cause cumulative impacts to recreational OHV use. Potential closures would include restrictions created from riparian management and wildlife conservation plans.

Under all RMP alternatives, the potential for cumulative impacts to OHV management would be similar because of similarities in management prescriptions between alternatives (open to OHV use or restricted to roads and vehicle routes). The greatest potential for cumulative impacts to OHV management would occur under Alternative 2 because of increased surface disturbance activities generating more improved roads. Under Alternative 3, impacts to OHV management would increase because of greater amounts of the RMPPA having OHV use restrictions.

Socioeconomic

The CIROI boundary for socioeconomics extends beyond the RMPPA and is made up of Albany, Laramie, Carbon, and Sweetwater counties. The effects of BLM actions on Albany, Carbon, Laramie, and Sweetwater socioeconomics within these counties is presented in Section 4.12 above.

The greatest potential for cumulative socioeconomic impacts is associated with oil and gas development throughout the Southwest Wyoming on federal, state, and public lands. For instance, the impacts of oil and gas development for the RMPPA discussed above considered only those directly tied to activities on federal lands with the field office. However, 55 percent of the potential drilling locations are located on

state and private lands. Analysis of the cumulative impacts of all potential oil and gas activities within the RMPPA region is summarized in Table 4-9.

Table 4-9. Cumulative Economic Impacts of Oil and Gas Development Within the RMPPA

Alternatives /Activities	Net Present Value 2004-2023 (7%)			Employment	
	Average Wells Drilled Per Year/Annual Value of Production	Mineral Tax Revenues	Total Earnings	Average Jobs Supported Per Year	Average Earnings Per Job
Preferred Alternative—Federal					
Oil and Gas Drilling	189		$751,536,828	1,552	$31,384
Oil and Gas Production	$9,012,715,994	$2,038,594,925	$521,288,628	1,332	$37,985
Total Impacts			$1,272,825,457	2,884	$34,684
Preferred Alternative—State and Private					
Oil and Gas Drilling	250		$658,905,199	1,982	$31,385
Oil and Gas Production	$10,791,278,574	$1,340,664,386	$624,159,333	1,595	$37,985
Total Impacts			$1,283,064,533	3,576	$34,685
Preferred Alternative—Cumulative Impacts					
Oil and Gas Drilling	438		$1,410,442,027	3,534	$33,960
Oil and Gas Production	$19,803,994,568	$3,379,259,310	$1,145,447,962	2,927	$37,985
Total Impacts			$2,555,889,989	6,461	$35,972

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As shown in Table 4-9, expected oil and gas activity within the RMPPA will increase mineral tax revenues, total earnings, and employment. If oil and gas development occurs at expected rates within the RMPPA and throughout southwest Wyoming, it is likely that significant socioeconomic impacts will occur. The pace and timing of mineral development activities is dependent on various factors beyond the management decisions of BLM, including national and international energy demand and prices, production factors within the RMPPA and business strategies of operators. Because the pace of development in the RMPPA is unknown, actual cumulative impacts might vary if the rate of production changes during the study period.

Potential socioeconomic impacts include changes in employment and income; changes in tax revenue to local, state, and federal government entities; and changes in demand for housing and government services. Because of the temporary nature of oil and gas activities, it is also likely that some communities within the study area will be affected by the "boom and bust" cycle. This can often cause hardships for areas that must improve or expand infrastructure for large, temporary increases in population.

Many of the cumulative socioeconomic impacts associated with oil and gas development are already occurring in the region and would be perpetuated in the future with increased oil and gas development. For instance, increased development is generating employment opportunities in Southwest Wyoming, and it is likely that individuals from outside the area will fill a percentage of those jobs in the future. This is because a recent increase in natural gas drilling activity throughout Wyoming and the region has caused the demand for skilled workers to exceed supply. Consequently, it is likely that changes in population will occur in certain parts of the study area as a result of oil and gas development.

Increasing employment from oil and gas development throughout Southwestern Wyoming is likely to impact communities such as Rock Springs and Rawlins as a result of the concentration of oil and gas services companies in these two communities. These larger communities tend to have excess capacity in infrastructure to absorb significant increases in population. For instance, development activities, like those expected throughout Southwest Wyoming would help to reverse the losses in population in the late 1990s. Other communities and unincorporated areas might also be impacted as new individuals move into the area and might not be able to fully absorb changes in population as it occurs. If these increases occur in the short term, smaller communities might realize impacts of a boom and bust cycle associated with mineral development activities. This can significantly impact the demand for government services, which can be overutilized or underutilized during these cycles.

Increased oil and gas development throughout the region is expected to provide positive benefits to local governments in the form of increased mineral tax revenues. For some counties, the increases are expected to be significant and will remain a major source of revenue for many years to come for various jurisdictions.

In addition, these overall socioeconomic effects could alter the attitudes and opinions of local area residents. This includes increases in existing conflicts between conservation minded individuals and groups and the pro-development community. Residents within the RMPPA have long held opinions that a need exists to balance conservation of natural resources with the economic viability of resource-based industries. As such, residents generally support the development of minerals and energy as long as these activities do not damage wildlife habitat or degrade the quality of recreational experiences. These attitudes and opinions would generally remain the same. Consequently, some local residents will support further development activities, whereas others will be dissatisfied if development activities were to reduce hunting opportunities or degrades recreational activities. In addition, others might be dissatisfied if areas within the RMPPA are not left in an undisturbed state.

Increased oil and gas development throughout the region would likely cause a change in population trends in the western portion of the study area. This will likely cause impacts to custom and culture as some areas are "industrialized" to support more oil and gas operations. Communities such as Rock Springs and Rawlins, which have developed around mineral extraction industries, would likely support these activities. However, other communities that have been more agriculturally based would experience changes in custom and culture as population changes to support this alternative activity. Population changes will likely bring new individuals to the area that might possess different opinions and values from current residents. This can lead to changes in overall social trends in localized areas.

No significant cumulative impacts to environmental justice would occur under any alternative because minority and/or low-income populations would not be disproportionately affected compared with other segments of the general population.

Special Management Areas

The CIAA boundary for SMAs includes the entire RMPPA because activities and resources occurring outside the RMPPA are not expected to affect SMA designations inside the RMPPA. Effects of BLM actions on lands administered by BLM within the RMPPA are presented in 4.13 above.

Overall impacts to SMAs from RMP alternatives range from significant to no impact, depending on whether a designation is being removed for a specific area in a specific alternative or the management of the area as an SMA is adequate to protect relevant and important values.

The largest area within the RMPPA containing other federal surface ownership is the Medicine Bow National Forest, the majority of which is located in the south-central portion of the RMPPA. Those portions of the Medicine Bow National Forest within the RMPPA comprise about 970,990 acres. In its 2003 Medicine Bow Revised Land and Resource Management Plan, the USFS recommended 27,963 acres of land to Congress for wilderness designation (in addition to its existing 78,850 acres of wilderness); designated 15,476 acres as Research Natural Area; designated 18,708 acres as Special Interest Area; and recommended 27.7 miles of portions of the North Platte and Encampment Rivers within the forest for designation as Wild and Scenic.

Cumulatively, preservation of these 62,147 acres (excluding WSR designations) within the Medicine Bow National Forest benefits the 375,050 acres of SMAs proposed on BLM lands within the RMPPA by enhancing wilderness values through protection of additional wilderness characteristics, complementing BLM's WSR recommendation on the Encampment River by recommending designation of additional areas along the Encampment and North Platte Rivers as Wild and Scenic, preserving and protecting areas of local interest through designation of Special Interest Areas, and protecting areas that represent important natural ecosystems and environments as well as special or unique scientifically important characteristics through designation of Research Natural Areas.

SMAs designated for the management of wildlife, including Wildlife Habitat Management Areas, Fish Habitat Management Areas, and Raptor Concentration Areas, would be managed to ensure sufficient protection of the relevant and important values for which these areas were designated. Actions proposed by the WGFD, in coordination with BLM, would benefit these areas through habitat improvement projects such as fence construction and modification and the restoration of native fish to traditional waterways. WGFD might also prescribe fire and modify existing grazing strategies for the benefit of wildlife. Overall, these actions would benefit wildlife, maintaining and enhancing the values of each wildlife SMA.

Potential cumulative affects from reasonably foreseeable development projects on state and private lands (mostly pipelines and wells associated with oil and gas development) would potentially occur to some SMAs. Cumulative impacts could include degradation of visual resources, soils, watershed resources, and vegetation caused by these development activities within and surrounding these SMAs. BLM restrictions on surface disturbance, such as in VRM Class I and II, preferred routes for ROWs, and areas of controlled surface use would likely reduce possible effects; however, activities on state and private lands that might not be subject to restrictions could likely compromise relevant and important values for which the area is being managed as an SMA, depending on the location of private and state land and level of activity occurring on these lands.

Beneficial cumulative impacts would be the greatest under RMP Alternatives 3 and 4 as a result of the greatest amount of acreage designated as SMAs under these alternatives and the least amount of projected development activities. Adverse cumulative effects would be the greatest under Alternative 2 because it removes SMA designations on three SMAs within the RMPPA and allows the greatest amount of development activities with the least amount of restrictions.

Vegetation Management

The CIAA for vegetation is composed of the RMPPA as a result of the diverse, and in some areas unique, vegetation communities contained within. Effects of BLM actions on vegetation administered by BLM within the RMPPA are presented in Section 4.15 above.

Potential impacts to vegetation communities would result primarily from surface disturbing and disruptive actions. Under all RMP alternatives, impacts to these communities would not be considered

significant; however, varying degrees of disturbance would occur depending on the level of development activity projected for each alternative. Such disturbances as roads and operational pads could potentially exist throughout the planning period; however, reclamation efforts would greatly reduce impacts to vegetation communities.

The majority of cumulative effects on vegetation within the CIAA would also result from surface disturbing and disruptive activities on private, state, and other federal lands that remove vegetation such as mineral development and associated wells, roads, pipelines, and facilities, livestock grazing improvements, and dispersed recreation. Vegetation treatments in the form of prescribed burns might also affect vegetative resources; however, those treatments proposed by WGFD would be for the benefit of wildlife (and thus likely vegetation). All effects would depend on the amount and timing of activities and whether the amount of activity within the CIAA outpaces the success of reclamation and revegetation efforts in disturbed areas, if reclamation efforts are initiated. Impacts are not likely to be significant because of the varied spacing of activities and reclamation and revegetation efforts. However, they are likely to be long term, even with successful reclamation, because most of the native shrub communities (e.g., sagebrush) that would be impacted require in excess of 20 years to reestablish to predisturbance conditions.

Oil and gas development would cause the greatest amount of effects to vegetation resources through removal of vegetation by construction of roads, pipelines, and well pads. Areas of intense development would cause more severe localized impacts to vegetative resources. Overall, the amount of disturbance is negligible compared with the amount of total vegetative resources within the CIAA because the majority of affected vegetation types are common and widely distributed throughout the region. Reclamation of construction impacts in areas not needed for long-term operation (i.e., roads and operational pads) and of abandoned well sites and roads would begin to increase during the planning period leading to some reduction of overall disturbance. The implementation of BLM's Mitigation Guidelines, restrictions on surface use, continued implementation of Standards for Healthy Rangelands (BLM 1997) and desired plant community objectives, and monitoring efforts would provide protection to vegetative resources on federal lands, and possibly lands with federal subsurface minerals, and help reduce overall effects. Special status plants species, under the ESA and Wyoming BLM sensitive species guidance, would be protected on federal lands by site-specific mitigation including exclusion or avoidance of all surface disturbing and disruptive activities; however, protection of these species on private and state lands might not occur, resulting in potentially significant impacts to these species.

Effects on vegetation from livestock grazing improvements or other possible surface disturbing and disruptive activities are considered minor compared with those of oil and gas development and would therefore only result in localized, short-term adverse effects to vegetative resources. Effects from vegetation treatments in the form of prescribed burns would include a short-term increase of early successional species and a short-term decrease in vegetation production. Long-term effects, however, would improve overall vegetative community diversity through an increase in grass species and multiseral plan community.

The differences in the projected amount of surface disturbance among the RMP alternatives (about 7,160 acres) do not affect the overall analysis of cumulative effects on vegetative resources within the CIAA.

Transportation and Access

The CIAA for transportation and access management consists of the entire RMPPA. Effects of actions on transportation and access on lands administered by BLM within the RMPPA are presented in Section 4.14 above.

Potential impacts to transportation and access would result primarily from various land use restrictions such as sensitive resource and wildlife areas, VRM classification, and cultural resources that would limit public access and use within the RMPPA.

The majority of cumulative effects on transportation and access within the CIAA would also result from actions that would require land use restrictions. Various wildlife protections would potentially cause cumulative impacts to transportation and access by placing additional land use restrictions within the CIAA. All restrictions would reduce the potential for access easement acquisition and BLM-designated road development locations and limit access resulting in overall negative cumulative effects within the CIAA. Effects would not be considered significant, however, because opportunities for access easement acquisition and BLM-designated road development and reasonable public access would still be available.

The potential for cumulative impacts would be greatest under Alternative 3 because of increased protection placed on sensitive resources. The most significant impacts would occur in areas designated as NSO and listed as avoidance or exclusion areas for ROWs under the lands and realty program. Impacts would be lessened under all other alternatives because of fewer restrictions on seasonal access and road development.

Visual Resources

The visual resource CIAA consists of the entire RMPPA. Effects of BLM actions on visual resources within the RMPPA are presented in Section 4.16 above.

Potential impacts to VRM would result primarily from surface disturbance activities that would cause visual intrusions not consistent with VRM designation. Impacts from vegetation treatments and fire management also pose potential impacts to visual resource management; however, if effectively mitigated, restoration efforts would greatly reduce these impacts resulting in only short-term impacts.

The majority of cumulative effects on visual resources would also result from surface disturbance activities. Potential cumulative actions that could affect visual resource management include oil and gas development, wind energy projects, power and pipeline projects, and communication towers. Actions on private lands and in the checkerboard and intermixed land ownership areas could also potentially result in cumulative visual impacts to VRM classifications because of BLMs lack of authority on these lands.

Under Alternative 3 and 4, the greatest potential for cumulative impacts to visual resources exists because of increased designations of VRM Class II and because of greater emphasis being placed on cultural resources. The potential for cumulative impacts on VRM under Alternative 2 increases because of development opportunities, however, because the majority of the RMPPA is designated as Class III and IV under this alternative, impacts from development would not be significant.

Water Quality, Watersheds, and Soils

The CIAA used to analyze cumulative impacts for soils is the RMPPA. The CIAA for water quality and watershed resources extends beyond the RMPPA following watershed boundaries for the North Platte (1018), South Platte (1019), Great Divide—Upper Green River (1404), and the White-Yampa (1405) USGS subregions (4-digit HUCs) (Map 4-1). Appendix 11: Water Quality and Depletions describes catalog units within the above subregions. These watersheds were used as the basic unit of analysis because impacts from management actions proposed under the draft RMP and other existing activity plans are not expected to have cumulative, hydrologic influence beyond this scale. Given that hydrologic influence is primarily focused in the stream channels and that delineation of the CIAA was based on

watershed boundaries, the area of analysis is sufficient. Effects of BLM actions on watershed resources administered by BLM within the RMPPA are presented in 4.17 above.

Potential, cumulative impacts to water quality, watershed, and soil resources would occur from a combination of activities and land uses occurring within the CIAA. Cumulative impacts would occur from all activities that disturb soils; remove vegetation; and cause soil compaction or channel overland flows, such as road and well pad construction, livestock trampling, and recreational use. Such disturbances result in accelerated soil erosion and runoff, which increase sediment, salt, and nutrient loads to local channels and lead to channel destabilization.

Conventional oil and gas and CBNG development activities would be the primary cause of surface disturbance and related impacts to soil resources, water quality, and watershed health. Increases in these activities combined with increases in recreation and continuation existing livestock grazing practices would in some locations degrade water quality beyond the designated use of receiving water bodies, thereby resulting in significant impacts. Appropriate mitigation and project design during site-specific analysis could minimize offsite sedimentation, but would be dependent on design and maintenance. Cumulative impacts would likely be greatest in the Colorado River Basin and in the North Platte subregion above Seminoe Reservoir as a result of minerals development and surface discharge of produced water combined with other surface disturbing and disruptive activities. Cumulative impacts would also likely increase in the eastern portion of the CIAA in the North Platte and South Platte subregions as a result of the amount of land under private ownership. Although existing and future activities on these lands is not well known, it is assumed that surface disturbing and disruptive activities (e.g., mineral development and general construction) would occur. However, private landowners are not required to implement the same level of mitigation and protection measures as BLM, which could increase impacts to soils and watershed resources. Specifically, discharging produced waters into ephemeral drainages or not adequately considering water treatment options in the North Platte or White-Yampa subregions could result in significant impacts.

Mineral development activities and construction of livestock water developments would deplete water from the Colorado River and Platte River drainages. Recovery programs or interagency agreements designed to protect endangered and/or threatened species outside the RMPPA would mitigate this. These depletions would change the nature of flows, which could alter stream dynamics and cause overall degradation of the riparian corridor. Furthermore, wildlife and fish species not identified under ESA for protection could be impacted by changes in flow in these systems.

Impacts to groundwater quality would depend on the quality and maintenance of wells and the overall level of activity. Even with proper oversight by BLM and the WOGCC, improper casing and cementing of wells, undetected spills, or leachate from produced water pits could introduce contaminants into the groundwater. Existing development combined with reasonably foreseeable development would increase the potential for such impacts.

Cumulative impacts of aquifer depletion during the production of CBNG from federal, state, and private wells would result in a permanent loss of these water resources. Although this would result in an irreversible and irretrievable commitment of these resources, the depths of many of these formations (1,000 to 10,000 feet) make the practicality of the use of these resources in the future unlikely. Typically, these formations are nontributary to surface waters, but can be connected to surface waters through springs along faults or where they outcrop. During site-specific project planning, water quality, isotopic analysis, and/or groundwater modeling will be used to evaluate this potential, and decisions will be made to protect surface waters as appropriate.

Impacts from surface disturbing and disruptive activities, water developments, and surface discharges from CBNG development would result in degradation of water quality beyond the designated use of receiving water bodies in the White-Yampa subregion and potentially in the North Platte subregion (depending on development strategies). These significant impacts would occur under all alternatives. Impacts from all surface disturbing and disruptive activities would result in significant impacts to soils under all alternatives because soil loss (locally and regionally) would exceed natural levels by more than 2 tons per acre.

Cumulative impacts would be greatest under Alternative 2 because of anticipated increases in development, as well as fewer restrictions on such activity. Under Alternative 3, increased restrictions on development, recreation and livestock grazing would reduce the potential for surface disturbance and subsequent increases in erosion, runoff and sedimentation of surface waters. Alternative 4 would result in fewer impacts than under Alternative 1 and 2 and more impacts than under Alternative 3. This is attributed to surface disturbing and disruptive activities and water disposal alternatives.

Wild Horses

The CIAA used to analyze cumulative impacts on wild horses includes the HMAs within the RMPPA and those HMA's that are adjacent to and comprise the meta-populations of RFO (Map 4-2). The HMAs included in the CIAA that makeup the Red Desert meta-population include Stewart Creek, Lost Creek, Divide Basin, Antelope Hills, and Green Mountain HMAs. Those HMAs that make up the State Line meta-population are Salt Wells Creek, Adobe Town, and Sand Wash Basin. This area was selected because of the amount of interaction that takes place between HMAs within the larger meta-population. Effects to Wild Horses from the RMP alternatives are presented in Section 4.18 above.

Potential impacts to wild horses would result primarily from surface disturbance actions. Under all RMP alternatives, impacts to wild horses would not be considered significant; however, varying degrees of disturbance would occur depending on the level of development activity projected for each alternative. Actions that also increase human presence (e.g., recreation and increased travel) would also cause impacts to wild horses.

The majority of cumulative effects on wild horses within the CIAA would also result from surface disturbing and disruptive activities on private, state, and other federal lands that would alter the wild and free-roaming nature of horse populations. Considerable existing and future oil and gas development projects are reasonably foreseeable within the RMPPA. Increasing development and recreation activities, along with the existing livestock and wildlife uses would cause soil disturbance, remove vegetation, degrade and reduce available forage, increase human presence, and disturb and displace wild horses and diminish their wild, free-roaming nature. This effect would be in proportion to the increased development and would vary by HMA. The impacts to vegetation are not anticipated to be significant as a result of the adaptability of wild horses and the small amount of vegetation actually removed by development activities. Impacts stemming from competition with livestock and wildlife over forage and water resources are expected to be mitigated by the Standards for Healthy Rangelands (BLM 1997) and Guidelines for Livestock Grazing. The impacts to the wild, free-roaming nature of the horses would range from minimal in the Stewart Creek and Lost Creek HMAs, assuming the limited foreseeable oil and gas development in these areas and could be easily mitigated. Impacts would be significant in portions of the Adobe Town HMA and would require reevaluation of the suitability of those portions to remain in the HMA, thereby potentially effecting a reduction in the AML for the HMA.

Cumulative impacts would likely be greatest under Alternative 2 because of anticipated increases in development and livestock grazing, as well as fewer restrictions placed on such activities. Under Alternative 3, increased land use restrictions and less development would reduce the potential for surface

disturbance and vegetation removal. Under Alternative 1 cumulative impacts to wild horses are not considered to be significant.

Wildlife and Fish

CIAAs for effects to wildlife and fish vary by species. The CIAAs for big horn sheep, elk, mule deer, and pronghorn are composed of the HMAs for each species that either falls completely within the RMPPA or both within and outside the RMPPA (Maps 4-3 through 4-6). CIAAs for the Greater sage-grouse, raptors, Special Status Species, and all other wildlife and fish species are all composed of the RMPPA. Effects of BLM actions on wildlife and fish administered by BLM within the RMPPA are presented in 4.19 above.

RMP alternative impacts to wildlife and fish habitat vary by alternative; however, the majority of impacts would be considered moderate as a result of actions such as minerals development, OHV use, and livestock grazing that could result in the loss, alteration, and fragmentation of habitats and displacement of wildlife. Alternative 2 would result in the greatest effects to wildlife attributed to the greatest amount of development with the least amount of protections. Alternative 3 would result in the least impacts attributed to the least amount of development and the greatest level of protection.

The majority of cumulative impacts on wildlife habitat within all the CIAAs would result from surface disturbing and disruptive activities, such as mineral development and associated wells, roads, pipelines, and facilities, livestock grazing and grazing improvements and others (e.g., geophysical exploration) on private, state, and other federal lands within the RMPPA. Effects could result in habitat fragmentation and animal displacement (short term or long term), depending on the amount, location, and timing of activities. Vegetation treatments in the form of prescribed burns might also affect wildlife resources, particularly Greater sage-grouse. All effects would depend on the amount and timing of activities and whether the amount of activity within each CIAA outpaces the success of reclamation and revegetation efforts in disturbed areas.

Loss of vegetation attributed to development activities would result in a reduction in available habitat and quality of habitat and could result in increasing forage competition among grazing animals. Habitats might be made unavailable to wildlife because of human disturbance factors (e.g., traffic, noise, or increases in livestock during sensitive time periods such as winter, birthing, nesting, and early rearing of young). Impacts to wildlife could be potentially significant if activities are concentrated in areas of sensitive wildlife habitat, and/or increased development and surface disturbance alter existing migration corridors to the extent that access to important habitat areas is greatly reduced.

Effects from vegetation treatments in the form of prescribed burns would include a short-term increase of early successional species and a short-term decrease in vegetation production. Long-term effects, however, would benefit most wildlife through an increase in grass species and vegetation production from conversion of high-density sagebrush to sagebrush/grass communities.

Big Horn Sheep

Approximately 40,120 acres of big horn crucial winter range and 920 acres of parturition area are present on private and state lands (with federal mineral estate) within the RMPPA. Additional big horn crucial winter range and parturition areas are located on private and state lands (without federal mineral estate) and USFS lands; however, acreages are unknown at present. Potential significant effects to these habitats from activities on these lands would be likely because they are not afforded the same protections as habitat on BLM lands.

Elk

Approximately 287,550 acres of elk crucial winter range and 21,370 acres of elk parturition area are present on private and state lands (with federal mineral estate) within the RMPPA. Additional elk crucial winter range and parturition areas are located on private and state lands (without federal mineral estates) and USFS lands; however, acreages are unknown at present. Crucial winter range and birthing habitat are important areas to the viability of the elk herds. Persistent disturbance in elk sensitive habitats shifts the areas of use, weakens the tendency of elk to return to the disturbed area, and results in selection of habitat with equal or more marginal quality and security occurs. If animals return to disturbed habitat, populations can be lower and use of the habitat can be unpredictable.

Potential significant effects to these habitats from activities on these lands would be likely because they are not afforded the same protections as habitat on BLM lands. One exception is WGFD's management and designation of Wildlife Habitat Management Areas where wildlife populations and habitat (in coordination with BLM as necessary) are managed for the protection and benefit of wildlife. The potential also exists for long-term disruption of migration corridors as a result of proposed pipelines and right-of-way corridors between key habitats within the CIAA; however, the majority of these corridors are located in areas of existing long-term disturbance (such as I-80) so minimal additional impacts would occur.

Pronghorn

Approximately 653,070 acres of pronghorn crucial winter range is present on private and state lands (with federal mineral estate) within the RMPPA. Additional pronghorn crucial winter range is located on private and state lands (without federal mineral estates); however, acreages are unknown at present.

Although few published studies exist on pronghorn antelope reactions to roads and/or disruptive human activities, roads, fences, and pipelines are known to fragment habitat and can impede or block antelope movement. The density of which these occur could have a large effect on antelope migration and use of habitat. Mineral development would cause the greatest amount of effects to pronghorn antelope through habitat fragmentation by the proliferation of roads, pipelines, and wells. Road proliferation would continue to occur with oil and gas projects on all lands in antelope habitat, which would potentially reduce or eliminate migration corridors throughout antelope crucial winter range in the CIAA. Depending on the timing of activities and location of surface disturbance within the CIAA, the potential exists for disruption of crucial winter range continuity and migration corridors between key habitats. This would likely affect pronghorn antelope populations; however, it is unknown whether effects would be significant given the lack of information on pronghorn reactions to human activity.

Mule Deer

Approximately 540,200 acres of mule deer crucial winter range is present on private and state lands (with federal mineral estate) within the RMPPA. Additional mule deer crucial winter range is located on private and state lands (without federal mineral estates); however, acreages are unknown at present.

Mineral development would cause the greatest amount of effects to mule deer habitats on all lands within the CIAA through direct loss of habitat and animal displacement. Depending on the timing of activities and location of surface disturbance within the CIAA, the potential exists for disruption of crucial winter range continuity and migration corridors between key habitats. This would likely affect pronghorn antelope populations; however, it is unknown whether effects would be significant.

4.21 Irreversible and Irretrievable Commitments of Resources

Section 102(2)C or NEPA requires a discussion of any irreversible or irretrievable commitments of resources, which would be involved in the proposal should it be implemented. An irretrievable commitment of a resource is one in which the resource or its use is lost for a time period (e.g., extraction of any locatable mineral ore or oil and gas). An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species or disturbance to protected cultural resources).

Implementation of the RMP would result in an irreversible or irretrievable commitment of resources. This would be from surface disturbing and disruptive activities associated with mineral extraction and energy development permanently altering soil and damaging cultural and paleontological resources. Slight increases in sediment, salinity, and nonpoint source pollution might result in an irretrievable degradation of water quality from these activities. Wildlife dependent on the affected habitats might be displaced and populations might be reduced as carrying capacity of the range is reduced. Irreversible and irretrievable losses of wildlife habitat indirectly reduce the amount of suitable Special Status Species habitat. However, management prescriptions and mitigation prescribed under the alternatives are intended to reduce the magnitude of these impacts and would restore some of the soil, vegetation, and habitat lost. Construction of roads, well pads, and other transportation infrastructure improvements create an irretrievable loss of habitat and impair important visual elements, particularly near communities. Stand-replacing fires might cause an irreversible loss to some key ecosystem components.

An irretrievable commitment of nonrenewable fossil fuels (i.e., oil, gas, and coal) would occur from extraction of potential wells developed during the next 20 years (Alternative 1, 8,945; Alternative 2, 9,198; Alternative 3, 8,632; and Alternative 4, 8,822). Mineral and energy development would result in an irreversible loss of vegetation resources and crucial mule deer, elk, big horn sheep, and pronghorn habitat within minerals and energy development categories as development occurs. Lands occupied by mineral extraction would permanently lose habitat values and reduce carrying capacity for wildlife resources.

4.22 Unavoidable Adverse Impacts

Section 102(C) of NEPA requires disclosure of any adverse environmental effects that cannot be avoided should the proposal be implemented. Unavoidable adverse impacts are those that remain following the implementation of mitigation measures or impacts for which no mitigation measures exist. Some unavoidable adverse impacts would occur as a result of implementing the RMP. Others are a result of public use of BLM-managed lands within the RMPPA.

Continuing to allow surface disturbing and disruptive activities as required by BLM multiple-use mandate would result in unavoidable adverse impacts. Although these impacts are mitigated to the extent possible, unavoidable damage is inevitable. Permanent conversion of vegetation resources to other uses such as transportation and mineral and energy development reduces the quantity of vegetation resources. Energy and mineral resources extraction on public lands potentially creates visual intrusions, soil erosion, and compaction problems. Portions of the resource area with more intense recreational use would continue to experience scarring, increased soil erosion, and loss of vegetation. Although these impacts are unavoidable, they are concentrated in areas already disturbed, which reduce the spread of impacts to more remote or less frequented areas.

Because large portions of the crucial big game habitats coincide with the known areas of oil and gas potential, impacts to habitats would be unavoidable under current BLM policy to foster oil and gas

development. However, permanent oil and gas well sites and their associated infrastructure would be mitigated to the extent possible to minimize fragmentation and avoid the most significant wildlife habitat values. Competition is anticipated for habitat resources between wildlife, livestock, and wild horses and burros. The extent of the impacts would vary by season and drought cycle. Although there might be short-term periods of significant impacts, long-term management will ensure that these uses are compatible to the extent possible.

Inadvertent damage to or loss of cultural resources from increased visitation and surface disturbing and disruptive activities is unavoidable. Although mitigation measures could be implemented for scientific data recovery, the impacts to the area of excavation would be unmitigatable. The number of sites anticipated to be inadvertently damaged is unknown, but is directly proportional to the acreage disturbed.

Conflicts between user types, such as recreationists who seek more primitive types of recreation and motorized vehicle users who share recreational areas, are unavoidable adverse impacts. As recreation demand increases, recreational use would disperse to other areas of the RMPPA, which could create conflicts with previous uses of those areas. Under alternatives in which mineral development is expected to be higher, recreation use would be transferred from those areas, which will increase the extent and frequency of conflict between these incompatible user groups.

Numerous land use restrictions imposed throughout the RMPPA to protect sensitive resources and other important values, by their nature, would impact the ability of operators, individuals, and groups who use the public lands to do so freely without limitations. Although attempts are made to minimize these impacts by limiting the protection level necessary to accomplish management objectives and by providing alternative use areas for impacted activities, unavoidable adverse impacts would occur.

4.23 Relationship Between Local Short-term Uses and Long-term Productivity

Section 102(C) of NEPA requires discussion of the relationship between local, short-term uses of man's environment and the maintenance and enhancement of long-term productivity of resources. As described in the introduction to this chapter, "short term" is defined as anticipated to occur within 1 to 5 years of implementation of the activity. "Long term" is defined as following the first 5 years of implementation but within the life of the RMP (projected to be 20 years).

Management actions would result in various short-term effects, such as increased localized soil erosion, fugitive dust emissions, vegetation damage, and decreased visual resource quality. Surface disturbing and disruptive activities, including mineral and energy development, dispersed recreation, livestock grazing, infrastructure development, and human use would result in the greatest potential for impacts to long-term productivity. Management actions and best management practices minimize the effect of short-term uses and reverse the change during the long term. However, BLM lands are managed to foster multiple uses and some long-term productivity impacts might occur regardless of management approach.

The short-term effects of oil and gas development decrease the area and productivity of potential crucial deer and elk and Special Status Species habitats. Development of additional roads associated with oil and gas development would cause the greatest impacts. However, permanent oil and gas well sites and their associated infrastructure would be mitigated to the extent possible to minimize fragmentation and avoid the most significant wildlife habitat values. In addition, management actions to improve soil, water, riparian, vegetation, and habitat resources would improve the productivity of wildlife and Special Status Species habitats throughout the RMPPA.

Long-term impacts to soil structure and vegetation would occur in areas where concentrated recreational use is directed. However, concentrating recreational use to certain areas would limit the adverse impacts from extending to other areas of the RMPPA. Maximizing short-term use of forage resources without an increase in woodland harvest or vegetation treatments would result in a long-term continued build-up of large fuels, which would result in uncharacteristically intense wildland fires and longer return-fire intervals. However, increases in short-term woodland product harvest (e.g., pole/post, dead and down fuel collection) as well as forest harvests would reduce the long-term intensity and size of wildland fires.

CHAPTER 5—CONSULTATION AND COORDINATION

The Bureau of Land Management (BLM) decision-making process is conducted in accordance with the requirements of the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations implementing NEPA, and Department of Interior (DOI) and BLM policies and procedures implementing NEPA. NEPA and the associated regulatory/policy framework require that all federal agencies involve interested general public in their decision-making, consider reasonable alternatives to proposed actions, and prepare environmental documents that disclose the potential impacts of proposed actions and alternatives.

Public involvement, consultation, and coordination have been at the heart of the planning process leading to this draft Environmental Impact Statement (EIS) and proposed Resource Management Plan (RMP). This was accomplished through public meetings, informal meetings, individual contacts, news releases, planning bulletins, a planning website, and Federal Register notices.

A Notice of Intent (NOI) was published in the Federal Register on February 25, 2002, to formally announce that the BLM Rawlins Field Office (RFO) was preparing an RMP and associated EIS. The notice invited the participation of the affected and interested agencies, organizations, and members of the general public in determining the scope and significant issues to be addressed in the planning alternatives and analyzed in the EIS. Additional public involvement was solicited to help identify issues to be addressed in developing a full range of land management alternatives (see Table 5-1 for a list of public involvement, coordination, and consultation events). This chapter describes this public involvement process as well as other key consultation and coordination activities undertaken for the preparation of a comprehensive draft EIS for the Rawlins Field Office.

Table 5-1. Public Involvement, Coordination, and Consultation Events

Date	Location	Type
February 5, 2003	Rawlins, Wyoming	Cooperators Meeting
March 3, 2003	Rock Springs, Wyoming	Joint Public Scoping Meeting for Rawlins RMP/Pinedale RMP
March 4, 2003	Rawlins, Wyoming	Public Scoping Meeting
March 5, 2003	Baggs, Wyoming	Public Scoping Meeting
March 6, 2003	Laramie, Wyoming	Public Scoping Meeting
July 14–18, 2003	Rawlins, Wyoming	Cooperators Meeting/Alternatives Development Workshop
December 1–5, 2003	Rawlins, Wyoming	Cooperators Meeting/Development of the Preferred Alternative

5.1 CONSULTATION AND COORDINATION

Because of jurisdictional responsibilities, BLM is required to consult with certain federal, Native American, and state agencies and entities (40 CFR 1502.25) during the NEPA decision-making process. BLM is also directed to integrate NEPA requirements with other environmental review and consultation requirements to reduce paperwork and delays (40 CFR 1500.4–5).

Title II, Section 202 of the Federal Land Policy and Management Act (FLPMA) directs BLM to coordinate planning efforts with Native American Indian tribes, other federal departments, and agencies of the state and local governments as part of its land use planning process. This section documents the consultation and coordination efforts undertaken by BLM throughout the entire process of developing the Proposed RMP and draft EIS.

Coordination with other agencies and consistency with other plans were accomplished through frequent communications, meetings, and cooperative efforts between the BLM interdisciplinary team and involved federal, state, and local agencies and organizations. Coordination and consistency for the draft EIS was primarily accomplished through the assistance of cooperating agencies formally involved in the project (see Section 5.1.1 for a list of cooperating agencies and a description of their involvement).

The U.S. Fish and Wildlife Service (USFWS) was consulted for Endangered Species Act Section 7 consultation and provided threatened and endangered species lists. An updated species list dated August 2003 was received.

Coordination with the Environmental Protection Agency (EPA) through various meetings has occurred throughout the Rawlins RMP process. BLM also participated as a member of the Air Quality Protocol Group, which includes USFS, the State of Wyoming, and the National Park Service (NPS) as participants.

5.1.1 Cooperating Agencies

The Rawlins Field Office extended cooperating agency status to the State of Wyoming, Carbon County, Albany County, Sweetwater County, and various Conservation Districts for the Rawlins RMP planning effort. These agencies were invited to participate because they have jurisdiction by law or could offer special expertise. A list of the Cooperating Agencies that have actively participated in cooperators meetings leading up to the development of the Proposed RMP/draft EIS is included below:

- Carbon County
- Albany County
- Sweetwater County
- Representative from the Wyoming Governor's Office
- State of Wyoming
- Wyoming State Lands and Investments
- Wyoming Department of Agriculture
- Wyoming Game and Fish Commission
- Wyoming Oil and Gas Commission
- Wyoming Department of Environmental Quality (WDEQ)–Water/Air
- State Historic Preservation Office
- Saratoga-Encampment-Rawlins Conservation District
- Medicine Bow Conservation District
- Little Snake River Conservation District
- Sweetwater County Conservation District
- U.S. Environmental Protection Agency (EPA).

The cooperating agencies were formally invited to participate in the development of the alternatives and to provide existing data and other information relative to their agency responsibilities, goals, and mandates. The RFO held meetings with the cooperating agencies on February 5, 2003, and December 1–5, 2003, concerning the approach to the planning process and development of alternatives. The cooperating agencies were invited to work with the BLM interdisciplinary team in developing the alternatives.

5.1.2 Coordination and Consistency

Coordination with other agencies and consistency with other agency and local and state government plans were accomplished through frequent communications and cooperative efforts between BLM and involved federal, state, and local agencies. The Wyoming Governor's Clearinghouse will receive 20 copies of this

draft EIS for review to ensure consistency with ongoing state plans. The interdisciplinary team will review county land use plans to ensure consistency. Table 5-2 summarizes coordination actions undertaken by various federal, state, and local agencies for the RMP development process.

Table 5-2. Key Coordination Actions

Agency	Coordination/Responsibility
FEDERAL AGENCIES	
U.S. Department of the Interior	
Bureau of Reclamation (BOR)	Coordinates mineral leasing and other activities that affect lands administered by the BOR. Reviews the Rawlins RMP/EIS for consistency with BOR planning.
Fish and Wildlife Service	Reviews actions affecting threatened or endangered species of fish, wildlife, or plants. Section 7 consultation, coordination, and review.
Geological Survey	Reviews Rawlins RMP/EIS for consistency with USGS planning.
Minerals Management Service	Reviews Rawlins RMP/EIS for consistency with MMS planning.
U.S. Department of Agriculture	
Forest Service	Coordinates mineral leasing and other activities that affect lands administered by the Forest Service. Reviews the Rawlins RMP/EIS for consistency with Forest Service planning. Coordinates and cooperates with EPA and WDEQ on monitoring and collection of air quality data.
Animal and Plant Health Inspection Service–Wildlife Services	Coordinates annual management plan for animal damage control activities on public lands.
U.S. Environmental Protection Agency	Coordinates with BLM, Forest Service, and WDEQ on monitoring and collecting air quality data. Reviews air quality monitoring data. Files Federal Register notices.
STATE AGENCIES	
State of Wyoming	Participates in the environmental analysis and documentation process by providing information concerning environmental issues for which the State of Wyoming has jurisdiction by law or special expertise. Provides information from state records on matters including, but not limited to, Rawlins RMP/EIS project impacts on air quality and Class 1 air sheds, fish and wildlife, domestic livestock grazing, social and economic impacts, minerals, and State of Wyoming permitting requirements. The state has primacy on water rights and determines the use and allocation of water resources in the state in terms of groundwater and surface water
WDEQ	Coordinates and cooperates on water quality, development of monitoring for visibility standards and guidelines, and collecting of air quality data. WDEQ administers the NPDES program and issues permits for surface discharge in the state, and sets the water quality standards for water bodies within the state.
Wyoming State Forestry, Emergency Management Agency, State Fire Marshall's Office	Coordinates on forest management of prescribed fire and wildland fire.
Wyoming Game and Fish Department	Coordinates and cooperates on vegetation treatment projects, wildlife habitat management, big game herd objectives, and special status species.
Wyoming Department of Transportation	Coordinates and cooperates on transportation planning and highway access.
State Historic Preservation Office	Consults on compliance with Section 106 of the National Historic Preservation Act in accordance with the National Programmatic Agreement, as implemented in the Wyoming Protocol to that agreement.

Agency	Coordination/Responsibility
COUNTY AGENCIES	
Carbon County **Albany County** **Sweetwater County**	Participate in the environmental analysis and documentation process by providing information concerning environmental issues for which each specified county has jurisdiction by law or special expertise. Provide information on Rawlins RMP/EIS project impacts on domestic livestock grazing and social and economic impacts relating to each specified county.
CONSERVATION DISTRICTS	
Medicine Bow Conservation District **Little Snake River Conservation District** **Sweetwater County Conservation District**	Assist with the conservation of Wyoming's soil and water resources; promote the control of soil erosion; promote and protect the quality of Wyoming's waters; reduce siltation of stream channels and reservoirs; promote wise use of Wyoming's water and all other natural resources; preserve and enhance wildlife habitat; protect the tax base; and promote the health, safety, and general welfare of the citizens of this state through a responsible conservation ethic.

5.1.3 Native American Interests

As part of the general scoping process and the requirement to consult with Native Americans, letters were sent to the Arapaho, Comanche, Crow, Eastern Shoshone, Shoshone-Bannock, and Ute tribes. The letters requested information to be considered in the planning process.

As a result of these letters, the BLM received comments from the Ute tribe requesting that the BLM consider and protect cultural resources and sites sensitive to Native Americans in the planning document.

Following the scoping process, a letter was sent to all of the tribes listed above and in addition to the Northern Cheyenne. This letter more specifically requested information regarding any concerns the tribes might have within the Rawlins Resource Management Planning Area (RMPPA) and presented the opportunity for meetings or field trips with representatives from the tribes. These letters were followed up with telephone calls. The need for the tribes to review and comment on the draft EIS was also stressed in the letters and during the follow-up telephone calls.

As a result of these calls, Vernon Hill of the Eastern Shoshone expressed his concerns that the BLM consider cultural resources in the planning process and requested that the BLM continue to contact the tribes on a project-specific level so that the tribes could provide input on sacred sites that might be impacted at that time.

5.2 Public Participation

Public participation in the BLM planning process includes a variety of efforts to identify and address public concerns and needs. The public involvement process assists the agencies in—

- Broadening the information base for decision-making
- Informing the public about the RMP/EIS and the potential impacts associated with various management decisions
- Ensuring that public needs and viewpoints are brought to the attention of the agency.

5.2.1 Scoping Period

The public is provided a scoping period to identify potential issues and concerns associated with the RMP/EIS. Information obtained by BLM during public scoping is combined with issues identified by the agencies to form the scope of the EIS.

Publication of an NOI on February 25, 2002, announced BLM's intention of revising the Great Divide RMP.

Scoping Notice

The official 60-day scoping period began when a public scoping notice was prepared and mailed to federal, state, and local agencies; interest groups; and members of the general public on January 31, 2003. The notice invited the public to participate in the scoping process and requested input in identifying resource issues and concerns, management alternatives, and other information valuable in determining future land use decisions for the Rawlins RMPPA. The notice also announced the availability of the Management Situation Analysis (MSA) on the Rawlins RMP project website. The scoping period ran from February 3, 2003, through April 7, 2003. Also included with the Scoping Notice was information on the Rawlins Field Office management area, background information on the planning process, as well as preliminary planning issues and planning criteria.

Scoping Meetings

Public scoping meetings were held in Rock Springs, Rawlins, Baggs, and Laramie, Wyoming, on March 3, 4, 5, and 6, 2003, respectively. During the four scoping meetings, more than 80 people registered their attendance. The meetings were structured in an open house format, with BLM specialists representing issues such as livestock grazing, mineral and gas development, and other resource areas. BLM specialists were available to provide information and responses to questions. Comments from the public were collected during the scoping meetings and throughout the scoping period through a variety of methods—mail, fax, e-mail, and through the project website.

Approximately 26,745 comments were received through the various methods. Comments were categorized by topic for analysis purposes. The category receiving the most comments was "mining and oil and gas development." A large number of comments expressed a desire for preservation over continued development. A major concern identified in the comments dealt with the disruption of migration corridors for big-game herd animals and the degradation of environmentally sensitive areas.

The second category receiving the most comments was "Wildlife and Fisheries." Although fewer in number, comments were also received dealing with Range Management and Livestock Grazing, Recreation and OHV Use, Cultural and Historic Resources, Special Management Areas, Wilderness, Transportation and Access, and General Comments. A summary of all comments was then compiled and made available as the *Rawlins RMP Scoping Report*, May 2003, which can be viewed at: http://www.rawlinsrmp.com.

5.2.2 Mailing List

The mailing list for public scoping was developed initially from the Rawlins Field Office mailing list and supplemented throughout the planning process. Scoping meeting participants were given the option to be added to the mailing list. In addition, individuals were able to add themselves to the project mailing list by registering on the project website, as well as through requests to be placed on the mailing list by

contacting BLM staff. The RFO mailing list has been used as the basis for the distribution of the Draft RMP/EIS (see Section 5.3).

5.2.3 Newsletters

Periodic newsletters have been developed to keep the public informed of the Rawlins RMP/EIS planning process. The April 2002 Rawlins RMP/EIS planning bulletin provided basic background information on the project, including the purpose and need for updating the RMP and issues that the plan may address. The newsletter also extended an invitation to the public to be involved in the process and advertised the Rawlins RMP project website.

The December 2003 Rawlins RMP/EIS planning bulletin described the scoping meetings that took place in March, and gave a brief summary of the main issues that were brought forward though public comment. The bulletin also described the process of working with cooperating agencies, alternatives development, and impact analysis, and discussed future public involvement opportunities.

5.2.4 Website

The Rawlins RMP/EIS project website can be found at http://www.rawlinsrmp.com. The site serves as a virtual repository for documents related to RMP development, including announcements, bulletins, and draft and final documents. These documents are available in .pdf format to ensure that they are available to the widest range of users.

During the scoping period, the website also provided the opportunity for the general public to submit their comments for consideration as part of scoping as well as add themselves to the project mailing list to receive periodic newsletters and announcements.

5.2.5 Future Public Participation

Public participation will be ongoing throughout the remainder of the Rawlins RMP planning process. One substantial part of this effort will be the opportunity for members of the public to comment on the content of this draft EIS during the specified comment period. The FEIS will respond to all substantive oral and written comments received during the 90-day comment period. The Record of Decision (ROD) is issued by the BLM after the release of the FEIS, the Governor's Consistency Review, and Protest Resolution.

5.3 Distribution List

Tribal Governments

Crow Tribe

- Crow Tribal Cultural Committee
- Crow Traditional Leader
- Crow Tribal Administration
- Crow Tribal Council

Eastern Shoshone Tribe

- Eastern Shoshone Business Council
- Eastern Shoshone Tribal Council

Shoshone-Bannock Tribes
- Fort Hall Business Council

Ute Tribe
- Ute Tribe
- Uinta Ute Cultural Rights and Protection Office
- Ute Mountain Tribe

Shoshone Tribe
- Shoshone Tribal Preservation Officer
- Shoshone Tribal Cultural Center

Northern Cheyenne Tribe
- Northern Cheyenne Tribal Council
- Northern Cheyenne Cultural Committee

Sioux Tribe
- Sisseton Sioux Spokesperson
- Rosebud Sioux Tribal Council

Northern Arapaho
- Northern Arapaho Business Council
- Traditional Elders Representative

Local Governments (Counties, Cities, Towns)

Albany County, Wyoming
- Albany County Commissioners
- City of Laramie
- Town of Rock River

Carbon County, Wyoming
- Carbon County Commissioners
  - Carbon County Museum
  - Carbon County Planning Commission
  - Carbon County Road and Bridge
  - Carbon County School District #1 and #2
  - Little Snake River Conservation District
  - Medicine Bow Conservation District
  - Saratoga-Encampment-Rawlins Conservation District
- Carbon County Chamber of Commerce
- Town of Bairoil
- Town of Baggs
  - Baggs Solid Waste District
- Town of Dixon
- Town of Elk Mountain
- Town of Encampment
- Town of Hanna
- Town of Medicine Bow
- City of Rawlins
  - Rawlins Chamber of Commerce

- Town of Riverside
- Town of Saratoga
  - Saratoga Platte Valley Chamber of Commerce
  - Upper Platte River Solid Waste District
- Town of Sinclair

Laramie County, Wyoming

- Laramie County Commissioners
  - Laramie County School District #1
- Town of Burns
- City of Cheyenne
- Town of Pine Bluffs

Sweetwater County, Wyoming

- Sweetwater County Commissioners
  - Sweetwater County Conservation District
  - Sweetwater County Historical Society
  - Sweetwater County Planning
  - Sweetwater County Solid Waste District
- City of Green River
- City of Rock Springs
  - Rock Springs Chamber of Commerce
- Town of Wamsutter

Town of Walden, Colorado

Wheatland Irrigation District

State of Wyoming

- Senator Tex Boggs, Sweetwater
- Senator Rich Cathcart, Laramie
- Senator Irene Devin, Albany
- Senator John Hanes, Laramie
- Senator Rae Lynn Job, Sweetwater/Fremont
- Senator April Brimmer Kunz, Laramie
- Senator Mike Massie, Albany
- Senator E. Jayne Mockler, Laramie
- Senator Kathryn Sessions, Laramie
- Senator Bill Vasey, Albany/Carbon
- Representative Rodney "Pete" Anderson, Laramie
- Representative George Bagby, Carbon
- Representative Kurt Bucholz, Carbon/Albany
- Representative Floyd A. Esquibel, Laramie
- Representative John M. Hastert, Sweetwater
- Representative Becket Hinckley, Laramie
- Representative Pete Illoway, Laramie
- Representative Lorna Johnson, Albany
- Representative Wayne H. Johnson, Laramie
- Representative Marty Martin, SW Fremont/Sweetwater
- Representative Larry Meuli, Laramie
- Representative Layton Morgan, Laramie

- Representative Philip A. Nicholas, Albany
- Representative Fred Parady, Sweetwater
- Representative Ed Prosser, Laramie
- Representative Wayne Reese, Laramie
- Representative Tony Ross, Laramie
- Representative James J. Slater, Albany
- Representative Bill Thompson, Sweetwater
- Representative Jane Warren, Albany

Wyoming State Agencies

- Office of the Governor, Environmental Policy Division
- Wyoming Department of Environmental Quality
  - Air Quality Division
  - Land Quality Division
- Wyoming Department of Agriculture
- Wyoming Department of State Parks and Cultural Resources
- Wyoming Department of Transportation
- Wyoming State Planning Office
- Wyoming Business Council
- Wyoming Game and Fish Department
  - Cheyenne, Green River, Lander, Rawlins, Savery, and Sinclair
- Wyoming State Geologic Survey
- Wyoming Office of State Lands and Investments
- Wyoming State Engineer's Office
- Wyoming State Historic Preservation Office
- Wyoming Department of Employment, Research, and Planning Division

Wyoming State Boards/Commissions

- Wyoming Public Service Commission
- Wyoming Water Development Commission
- Wyoming Recreation Commission
- Wyoming State Grazing Board
- Wyoming Farm Bureau Federation
- Wyoming Oil and Gas Conservation Commission
- Wyoming State Board of Outfitters and Professional Guides
- Cheyenne Board of Public Utilities

Associations/Councils

- Wyoming Association of Municipalities
- Council of Governments
- Petroleum Association of Wyoming
- Powder River Basin Resource Council
- Southwest Wyoming Mineral Association
- Southwest Wyoming Industrial Association
- Wyoming Stockgrowers Association
  - Carbon County Stockgrowers
- Wyoming Mining Association
- Wyoming Sportsman's Association

- Wyoming Association of Professional Historians
- Wyoming Association of Professional Archeologists
- Wyoming Wilderness Association
- Wyoming Woolgrowers Association
- Wheatland Rural Electric Association
- Coalbed Methane Coordination Coalition
- Natural Diversity Database
- Yampa Valley Electrical Association, Colorado
- American Wind Energy Association
- American Horse Protection Association
- American Mustang and Burro Association
- American Mustang Association
- North American Mustang Association
- Motorcycle Industry Council
- Oregon-California Trails Association
- Wyoming Outdoor Council
- The Natural Resources Defense Council
- Wildlife Habitat Council
- Adventure Cycling Association
- Independent Petroleum Association of Mountain States
- Jeffrey City Community TV Association
- Powder River Basin Resource Council
- Sweetwater Wildlife Association
- Southwest Wyoming Minerals Association
- Southwest Wyoming Industrial Association
- Mormon Trails Association
- National Mustang Association
- National Wild Horse Association

Clubs/Alliances/Societies/Groups

- American Lands Alliance
- Biodiversity Conservation Alliance
- Sierra Club
- Western Watersheds Project
- Centennial Valley Concerned Citizens
- Carbon County Economic Development Corporation
- Friends of the West
- Doris Day Animal League
- Wildlife Management Institute
- Defenders of Wildlife
- The Wilderness Society
- Rails to Trails Conservancy
- National Wildlife Federation
- Wyoming Wildlife Federation
- Humane Society of the United States
- Continental Divide Trail Society
- Wolfe Continental Divide Trail Society
- Predator Project
- Rocky Mountain Elk Foundation
- Wildland Center for Preventing Roads

- Hooved Animal Humane Society
- Earthjustice Legal Defense Fund, Inc.
- Environmental Defense
- Safari Club International
- Oil and Gas Accountability Project
- Center for Native Ecosystems
- Wyoming Advocates for Animals
- Audubon Society
- Land and Water Fund of the Rockies
- Izaak Walton League
- The Nature Conservancy
- The Wildlife Society
- Overland Trail Property Owners
- Rawlins Downtown Development Authority
- Carbon County Amateur Radio
- Carbon County Coalition
- 3-Shot Sage Grouse Foundation
- Saratoga Lions Club
- Wind River Multiple Use Advocates
- National Outdoor Leadership School
- People for Wyoming
- Wyoming People for the USA
- Murie Audubon Society
- Conservancy of the Phoenix
- Grassroots Advocate
- The International Society for the Protection of Mustang and Burros
- Southwest Wyoming Mule Deer Foundation
- Western Wyoming Mule Deer Foundation
- Trout Unlimited
- Fund for Animals
- People for the West
- Colorado River Basin Salinity Control Forum
- Medicine Wheel Coalition for Sacred Sites of North America
- Wild Horse Organized Assistance
- Dream Catcher Wild Horse and Burro Sanctuary
- Animal Protection Institute
- Western Land Exchange Project
- American Lands
- Whole Horse Institute
- Public Lands Advocacy

Congressional Delegation

- U.S. Senator Mike Enzi
  - Washington, D.C. and Casper, Cheyenne, Gillette, and Jackson, Wyoming, offices
- U.S. Senator Craig Thomas
  - Washington, D.C. and Cheyenne and Rock Springs, Wyoming, offices
- U.S. Representative Barbara Cubin
  - Washington, D.C. and Cheyenne and Rock Springs, Wyoming, offices

Department of the Interior Agencies

- Bureau of Indian Affairs
- Bureau of Reclamation
  - Washington, D.C. and Casper and Provo, Wyoming, offices
- Minerals Management Service
- National Park Service
  - Washington, D.C. and Denver, Colorado, offices
- Office of Environmental Policy and Compliance
- Natural Resources Library
- Office of Surface Mining
- U.S. Fish and Wildlife Service
  - Washington, D.C. and Denver, Colorado; and Cheyenne, Wyoming, offices
- U.S. Geological Survey
  - Washington, D.C. and Cheyenne, Wyoming, offices

Other Federal Agencies

- Environmental Protection Agency
- Department of Agriculture
  - Forest Service
    - » Big Horn National Forest
    - » Black Hills National Forest
    - » Bridger-Teton National Forest
    - » Medicine Bow/Routt National Forest
    - » Shoshone National Forest
  - Natural Resource Conservation Service
    - » Casper and Baggs, Wyoming, offices
- Army Corp of Engineers
- Department of Energy
  - Western Area Power Area
    - » Loveland and Lakewood, Colorado, offices
- Federal Highway Administration
- Federal Energy Regulatory Commission
- U.S. Government Printing Office
- National Weather Service

Other Governmental Agencies

- Colorado Division of Water Resources
- State of Colorado, Department of Public Health and Environment, Air Pollution Control Division
- Colorado State Forest Service
- Routt County Planning Director
- Platte River Power Authority

Media

- Casper Star Tribune
- Grassroots Advocate
- Green River Star
- Lander Journal

- Laramie Daily Boomerang
- Laramie News Service
- Northwest Colorado Daily Press
- Pine Bluffs Post
- Rawlins Daily Times
- Rocket Miner
- Rocky Mountain Energy
- Saratoga Sun
- Wyoming State Tribune-Eagle
- KCNC-Western Inspirational Broadcast
- KCWY TV
- KFBC/Cowboy News Network
- Wyomedia KFNB-TV
- KGWN TV
- KING/KOLT
- KOWB
- KRAL/KIQZ
- KRSV
- KTWO TV/KTWO Radio
- KUGR/KYCS
- KUWR

Libraries

- Library of Congress
- Laramie County Library System
- Burns Branch Library
- Centennial Branch Library
- Albany County Library
- University of Wyoming Library
- Carbon County Public Library
- Bairoil Branch Library
- Elk Mountain Branch Library
- Encampment/Riverside Branch Library
- Hanna Branch Library
- Medicine Bow Branch Library
- Saratoga Branch Library
- Sinclair Branch Library
- Rock Springs Library
- White Mountain Library
- Western Wyoming Community College Library
- Sweetwater County Library System
- Utah State University—Merrill Library and Learning

Educational Institutes

- Mississippi State University
  - Department of Wildlife and Fisheries
- Metropolitan State College
- Laramie County Community College
- University of Wyoming

  - Trustees
  - Geology Museum
  - Department of Range Land Ecology
  - Department of Geology and Geophysics
- Western Wyoming Community College
  - Archeological Services

CHAPTER 6—LIST OF PREPARERS AND CONTRIBUTORS

As required by National Environmental Policy Act (NEPA) Regulations (40 Code of Federal Regulations [CFR] Part 1502.17), this section lists the people primarily responsible for preparing this Draft Environmental Impact Statement (draft EIS) and presents their qualifications. Booz Allen Hamilton, a contractor selected to prepare the EIS as directed by Bureau of Land Management (BLM), has, in accordance with 40 CFR 1506.5(c), certified that it does not have any financial or other interest in the outcome of decisions to be made pursuant to this EIS. In addition to the specific responsibilities listed, many BLM employees also contributed substantial time consulting with other agency personnel in preparing this EIS (refer to Section 5.3, Agency Consultation and Coordination) (see Table 6-1).

Table 6-1. List of Preparers and Contributors

Name	Education	Project Role
Bureau of Land Management		
John Spehar	BS, Forestry BLM 25 years	RMP/EIS Team Leader.
Joseph Patti Jr.	AS, Pre-forestry BS, Forest & Range Management BLM 42 years	Senior Planning Coordinator, technical planning and NEPA procedural guidance and assistance for the RMP effort and overall coordination with contractors, state government and other cooperating agencies.
Rey T. Adame	AAS, Public Affairs BA, Public Relations MS, Political Science	Public Affairs.
Roy L. Allen	PhD, Economics BLM 27 years	Coordination and review of Socioeconomics sections.
Frank Blomquist	BA, Natural Resource Management BS, Wildlife Biology BS, Botany Certified Wildlife Biologist BLM 21 years	Wildlife Biologist, Wildlife and Fisheries section, Wildlife Cooperative Management Areas.
Mike Bower	BS, Fish and Wildlife Biology and Management BLM 4 years	Fishery Biologist, Wildlife and Fisheries section.
Heather Burdick	BS, Rangeland Resource Science BLM 4 years	Rangeland Management Specialist
Susan Caplan	BS, Meteorology MS, Air Resource Management BLM 6 years	Physical Scientist, Air Quality lead.
Lloyd Chism	BS, Petroleum Engineering BS, Geology BLM 3 years	Petroleum Engineer for Fluid and Solid Minerals.
Krystal Clair	BA, Recreation Administration MBA BLM 12 years	Recreation Planner, WSA, SRMA, OHV, WSR, VRM.
Heath Cline	BS, Wildlife and Fisheries Biology and Management BLM 3 years	Wildlife Biologist.
Susan Foley	BS, Range BLM 12 years	Weeds Specialist.
Ken Henke	BS, Wildlife Biology	Lead, state hazardous materials sections.

Name	Education	Project Role
Vicki Herren	BS, Wildlife Biology MS, Wildlife Biology BLM 10 years	State office review team.
Pamela M. Huter	BA, Anthropology MA, Anthropology BLM 1 year	Resource specialist, Cultural Resource section.
Kurt J. Kotter	BS, Wildlife Management MS, Range Science BLM 30 years	Field Manager.
Bob Lange	BA, Technical Journalism BS, Physical Science MS, Watershed Science BLM 2 years	Hydrology specialist.
William Mack	BS, Forest Management BLM 7 years	Forester, Forestry sections.
Lynn McCarthy	BS, Education MS, Administration BLM 17 years	GIS specialist.
Aaron Mier	BS, Agro-ecology BLM 10 years	Fuels Program Manager, Fire and Fuels section.
Clare Miller	BS, Botany BLM 28 years	Assistant Field Manager, Minerals and Lands. Technical Reviewer.
Mark Newman	BS, Geology Certified Mineral Examiner BLM 23 years	Geologist. Technical Reviewer for Solid Minerals and Paleontology.
Craig Nicholls	BS, Atmospheric Science MS, Atmospheric Science BLM 1 year	National Air Quality Modeler, Air Quality Emissions.
Mary Read	BS, Animal Science MS, Environmental Science and Policy Certified Wildlife Biologist BLM 11 years	Wildlife Biologist, Wildlife and Fisheries section, Wildlife Cooperative Management Areas.
Chuck Reed	BS, Range Animal Science BLM, 30 years	Wild Horse specialist.
Alberta Settle	BA, Geology MS, Geology MS, Environmental Engineering BLM 4 years	Civil Engineer, Collateral Hazardous Materials Coordinator.
Dean Stilwell	BS, Geology MS, Geology Wyoming Certified Geologist BLM 23 years	Geologist, RFD section.
Larry Trapp	AS, Natural Resources Management BLM 30 years	Fire Management Officer, Fire and Fuels section.
Charles A. Valentine	BS, Geography BLM 16 years	Realty Specialist, Technical Reviewer for Lands & Realty, Transportation & Access.
Patrick Walker	BA, Anthropology BLM 2 years	Archaeologist, Cultural Resources section.
Andy Warren	BS, Range Management BS, Wildlife Biology BLM 24 years	Lead Range Specialist, Livestock and Grazing and Vegetation sections.
Janelle Wrigley	Realty Management Certification, Feb. 1995 BLM 21 years	Realty Specialist. Technical Reviewer for Lands & Realty, Transportation & Access.
Missy Cook	Secretary 16 year BLM employee	Mailing list and document distribution.

Name	Education	Project Role
Booz Allen Hamilton		
David Baxter	BA, Regional Geography and History BA Honors, Political Geography MA, Economic Geography HED, Education PhD, in progress	Project Manager.
Erik Anderson	BS, Civil and Environmental Engineering	Resource Specialist.
Quincy Bahr	AS, Humanities, Arts and Social Sciences BS, Natural Resources Management and Planning	Resource Specialist, Wild Horse Management.
Tonia Bleecher	BA, English and History MCP, Community Planning	Quality Assurance/Quality Control.
Karen Desimone	MA, Urban and Environmental Planning	Public Participation and Cooperator Involvement Coordinator.
James Doenges	BS, Biology MS, Biology	NEPA Advisor and Technical Reviewer.
John Fomous	LL.M., Environmental Law	Public Lands Advisor.
Michael Ghazizadeh	BS, Geology MS, Geology MS, Natural Science PhD, Geology	Resource Specialist, Minerals section.
Jared Gunnerson	BA, Environmental Policy MPA, Natural Resource Management	Forestry and Fire Resource Specialist.
Joel Hanson	BA, Geography and Environmental Studies	GIS Analyst.
Ray W. (Wes) Johnson	BIS, Zoology, Botany, Geography, Certified Meteorologist, U.S. Air Force (ret)	Resource Specialist, Wildlife and Fisheries.
Greg Kloberdanz	AS, Architectural Technology BS, Environmental Planning and Landscape Architecture	Resource Analyst for Lands and Realty, Transportation and Access.
Bryan Klyse	MESM, Environmental Science and Management	NEPA Specialist and Technical Reviewer.
Bill Lamb	BS, Rangeland Management	Public Lands Advisor.
Robert Lane	BA, History MA, Political Science	Quality Assurance/Quality Control
Lisa McDonald	BS, Earth Science MS, Mineral Economics PhD, Mineral Economics	Socioeconomics section.
Kasey Pearson	BA, Environmental Biology	Resource Specialist for Vegetation, Wildlife and Special Management Areas.
Amanda Pryor	BA, Biology MS, Environmental Biology	NEPA Specialist and Technical Reviewer
Dana Purrone	BA, Environmental Policy BA, Spanish MS, Environmental/Natural Resources Management (currently pursuing)	NEPA Analyst, Resource Planner for Wildlife Resources.
Mike Sumner	BS, Recreation Resource Management	NEPA Analyst and Technical Reviewer.
Jeff Ward	BS, Parks, Recreation and Tourism	Resource Specialist, OHV, Recreation, VRM, and Special Management Areas.
ASE, Inc.*		
Jeff Petty	BS, Range Ecology MS, Water Resources	Livestock Grazing and Vegetation Specialist.

Name	Education	Project Role
Warner Reeser	BA, Mathematics MS, Atmospheric Science PhD, Earth Resources	Air Quality Specialist.
TRC Mariah Corporation		
William Batterman	BA, Archaeology	Writer, Cultural Resource sections of Environmental Consequences.
Lance McNees	BS, Philosophy MA, Philosophy	Cultural Resources Overview
ENSR		
James M. Beck, P.E.	BS, Mining Engineering	Technical Reviewer—Minerals and Geology, preparer—Coal Unsuitability Appendix.
William R. Berg, P.G.	BS, Geology MS, Geology	Co-author and Technical Editor for the Mineral Occurrence Development Potential Report.

LIST OF ACRONYMS

ac	Acres
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
AD	Administrative Determination
ADAAG	Americans with Disabilities Act Accessibility Guidelines
ADC	Animal Damage Control (see also WS)
AIRFA	American Indian Religious Freedom Act
AML	Abandoned Mine Lands
AML	Appropriate Management Level
AMP	Allotment Management Plan
AMR	Appropriate Management Response
ANG	Air National Guard
ANS	Aquatic Nuisance Species
APD	Application for Permit to Drill (an oil or gas well)
APE	Area of Potential Effects
APHIS	Animal and Plant Health Inspection Service (USDA)
APWG	Activity Plan Working Group
AQRV	Air Quality Related Value
AQTSD	Air Quality Technical Support Document
ARPA	Archeological Resource Protection Act (of 1979)
ASTM	American Society for Testing and Materials
ATV	All-Terrain Vehicle
AUM	Animal Unit Month
BA	Biological Assessment
BACT	Best Available Control Technology
bbl	Billion Barrels
BCF	Billion Cubic Feet (a measure of quantity of natural gas)
BCFG	Billion Cubic Feet of Gas
BEA	Bureau of Economic Analysis
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management (U.S. Department of the Interior)
BMP	Best Management Practice
BO	Biological Opinion

BOP	Blowout Prevention
BOR	Bureau of Reclamation (see also USBR)
B.P.	Before Present
BTU/lb	British Thermal Units of Energy per Pound
BWPD	Barrels of Water Per Day
C&MU	Classification & Multiple Use (Act of 1964)
CAA	Clean Air Act (of 1970)
CASTNet	Clean Air Status and Trends Network
CBCPEIS	Carbon Basin Coal Project Environmental Impact Statement
CBNG	Coalbed Natural Gas
CDNST	Continental Divide National Scenic Trail
CDPA	Coal Development Potential Area
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act (of 1980)
CFR	Code of Federal Regulations
CIAA	Cumulative Impacts Analysis Area
CIROI	Cumulative Impact Region of Influence
CMA	Cooperative Management Area
CO	Carbon Monoxide
COA	Conditions of Approval
CPI	Consumer Price Index
CRCT	Colorado River Cutthroat Trout
CREG	Consensus Revenue Estimating Group
CRMP	Cultural Resource Management Plan
CSR	Channel Stability Rating
CSU	Controlled Surface Use
dB	Decibel
DBH	Diameter at Breast Height
DEIS	Draft Environmental Impact Statement
DFC	Desired Future Condition
DM	Departmental Manual
DOI	(U.S.) Department of the Interior (see also USDI)
DPC	Desired Plant Community
DR	Decision Record
dv	Deciview

EA	Environmental Assessment
EIS	Environmental Impact Statement
E.O.	Executive Order
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act (of 2000)
ESA	Endangered Species Act (of 1973)
ESC	Ecological Site Condition
ESRI	Environmental Systems Research Institute
^{0}F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FIRE	Finance, Insurance, and Real Estate
FEIS	Final Environmental Impact Statement
FLM	Federal Land Manager
FLPMA	Federal Land Policy and Management Act (of 1976)
FMU	Forest Management Unit
FNAWS	Foundation for North American Wild Sheep
FO	Field Office
FOIA	Freedom of Information Act
FONSI	Finding of No Significant Impact
FR	Federal Register
FS	Forest Service, U.S. Department of Agriculture (see also USFS)
FTE	Full-time Equivalent
FWS	United States Fish & Wildlife Service (see also USFWS)
FY	Fiscal Year
FYPC	Fossil Yield Potential Classification (see also PFYC)
g/bhp-hr	grams per braking horsepower hour
GAP	Geographical Analysis Program
GIS	Geographic Information Systems
GRRA	Green River Resource Area
GRRMP	Green River Resource Management Plan
H_2SO_4	Sulfuric Acid
ha	Hectare
HA	Herd Area (for Wild Horses, see WHHA)
HAP	Hazardous Air Pollutants
HMA	Herd Management Area

HMAP	Herd Management Area Plan
HMP	Habitat Management Plan
HMRRP	Hazard Management and Resource Restoration Program
HNO_3	Nitric Acid
HU	Herd Unit
HUC	Hydrologic Unit Code
I-80	Interstate 80
IBA	Important Bird Area
IBLA	Interior Board of Land Appeals
IDLH	Immediately Dangerous to Life or Health
IMPLAN	IMpact analysis for PLANning (a regional economic impact model)
IMPROVE	Interagency Monitoring of Protected Visual Environments
Kg/ha	Kilograms per Hectare
KGS	Known Geologic Structure
KRCRA	Known Recoverable Coal Resource Area
KSLA	Known Sodium Leasing Area
LAU	Lynx Analysis Unit
LBA	Lease by Application
LDA	Limited to Designated Areas
LHP&P	Laramie, Hahn's Peak and Pacific Railways
LOC	Levels of Concern
LOP	Life of Project
$\mu g/m^3$	Micrograms per Cubic Meter
MACT	Maximum Achievable Control Technology
MBTA	Migratory Bird Treaty Act (of 1918)
MCFD	Thousand Cubic Feet per Day
MFP	Management Framework Plan (pre-FLPMA BLM land use plan)
mcf	Thousand Cubic Feet
MEI	Maximally Exposed Individual
MLA	Mineral Leasing Act (of 1920)
MLE	Most Likely Exposure
MMBF	Million board feet (a measure of timber volume)
MMBO	Million Barrels of Oil
MMCF	Million Cubic Feet
MOU	Memorandum of Understanding

mph	Miles per Hour
MSA	Management Situation Analysis
MSHA	Mine Safety and Health Act (of 1977)
MSHA	Mine Safety and Health Administration
MSL	Mean Sea Level
$(NH_4)_2SO_4$	Ammonium Sulfate
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NEPA	National Environmental Policy Act (of 1969)
NFP	National Fire Plan
NGVD	National Geodetic Vertical Datum
NH_4^+	Ammonium
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NNL	National Natural Landmark
NO_2	Nitrogen Dioxide
NO_3^-	Nitrate
NO_x	Nitrogen Oxides
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOS	Notice of Staking
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service (see also USNPS)
NRA	National Recreation Area
NRHP	National Register of Historic Places
NRS	Natural Resource Specialist
NSO	No Surface Occupancy (a stipulation on an oil and gas lease)
NSS	Native Species Status (Wyoming sensitive species category)
NTL	Notice to Lessee (oil & gas leases)
NWPS	National Wilderness Preservation System
NWSRS	National Wild & Scenic Rivers System
O_3	Ozone
OEPC	Office of Environmental Policy and Compliance

OHV	Off-Highway Vehicle
ORV	Off-Road Vehicle
PA	Programmatic Agreement
Pb	Lead
PFC	Proper Functioning Condition
PFYC	Probable Fossil Yield Classification
PILT	Payments in Lieu of Taxes
P.L.	Public Law
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter (less than 2.5 microns in diameter)
PM_{10}	Particulate Matter (less than 10 microns in diameter)
PNC	Potential Natural Condition
POD	Plans of Development
ppb	Parts per Billion
ppm	Parts per Million
PRLA	Preference Right (coal) Lease Application
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit (Air Quality Term)
PUP	Pesticide Use Proposal
R&PP	Recreation and Public Purpose Act (of 1926)
RAMP	Recreation Area Management Plan
RCA	Raptor Concentration Area
RCRA	Resource Conservation and Recovery Act (of 1976)
REL	Reference Exposure Levels
RFA	Reasonably Foreseeable Action or Activity
RfC	Reference Concentrations for Chronic Inhalation
RFD	Reasonably Foreseeable Development
RFO	Rawlins Field Office
RMG	Reservoir Management Group
RMIS	Recreation Management Information System
RMNP	Rocky Mountain National Park
RMP	Resource Management Plan (BLM land use plan under FLPMA)
RMPPA	Resource Management Plan Planning Area
RNA	Raptor Nesting Area
ROD	Record of Decision

ROI	Region of Influence
ROW	Right-of-Way
RPS	Rangeland Program Summaries
RSFO	Rock Springs Field Office
RVD	Recreation Visitor Days
S&G	Standards and Guidelines (from the Wyoming Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management)
SASEM	Simple Approach Smoke Estimation Model
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMA	Special Management Area
SMCRA	Surface Mining Control and Reclamation Act (of 1977)
SO_2	Sulfur Dioxide
SO_4^{--}	Sulfate
SRMA	Special Recreation Management Area
SSS	Special Status Species
SUV	Sport Utility Vehicle
T&E	Threatened and/or Endangered Species (as per ESA of 1973)
TCLP	Toxicity Characteristic Leaching Procedure
TCP	Traditional Cultural Property
TDS	Total Dissolved Solid
TMDL	Total Maximum Daily Load
tpy	Tons per Year
UFAS	Uniform Federal Accessibility Standards
U.P.R.R.	Union Pacific Railroad
URF	(EPA's) Unit Risk Factors
US-30	Highway 30
USAF	United States Air Force
USBR	United States Bureau of Reclamation
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior (see also DOI)
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VRM	Visual Resource Management
WA	Wilderness Area
WAAQS	Wyoming Ambient Air Quality Standards
WAPA	Western Area Power Administration
WAQD	Wyoming Air Quality Division
WAQSR	Wyoming Air Quality Standards & Regulations
WARMS	Wyoming Air Resources Monitoring System
WDEQ	Wyoming Department of Environmental Quality
WFSA	Wildland Fire Situation Analysis
WGFD	Wyoming Game and Fish Department
WH&B	Wild Horse and Burro (as per the Act of 1971)
WHHA	Wild Horse Herd Area
WHHMA	Wild Horse Herd Management Area (see also HMA)
WHMA	Wildlife Habitat Management Area
WOGCC	Wyoming Oil and Gas Conservation Commission
WQD	Water Quality Division (of WDEQ)
W.S.	Wyoming Statute
WS	Wildlife Services (formerly known as Animal Damage Control)
WSA	Wilderness Study Area
WSGS	Wyoming State Geological Survey
WSO	Wyoming (BLM) State Office
WSR	Wild & Scenic Rivers (as per the Act of 1973)
WTPD	White Tailed Prairie Dogs
WUG	Western Utility Group
WUI	Wildland Urban Interface
WWDC	Wyoming Water Development Commission
WYDOT	Wyoming Department of Transportation
WYNDD	Wyoming Natural Diversity Database

GLOSSARY

ABANDONED LEK. A lek in otherwise suitable habitat that has not been active during a consecutive 10-year period. Before a lek is designated "abandoned" it must be confirmed as "inactive" (see definition under "Inactive Lek") in at least four non-consecutive strutting seasons spanning the 10 years. Once designated "abandoned," the site should be surveyed at least once every 10 years to determine whether or not the lek has been reoccupied.

ACTIVE LEK. Any lek that has been attended by male greater sage-grouse during the strutting season. Presence can be documented by observing birds using the site or by signs of strutting activity.

ACTIVE RAPTOR NEST SITES. Any identified raptor nest site that could provide a nesting opportunity for a raptor. Temporal and spatial stipulations will be applied.

ACTIVITY PLANNING. Site-specific planning that precedes development. This is the most detailed level of Bureau of Land Management (BLM) planning. An activity plan details management of one or more resources on a specific site. Examples are allotment management plans and recreation area management plans. Activity plans implement decisions made in the RMP.

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 periodic field checks by the BLM.

ALL-TERRAIN VEHICLE (ATV). A wheeled or tracked vehicle, other than a snowmobile or work vehicle, designed primarily for recreational use or for the transportation of property or equipment exclusively on undeveloped road rights-of-way, marshland, open country, or other unprepared surfaces.

ALLOTMENT. An area of land where one or more livestock operators graze their livestock. Allotments consist of BLM administered lands and usually 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 written plan of livestock grazing management designed to attain management goals and objectives in a grazing allotment. An AMP is prepared in consultation with the permittee(s), lessee(s), and other affected interests. Livestock grazing is considered in relation to other uses of the range and in relation to renewable resources, such as watershed, vegetation, and wildlife.

ALLUVIUM. Any sediment deposited by flowing water, as in a riverbed, floodplain, or delta.

AMENDMENT. The process for considering or making changes in the terms, conditions, and decisions of approved RMPs or Management Framework Plans using the prescribed provisions for resource management planning appropriate to the proposed action or circumstances. Usually only one or two issues are considered that involve only a portion of the planning area.

ANIMAL DAMAGE CONTROL (ADC). The control of animals that are causing economic losses to agriculture, damage to property, or hazards to human health. Such control usually results in the killing of the offending animal(s). (See also Wildlife Services)

ANIMAL UNIT. A standardized unit of measurement for range livestock or wildlife. Generally, one mature (1,000-pound) cow or its equivalent, based on an average daily forage consumption of 26 pounds of dry matter per day.

ANIMAL UNIT MONTH (AUM). A standardized unit of measurement of the amount of forage necessary for the sustenance of one animal unit for 1 month; also, a unit of measurement that represents the privilege of grazing one animal unit for 1 month.

APPLICATION FOR PERMIT TO DRILL (APD). An official request submitted by a lessee or operator to the BLM for permission to drill a well. The approved APD is a contract between the operator and the Federal Government and cannot be changed or modified unless authorized by the BLM.

APPROPRIATE MANAGEMENT LEVEL (AML). The prescribed number of wild horses BLM has determined through monitoring will be maintained within a Horse Management Area (HMA). The AML is set to ensure a thriving natural ecological balance will be maintained while also ensuring viable populations of wild horses. Therefore, the number is not necessarily the resource-limited carrying capacity of an HMA. Maintenance of a thriving natural ecological balance requires consideration of wild horses in light of other consumptive and non-consumptive uses within an HMA. Through establishing the AML, BLM strives to maintain the multiple-use relationship that existed at the time the Wild and Free-Roaming Horses and Burros Act was passed. Appendix 12 contains a detailed description of the development, application, and interpretation of AMLs for the Rawlins HMAs.

APPROPRIATE MANAGEMENT RESPONSE (AMR). The response to a wildland fire is based on an evaluation of risks to firefighter and public safety; the circumstances under which the fire occurs, including weather and fuel conditions; natural and cultural resource management objectives; protection priorities; and values to be protected. This includes the use of wildland fire to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural ecological role. The evaluation must also include an analysis of the context of the specific fire within the overall local, geographic area, or national wildland fire situation.

AQUATIC NUISANCE SPECIES (ANS). A nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, or recreational activities dependent on such waters. Aquatic nuisance species include nonindigenous species that may occur in inland, estuarine, and marine waters and that presently or potentially threaten ecological processes and natural resources. In addition to adversely affecting activities dependent on waters of the United States, aquatic nuisance species adversely affect individuals, including health effects.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). Areas within the public lands 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 identification of a potential ACEC shall not, of itself, change or prevent change of the management or use of public lands.

ASSESSMENT. The act of evaluating and interpreting data and information for a defined purpose.

AVOIDANCE AREAS. Areas with sensitive resource values where rights-of-way and Section 302 permits, leases, and easements would be strongly discouraged. Authorizations made in avoidance areas

would have to be compatible with the purpose for which the area was designated and not be otherwise feasible on lands outside the avoidance area.

BIG GAME. Large species of wildlife that are hunted, such as elk, deer, bighorn sheep, and pronghorn antelope.

BIOACCUMULATION. Processes involving dissolved and particulate organic carbon are of central importance in shaping the chemical character of water.

BIOLOGICAL ASSESSMENT (BA). The gathering and evaluation of information on proposed endangered and threatened species and critical habitat and proposed critical habitat. A BA is required when a management action potentially conflicts with endangered or threatened species and is the method by which other federal agencies enter into formal consultation with the U.S. Fish and Wildlife Service and describe a proposed action and the consequences to the species the action would affect.

BOARD FOOT. A unit of solid wood 1 foot square and 1 inch thick.

CANDIDATE SPECIES. Any species included in the *Federal Register* notice of review that is being considered for listing as threatened or endangered by the U.S. Fish and Wildlife Service.

CANOPY. The uppermost layer consisting of the crowns of trees or shrubs in a forest, woodland, or shrubland.

CASUAL USE. Activities that involve practices that do not ordinarily lead to any appreciable disturbance or damage to lands, resources, and improvements and, therefore, do not require a right-of-way grant or temporary use permit.

CHANNEL. An open conduit either naturally or artificially created that periodically or continuously contains moving water or forms a connecting link between two bodies of water.

CHECKERBOARD LAND PATTERN. Alternating sections of federally owned lands and private or state lands on either side of the Union Pacific railroad in southwestern Wyoming. This pattern of land ownership looks like a checkerboard on maps, using different colors to show land status.

CLASSIFICATION AND MULTIPLE USE. Refers to both the Classification and Multiple Use (C&MU) Act of 1964 and the classifications that were placed on the lands pursuant to that act. The objective of the C&MU Act was to provide an opportunity for BLM to categorize lands for multiple use management and for disposal. The act provided 4 years for BLM to classify lands for multiple use management by prohibiting disposal or entry under various public land laws to be specified in the particular classification document.

The C&MU classifications referred to in the current document prohibited disposal under the Isolated Tracts Act (Revised Statutes 2455) and entry under the agricultural entry laws (Homestead Act, Desert Land Act, and others). Portions of the C&MUs also prohibited entry under the General Mining Law of 1872. Today, the multiple use provisions of the Federal Land Policy Management Act of 1976 fulfill the purpose and objectives of the C&MU classifications.

CODE OF FEDERAL REGULATIONS (CFR). The official, legal tabulation or regulations directing federal government activities.

COMMERCIAL FORESTLAND. Forestland that is now producing or is capable of producing at least 20 cubic feet of wood fiber per acre per year from commercial coniferous tree species and that has met certain economic, environmental, or multiple-use criteria for inclusion in the commercial forestland base.

COMMODITY. An economic good such as a product of agriculture or mining.

COMMUNITY. An assemblage of plant and animal populations in a common spatial arrangement.

COMPENSATION MITIGATION. Mitigation measures located away from an adversely affected site (i.e., in contrast with on-site mitigation.) Compensation mitigation would be used as a tool to address loss of habitat effectiveness when reclamation, Best Management Practices, and on-site mitigation measures are not adequate to mitigate the impacts of proposed actions.

CONDITIONS OF APPROVAL (COA). Conditions or provisions (requirements) under which a site-specific surface disturbing or human presence activity (Application for Permit to Drill, sundry notice, right-of-way, etc.) is approved.

CONFORMANCE. Condition in which a proposed action shall be specifically provided for in the land use plan or, if not specifically mentioned, shall be clearly consistent with the goals, objectives, or standards of the approved land use plan.

CONSERVATION POPULATION. A reproducing and recruiting population of native cutthroat trout that is managed to preserve the historical genome and/or unique genetic, ecological, and/or behavioral characteristics within specific populations and within geographic units. Conservation population is at least 90 percent cutthroat trout and approximately 10 percent introgression.

CONSISTENCY. The circumstance in which the proposed land use plan does not conflict with officially approved plans, programs, and policies of tribes, other federal agencies, and state, and local governments to the extent practical within federal law, regulation, and policy.

COUNCIL ON ENVIRONMENTAL QUALITY (CEQ). An advisory council to the President of the United States established by the national Environmental Policy Act of 1969. It reviews federal programs for their effect on the environment, conducts environmental studies, and advises the president on environmental matters.

COVER. Any form of environmental protection that helps an animal stay alive (mainly shelter from weather and concealment from predators). (See also Vegetation Cover and Forest Crown Cover.)

CREPUSCULAR. Refers to species that are active at twilight.

CRITICAL HABITAT. An area occupied by a threatened or endangered species "on which are found those physical and biological features (1) essential to the conservation of the species, and (2) which may require special management considerations or protection." These irreplaceable and vital areas are designated as critical by the Secretary of the Interior for the survival and recovery of listed Threatened and Endangered Species.

CRUCIAL HABITAT. Any particular range or habitat component (often winter or winter/yearlong range in Wyoming), that is the determining factor in a population's ability to maintain and reproduce itself at a certain level (theoretically at or above the Wyoming Game and Fish Department's population objective) over the long term.

CRUCIAL WINTER RANGE. The portion of the winter range to which a wildlife species is confined during periods of heaviest snow cover.

CULTURAL RESOURCE. A fragile and nonrenewable remnant of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, or natural features.

CULTURAL RESOURCE INVENTORY. A descriptive listing and documentation, including photographs and maps, of cultural resources. Processes involved are locating, identifying, and recording of sites, structures, buildings, objects, and districts through library and archival research; collecting information from persons knowledgeable about cultural resources; and conducting on-the-ground field surveys of varying levels of intensity. See also Cultural Resource Inventory Classes.

CULTURAL RESOURCE INVENTORY CLASSES. A Class I inventory of a defined area provides a narrative overview of existing information and a compilation of existing data on which to base the development of BLM's site record system. A Class II inventory is a sample-oriented field inventory designed to locate and record, on the basis of surface and exposed profile indications, all cultural resource sites within a portion of a defined area to make possible an objective estimate of the nature and distribution of cultural resources in the entire defined area. A Class III inventory is an intensive field inventory designed to locate and record all cultural resource sites within a specified area. Upon completion of such an inventory, no further cultural resource inventory work is normally needed in that area.

CULTURAL RESOURCE MANAGEMENT PLAN (CRMP). A plan designed to inventory, evaluate, protect, preserve, or make beneficial use of cultural resources and the natural resources that figured significantly in cultural systems. The objectives of such plans are the conservation, preservation, and protection of cultural values and the scientific study of those values.

CULTURAL RESOURCE SITE (cultural property). A physical location of past human activities or events. Cultural properties are extremely variable in size, ranging from the location of a single cultural resource feature to a cluster of cultural resource structures with associated objects.

CUMULATIVE IMPACT. The impact on the environment that results from the incremental impact of an action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

DESIGNATED ROADS AND VEHICLE ROUTES. Those roads and vehicle routes that are specifically identified by the BLM as the only allowable routes for motor vehicle travel in the specific area involved. Travel on designated roads and trails may be allowed seasonally or yearlong. Additional roads or vehicle routes may be constructed and authorized for travel, as need dictates, in conformance with the land use plan or activity plan.

DESIGNATED RIGHT-OF-WAY (ROW) CORRIDOR. A parcel of land with specific boundaries identified by law, Secretarial Order, the land use planning process, or by some other management decision as a preferred location for existing and future ROW facilities. The corridor may be suitable to accommodate more than one type of ROW use or facility or one or more ROW uses or facilities that are similar, identical, or compatible. A designated corridor may already be occupied by existing utility facilities. It has been adequately analyzed in order to provide a high degree of assurance that in being identified as a "designated corridor," it can accommodate at least one new additional utility facility.

DESIRED FUTURE CONDITIONS (DFC). The set of physical and chemical habitat parameters that constitute suitable conditions to fulfill the life history requirements of desired fishes.

DESIRED PLANT COMMUNITY (DPC). A plant community that produces the kind, proportion, and amount of vegetation necessary for meeting or exceeding the land use plan/activity plan objectives established for an ecological site(s). The desired plant community must be consistent with the site's capability to produce the desired vegetation through management, land treatment, or a combination of the two.

DESTROYED LEK. A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer capable of supporting sage-grouse breeding activity. A lek site that has been strip-mined, paved, converted to cropland, or undergone other long-term habitat type conversion is considered destroyed. Destroyed leks do not require monitoring unless the site is reclaimed as suitable sage-grouse habitat.

DISCHARGE (WATER). The rate of flow or volume of water flowing in a stream at a given location or within a given period of time.

DISCOVERY. The knowledge of the presence of valuable minerals within or close enough to a location to justify a reasonable belief in their existence. Discovery is extremely important to public lands mining because the Mining Law of 1872 provides that mining claims can be located only after a discovery is made.

DISPERSED RECREATION. Recreation activities of an unstructured type that are not confined to specific locations such as recreation sites. An example of these activities may be hunting, fishing, off-road vehicle use, hiking, and sightseeing.

DISPOSAL. Transfer of ownership of a tract of public land from the United States to another party through sale, exchange, or transfer under the Recreation and Public Purposes Act.

DISRUPTIVE ACTIVITIES. Activities that cause disorder or turmoil; or destroy, usually temporarily, the normal continuance of animal activity (i.e., herd movement, normal breeding behavior [such as grouse strutting], foraging, nesting). Some examples of disruptive activities include resource surveys that require personnel to remain in an area for more than one hour (e.g., excavation of cultural sites, land surveys, project construction, geophysical activities, permitted or organized recreational activities, prescribed fire. etc.); fencing modification; facility monitoring; and livestock herding.

DIURNAL. Describes a cyclic event recurring daily; or the nature or habit of an organism to be active during daylight hours.

DIVERSITY. The relative abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

DOCUMENTED LEK. Any lek that has been identified as Active, Inactive, Unknown, or Occupied.

EASEMENT. A right afforded a person or agency to make limited use of another's real property for access or other purposes.

ECOSYSTEM. A complete, interacting system of living organisms and the land and water that make up their environment; the home places of all living things, including humans.

EMERGENCY CLOSURE. An immediate management action taken to resolve a resource problem or to protect public safety. An emergency closure is not an official OHV use designation. This closure can affect all access to an area or use of a road or trail, including OHV use. The authority for emergency closures is 43 CFR 8364, Closure of Lands.

EMERGENCY STABILIZATION AND REHABILITATION. The full range of post fire activities to protect and sustain ecosystems, public health, and safety, and to help communities protect infrastructure in the most cost-effective manner.

ENDANGERED SPECIES. Any plant or animal species that is in danger of extinction throughout all or a significant portion of its range, as defined by the U.S. Fish and Wildlife Service under the authority of the Endangered Species Act 1973, as amended.

ENVIRONMENTAL ASSESSMENT (EA). Concise, analytical documents, authorized by the National Environmental Policy Act (NEPA) of 1969 and prepared with public participation that determine whether an Environmental Impact Statement (EIS) is needed for a particular project or action. If an EA determines an EIS is not needed, the EA becomes the document asserting agency compliance with NEPA requirements.

ENVIRONMENTAL IMPACT STATEMENT (EIS). A detailed written statement required by the National Environmental Policy Act when an agency proposes a major federal action significantly affecting the quality of the human environment.

EPHEMERAL CHANNELS. A defined channel formed in response to ephemeral surface flow conditions. Defined channels typically can be identified by an abrupt bank along a water flow path with evidence of scouring, sorting, and/or vegetation removal during flood events. These channels generally form in concave erosional features such as gullies, ravines, swells, etc.

EPHEMERAL SURFACE WATERS. Streams, lakes, or other surface water bodies that have open water *only* during or immediately after periods of rainfall or snowmelt.

EROSION. The wearing away of the land surface by running water, wind, ice, or other geological agents.

EXCLUSION AREA. Areas with sensitive resource values where rights-of-way and 302 permits, leases, and easements would not be authorized.

EXTENSIVE RESOURCE MANAGEMENT AREA. That portion of the RMPPA not included in one of the Special Recreation Management Areas.

FEDERAL LANDS. As used in this document, lands owned by the United States, without reference to how the lands were acquired or what federal agency administers the lands. The term includes mineral estates or coal estates underlying private surface but excludes lands held by the United States in trust for Indians, Aleuts, or Eskimos. See also Public Land.

FEDERAL LANDS POLICY AND MANAGEMENT ACT of 1976 (FLPMA). Public Law 94-579. Effective October 21, 1976, it is often referred to as the BLM' s "Organic Act," which provides the majority of the BLM's legislated authority, direction, policy, and basic management guidance.

FEDERAL REGISTER (FR). A daily publication that reports Presidential and federal agency documents.

FISHERY. The complex of interactions within and between the population(s) of fish being harvested, the population(s) of anglers, and the environment of each.

FIRE MANAGEMENT. Fire management activities, including fire planning, fire management strategies, tactics, alternative prevention, preparedness, and education. Addresses the role of mitigation, post-fire rehabilitation, fuels reduction, and restoration activities in fire management.

FIRE MANAGEMENT PLAN (FMP). A strategic plan that defines a program to manage wildland and prescribed fires, and documents the fire management program in the approved land use plan. FMPs must address a full range of fire management activities that support ecosystem sustainability, values to be protected, protection of firefighters and public safety, and public health and environmental issues, and must be consistent with resource management objectives and activities of the area.

FIRE SUPPRESSION. All work and activities associated with fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

FLIGHT DISTANCE (DISPLACEMENT DISTANCE). That distance to which a person can approach a wild animal without causing it to flee.

FLOOD PLAIN. The relatively flat area or lowlands adjoining a body of standing or flowing water that has been or might be covered by floodwater.

FORAGE. All browse and herbaceous foods available to grazing animals that may be grazed or harvested for feeding.

FOREST CROWN COVER. The proportion of forested land area covered by tree crowns.

FORESTLAND. Lands that are capable of producing at least a 10 percent crown cover of both commercial and non-commercial forest vegetation and that are managed for other resource values.

FUELS MANAGEMENT. Fuels are vegetation (alive or dead) that can carry fire. Management of fuels includes attempting to modify fire behavior should a wildland fire occur.

FUGITIVE DUST. Airborne emissions of visible and non-visible fine, dry particulate matter smaller than 100 micrometers (microns) that result from surface disturbance activities.

FUR BEARING ANIMAL. Badger, beaver, bobcat, marten, mink, muskrat, and weasel.

GAME BIRDS. Grouse, partridge, pheasant, ptarmigan, quail, wild turkey, and migratory game birds.

GOAL. A broad statement of a desired outcome. Goals are usually not quantifiable and may not have established time frames for achievement.

GRAZING PREFERENCE. The total number of AUMs on public land apportioned and attached to base property owned or controlled by a permittee or lessee.

GRAZING SYSTEM. A systematic sequence of grazing use and nonuse of an allotment to reach identified multiple-use goals or objectives.

GUIDELINES. Actions or management practices that can be used to achieve desired outcomes, sometimes expressed as best management practices. 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.

HABITAT. A specific set of physical conditions that surround a species, group of species, or a large community. In wildlife management, the major constituents of habitat are considered to be food, water, cover, and living space.

HABITAT MANAGEMENT PLAN (HMP). An approved plan, identifying wildlife habitat and related objectives for a specific geographic area of public lands, to be implemented to maintain and improve wildlife habitat.

HAZARD REDUCTION. Any treatment of a hazard that reduces the threat of ignition and fire intensity or rate of spread.

HERBACEOUS. Pertaining to or characteristic of an herb (fleshy-stem plant) as distinguished from the woody tissue of shrubs and trees.

HERD AREA. An area where wild horses existed in 1971.

HERD MANAGEMENT AREA (HMA). An area that has been designated for continuing management of wild horses.

HIBERNACULUM. Winter home or abiding place.

HIGH-VALUE HABITAT. Habitat that sustains a community, population, or subpopulation, but can be reconstructed or enhanced where avoidance is not possible.

HISTORIC. Period wherein nonnative cultural activities took place, based primarily upon European roots, having no origin in the traditional Native American culture(s).

HISTORICAL LEK. (Former term for "unoccupied lek.") There are two types of unoccupied leks, "destroyed" or "abandoned." Management protection will not be afforded to unoccupied leks.

HISTORICAL RAPTOR NESTS. Any raptor nest or site that has been destroyed but that was historically recorded and documented. Temporal and spatial stipulations will not apply.

HOME RANGE. The area in which an animal travels in the scope of its natural activities.

IDENTIFIED 100-YEAR FLOOD PLAINS. Those areas delineated by the Army Corps of Engineers or other appropriate authority for legal 100-year floodplain delineation.

IMPACTS (OR EFFECTS). Consequences (the scientific and analytical basis for comparison of alternatives) as a result of a proposed action. Effects may be either direct, which are caused by the action and occur at the same time and place, or indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable, or cumulative.

IMPLEMENTATION PLAN. A site-specific plan written to implement decisions made in a land use plan. An implementation plan usually selects and applies best management practices to meet land use plan objectives. Implementation plans are synonymous with "activity" plans. Examples of implementation plans include interdisciplinary management plans, habitat management plans, and allotment management plans.

IMPORTANT OR LIMITED HABITATS. Areas of especially high value for a diversity of wildlife or areas that provide certain habitat elements essential to the existence of certain groups of wildlife.

INACTIVE LEK. Leks where it is known that there was no strutting activity through the course of a strutting season. A single visit, or even several visits, without strutting grouse being seen is not adequate documentation to designate a lek as inactive. This designation requires either an absence of birds on the lek during multiple ground visits under ideal conditions throughout the strutting season or a ground check of the exact lek site late in the strutting season that fails to find any sign (droppings/feathers) of strutting activity.

INACTIVE RAPTOR NESTS. Any nest site that has been monitored in 6 of the last 10 years and been documented as being unoccupied each time it was monitored. Temporal stipulations apply, but not spatial stipulations.

INTENSIVE MANAGEMENT. Management that includes the use of proper distance restrictions, mitigation stipulations, seasonal or timing restrictions, rehabilitation standards, reclamation measures, use of best management practices (see Appendix 13), and the application of the Wyoming Mitigation Guidelines for Surface-disturbing and Disruptive Activities (Appendix 1) to adequately protect the resources for which the intensive management is applied. Intensive management actions would be applied with the goal of maintaining or enhancing sensitive resources (i.e., plant communities, wildlife habitats, soils, water, archeological or paleontological resources, etc.). Management may include attaching conditions of approval to specific projects or additional planning recognizing the unique resources for which the area is managed; typically these would be more restrictive then standard management and would be designed for specific projects and locations.

INTERDISCIPLINARY TEAM. A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to a solution with frequent interaction so that each discipline can provide insights on any stage of the problem and disciplines can combine to provide new solutions. The number and particular disciplines of the members preparing the plan vary with circumstances. A member may represent one or more disciplines or BLM program interest.

INTERIOR BOARD OF LAND APPEALS (IBLA). The Department of the Interior, Office of Hearings and Appeals, board that acts for the Secretary of the Interior in responding to appeals of decisions on the use and disposition of public lands and resources. Because the Interior Board of Land Appeals acts for and on behalf of the Secretary of the Interior, its decisions usually represent the Department's final decision but are subject to the courts.

INTERMITTENT SURFACE WATERS. Streams, lakes, or other surface water bodies that have open water during a portion of the year, or, during particularly wet years, may have open water throughout the year. In the case of streams, this term can also refer to non-continuous flow resulting from groundwater interaction (i.e., portions of the stream are generally dry and other portions are generally wet in most years).

INVASIVE SPECIES. A species that is not native (or is alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Executive Order 13112).

JURISDICTION. The legal right to control or regulate use of a transportation facility. Jurisdiction requires authority, but not necessarily ownership.

KEYSTONE SPECIES. A species that plays a pivotal role in an ecosystem, and upon whom a large part of the community depends (e.g., prairie dog establishes towns that provide habitat for burrowing owls, mountain plover, and other species).

LAND USE PLAN. A set of decisions that establishes management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of land-use-plan-level decisions developed through the planning process, regardless of the scale on which the decisions were developed.

LEASABLE MINERALS. Minerals subject to lease by the Federal Government, such as coal, oil and gas, oil shale, potash, sodium, phosphate, and other minerals that can be acquired under the Mineral Leasing Act of 1920, as amended. The major leasable minerals in the planning area are oil and gas and coal.

LEK. A traditional courtship display area attended by male greater sage-grouse in or adjacent to sagebrush dominated habitat. Designation of the site as a lek requires the observation of two or more male sage-grouse engaged in courtship displays. In addition, new leks must be confirmed by a survey conducted during the appropriate time of day and during the strutting season. Observation of sign of strutting activity can also be used to confirm a suspected lek. (See also, Abandoned Lek, Active Lek, Destroyed Lek, Documented Lek, Historical Lek, Inactive Lek, Lek Complex, Lek Count, Lek Survey, Occupied Lek, Undetermined Lek, Unknown Lek, and Unoccupied Lek.)

LEK COMPLEX. A group of leks in close proximity between which male sage-grouse may be expected to interchange from one day to the next. A specific distance criterion does not yet exist.

LEK COUNT. A census technique that documents the actual number of male sage-grouse observed on a particular lek or complex of leks using a lek survey. (See Lek Survey.)

LEK SURVEY. A monitoring technique designed primarily to determine whether leks are active or inactive. Obtaining accurate counts of the numbers of males attending is secondary.

LENTIC. Wetland areas with standing water habitat, such as lakes, ponds, seeps, bogs, and meadows.

LIMITED DESIGNATION (OHV). Area in which vehicle travel is restricted in some manner. Restrictions could take many forms, but the most common are "limited to existing roads and trails;" which allows vehicle travel only on roads that were in existence at the time of designation or have been authorized for future uses; "limited to designated roads and trails," which allows vehicle travel only on roads that BLM designates; and "seasonal restrictions," which restricts vehicle travel in an area or on certain roads during some portion of the year (such as wintertime vehicle restrictions to protect big game on crucial winter range).

Under limitations to existing or designated roads and trails, vehicle travel off roads is permitted only to accomplish necessary tasks and only if such travel would not result in resource damage. Necessary tasks are defined as work requiring the use of a motor vehicle. Examples include repairing range improvements, managing livestock, and conducting mineral activities in which surface disturbance does not total more than 5 acres, as described in the provisions of 43 CFR 3809.1-3.

LIVESTOCK CONVERSION. A discretionary action changing permitted use from one class of animal to another.

LOCATABLE MINERALS. Generally, the metallic minerals subject to development specified in the Federal Mining Law of 1872. Examples are gold, silver, and copper.

LOTIC. Riparian areas with running water habitat such as rivers, streams, creeks, and springs.

MANAGEMENT DECISION. A decision made by the BLM to manage public lands. Management decisions include both land use plan decisions and implementation decisions.

MANAGEMENT SITUATION ANALYSIS (MSA). Assessment of the current management direction. It includes a consolidation of existing data needed to analyze and resolve identified issues, a description of current BLM management guidance, and a discussion of existing problems and opportunities for solving them.

MINERAL. Any solid or fluid inorganic substance that can be extracted from the Earth for profit.

MINERAL ENTRY. The filing of a claim on public land to obtain the right to any minerals it may contain.

MINERAL ESTATE. The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

MINERAL LOCATION. The act of marking out and establishing rights by a claimant for mining purposes in accordance with the Mining Law of 1872, as amended.

MINERAL MATERIALS. Materials such as common varieties of sand, stone, gravel, pumice, pumicite, and clay, that are not obtainable under the mining or leasing laws but that can be acquired under the Mineral Materials Act of 1947, as amended.

MINERAL WITHDRAWAL. A formal order that withholds federal lands and minerals from entry under the Mining Law of 1872 and closes the area to mineral location (staking mining claims) and development.

MINING CLAIM. A selected parcel of federal land, valuable for a specific mineral deposit or deposits, for which an individual has asserted a right of possession under the General Mining Law. That individual's right is restricted to the development and extraction of a mineral deposit. The rights granted to that individual by a mining claim are valid against a challenge by the United States and other claimants only after discovery of a valuable mineral deposit. There are two types of mining claims, lode and placer, and there are two other types of mining support locations, mill sites and tunnel sites.

MITIGATION. A method or process by which impacts from actions can be made less injurious to the environment through appropriate protective measures. Also called mitigative measure.

MONITORING. A program designed to measure changes in vegetation, watershed health, climate, animal populations, and other resources on BLM-administered land.

MOUNTAIN PLOVER OCCUPIED HABITAT. An area within mountain plover habitat where broods and/or adults have been found in the current year or documented in at least 2 of the past 5 years.

MULTIPLE USE. Coordinated management of various surface and subsurface resources so that they are used in the combination that will best meet present and future needs.

NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS). The allowable concentrations of air pollutants in the ambient (public outdoor) air. National ambient air quality standards are based on the air quality criteria and divided into primary standards (allowing an adequate margin of safety to protect the public health) and secondary standards (allowing an adequate margin of safety to protect the public welfare). Welfare is defined as including (but not limited to) effects on soils, water, crops, vegetation, human-made materials, animals, wildlife, weather, visibility, climate, and hazards to transportation, as well as effects on economic values and on personal comfort and well-being.

NATIONAL ENVIRONMENTAL POLICY ACT of 1969 (NEPA). The basic national law for protection of the environment passed by the Congress in 1969. It sets policy and procedures for environmental protection, and authorizes EISs and Environmental Assessments (EAs)to be used as analytical tools to help federal managers make decisions.

NATIONAL REGISTER OF HISTORIC PLACES (NRHP). A register of districts, sites, buildings, structures, and objects that are significant in American history, architecture, archaeology and culture, established by the Historic Preservation Act of 1966 and maintained by the Secretary of the Interior.

NATIVE SPECIES. A species that, other than as a result of an introduction, historically occurred or currently occurs in an ecosystem (Executive Order 13112).

NATURALNESS. Unmodified by human impacts.

NECESSARY TASKS. Work requiring the use of a motorized vehicle. Examples include surveying and staking for Notices of Intent (NOIs) to conduct geophysical activities, APDs, ROWs; repairing range improvements; managing livestock; and mineral activities where surface disturbance does not total more than 5 acres as described in the 5-acre exemption under 43 CFR 3809 regulations.

NO SURFACE OCCUPANCY (NSO). Use or occupancy of the land surface for development activities or facilities is prohibited to protect identified resource values.

NOCTURNAL. Refers to species that are active at night.

NONCOMMERCIAL FORESTLAND. (See Woodlands.)

NON-NATIVE SPECIES. A species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to the ecosystem under consideration (Executive Order 13112).

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 condition for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement.

OCCUPIED LEK. A lek that has been active during at least one strutting season within the last 10 years. Management protection will be afforded to occupied leks.

OFF-HIGHWAY VEHICLE (OHV). Any motorized tracked or wheeled vehicle designed for cross-country travel over any type of natural terrain. Exclusions (from Executive Order 11644, as amended by Executive Order 11989) are nonamphibious registered motorboats; any military, fire, emergency, or

law enforcement vehicle while being used for emergency purposes; any vehicle whose use is expressly authorized by the authorizing officer or otherwise officially approved; vehicles in official use; and any combat support vehicle in times of national defense emergencies.

OFF-SITE MITIGATION. (See Compensation Mitigation.)

OTHER ACTIVITIES. Seismic activities, maintenance actions exceeding 8 hours on existing equipment and facilities, repair or reconditioning of rangeland improvements that exceed 8 hours in duration, or any activity that requires more than 8 hours on the site.

Maintenance actions related to Other Activities include—

- Leasable, Locatable, and Saleable Mineral Activities:
  - Work over rig
  - Pipeline repair
  - Reclamation activities
- Range Management
  - Fence repair
  - Stock pond maintenance
  - Pipeline repair
- Reclamation of habitat.

OUTSTANDINGLY REMARKABLE VALUES. Waterway-related characteristics that are exemplary in their scenic, recreational, geological, historical, cultural, ecological, biological, botanical, paleontological, hydrological, or scientific attributes. For specific criteria in each classification, see Appendix 3.

OVERLAND FLOW. Water that flows on the surface in response to precipitation events, typically described as sheet or rill flow with rills forming as a result of the channelization of water on the hillslope and sheet flow being more uniform along the slope.

OVERSTORY. The most height-dominant story of vegetation present in a multilevel vegetation community.

PALEONTOLOGICAL RESOURCES (FOSSILS). The physical remains of plants and animals preserved in soils and sedimentary rock formations.

PARTICULATE MATTER (PM). Fine liquid or solid particles suspended in the air and consisting of dust, smoke, mist, fumes, and compounds containing sulfur, nitrogen, and metals.

PARTURITION AREA. Birthing area commonly used by more than a few female members of a population.

PASSERINE BIRDS. Birds of the order Passeriformes, which includes perching birds and songbirds such as blackbirds, jays, finches, warblers, and sparrows. More than half of all birds belong to this order.

PERENNIAL SURFACE WATERS. Streams, lakes, or other surface water bodies that have open water in most years. These systems would generally **only** dry up during drought conditions. In the case of streams, this term can refer to the persistence of surface waters along a channel (i.e., few reach where the infiltration into the stream aquifer exceeds the flow).

PERSONAL INCOME. The sum of wage and salary disbursements, other labor income, proprietors' income, rental income of persons, personal dividend income, personal interest income, and transfer payments to persons, less personal contributions for social insurance.

pH. A measure of acidity or hydrogen ion activity. Neutral is pH 7.0. All values below 7.0 are acidic, and all values above 7.0 are alkaline.

PLAN. A document that contains a set of comprehensive, long-range decisions concerning the use and management of BLM-administered resources in a specific geographic area.

PLANNING AREA. A geographical area for which land use and RMPs are developed and maintained.

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 streamline and simplify the resource management planning actions.

PLANNING BASE. Includes law, regulation, policy, land use plan decisions (e.g., RMPs, RMP Amendments, and Management Framework Plan Amendments), NEPA documents (e.g., EISs, Administrative Determinations, EAs, and Categorical Exclusion Reviews), and supporting data (e.g., automated data bases, research, and evaluations).

POPULATION. A group of organisms, all of the same species, which occupies a particular area. The term is used to refer to the number of individuals of a species within an ecosystem or of any group of like individuals.

PREFERENCE. Grazing privileges established following the passage of the Taylor Grazing Act, based on the use of the federal range during the priority period. The active preference and suspended preference together make up the total grazing preference.

PREHISTORIC. Refers to the period wherein Native American cultural activities took place that were not yet influenced by contact with historic nonnative culture(s).

PRESCRIBED FIRE. Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

PRESCRIBED FIRE PLAN (BURN PLAN). This document provides the prescribed fire burn boss information needed to implement an individual prescribed fire project.

PRESCRIPTION. Measurable criteria that define conditions under which a prescribed fire or wildland fire for resource benefit may be used to guide selection of appropriate management responses, and indicate other required actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

PRODUCED WATER. Groundwater removed to facilitate the extraction of minerals such as coal, oil or gas.

PROPER FUNCTIONING CONDITION (PFC). A riparian-wetland area is considered to be in proper functioning condition when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflow, thereby reducing erosion and improving water quality; to filter sediment, capture bedload, and aid floodplain development; to improve flood-water retention and

ground-water recharge; to develop root masses that stabilize streambanks against cutting action; to develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary to fish production, waterfowl breeding, and other uses; and to support greater biodiversity. The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation. (Prichard, et al. 1998) There are two categories of wetlands. Lentic areas are created by a stable water table such as playas, fens, areas around lakes, marshes, etc., and lotic areas are in riverine environments.

PROPOSED SPECIES. Species that have been officially proposed for listing as threatened or endangered by the Secretary of the Interior. A proposed rule has been published in the *Federal Register*.

PUBLIC LAND. As used in this document, federally owned surface or mineral estate specifically administered by the BLM.

PUBLIC LAND LAWS. That body of laws dealing with the administration, use, and disposition of the public lands, but does not include the mineral laws, 43 CFR 2091.0-5 (h).

RANGELAND IMPROVEMENTS. Any activity or program on or relating to rangelands that is designed to improve forage production, change vegetation composition, control patterns of use, provide water, stabilize soil and water conditions, and enhance habitat for livestock, wildlife, and wild horses. Rangeland improvements include such things as water developments, fences, and vegetation treatments.

RANGE TREND. The direction of change in range condition.

RAPTOR. Bird of prey with sharp talons and strongly curved beaks such as hawks, owls, vultures, and eagles.

RAPTOR CONCENTRATION AREA (RCA). A localized area where raptors congregate that may provide thermal protection, increased forage availability, and a minimal level of stress-inducing disturbances.

RECREATION AND PUBLIC PURPOSES ACT of 1926 (R&PP). Refers to both the Recreation and Public Purposes Act [(43 U.S.C 869(a)] and the uses to be made of public land transferred under the act. The objective of the R&PP Act is to meet the needs of state and local government agencies and nonprofit organizations by leasing or conveying public land required for recreation and public purpose uses. Examples of uses made of R&PP lands are parks and greenbelts, sanitary landfills, schools, religious facilities, and camps for youth groups. The act provides substantial cost-benefits for land acquisition and provides for recreation facilities or historical monuments at no cost.

RECREATION OPPORTUNITY SPECTRUM (ROS). A planning process that provides a framework for defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for experiences are arranged along a continuum or spectrum of six classes: primitive, semi-primitive nonmotorized, semiprimitive motorized, roaded natural, rural, and urban. The resulting analysis defines specific geographic areas on the ground, each of which encompasses one of the six classes.

RECREATION SITES. Specific areas where concentrated recreation use is known to occur. There are two kinds of sites, developed and undeveloped.

- **Developed Recreation Sites:** Areas that support recreation that requires facilities, resulting in a concentrated use of the area. An example of a developed recreation site is a campground. Facilities might include parking lots, boat ramps, toilets, sources of drinking water, or designated camp sites with picnic tables and fire rings.
- **Undeveloped Recreation Sites:** Small areas without facilities (usually 2–3 acres in size) that are known and used because of their location along rivers or trails.

RESOURCE DAMAGE. Damage to any natural or cultural resources that results in impacts such as erosion, water pollution, degradation of vegetation, loss of archaeological resources, or the spread of weeds.

RESOURCE MANAGEMENT PLAN (RMP). A land use plan, as prescribed by the Federal Land Policy and Management Act, that establishes, for a given area of land, land-use allocations, coordination guidelines for multiple-use, objectives and actions to be achieved.

RIGHT-OF-WAY. A permit or grant that authorizes the use of public lands for certain specified purposes, commonly for pipelines, roads, telephone lines, electric lines, reservoirs, etc.; also, the lands covered by such a grant or permit.

RIPARIAN. Wetlands situated on or pertaining to the bank of a river, stream, lake or other body of water. Typically used to refer to the plants that grow rooted in the water table. In common use, this term can be synonymous with wetlands, but typically refers to areas along flowing water (see Lentic and Lotic). (See also Wetland/Riparian.)

RIPARIAN AREA. A transition between wetlands or water bodies and upland areas. Riparian areas exhibit vegetation or physical characteristics that reflect the influence of subsurface water in the root zone. Typical riparian areas include lands along, adjacent 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 COMMUNITIES. Communities of vegetation associated with either open water or wetlands. Examples are cottonwood and willow communities, meadows, aspens near water sources, and other trees, grasses, forbs, and shrubs associated with water.

RUNOFF. Water flowing out of a system, whether surface or groundwater. Typically excess water beyond the ability of the system to store it or use it in vegetation transpiration.

SAGE-GROUSE BREEDING HABITATS. Breeding habitats are composed of leks, nesting, and early broad rearing habitats.

SAGE-GROUSE LEK. (See Lek.)

SAGE-GROUSE NESTING/EARLY BROOD-REARING HABITAT. Nesting habitat for sage-grouse in Wyoming is generally described as sagebrush that has canopy cover between 15 and 30 percent and heights between 11 and 32 inches. Herbaceous plant height (6 inches or greater) and canopy cover (>15 percent) provide important cover and food for sage-grouse using these habitats. Early brood-rearing habitat generally has 10 to 25 percent sagebrush canopy cover and has slightly higher canopy cover of grasses and forbs than nesting habitat. Early brood-rearing habitat is generally used by sage-grouse hens with chicks when chicks range in age from 1 to 21 days.

SAGE-GROUSE WINTER HABITATS. During winter, sage-grouse feed almost exclusively on sagebrush leaves and buds. Suitable winter habitat requires sagebrush above snow. Sage-grouse tend to select wintering sites where sagebrush is 10 to 14 inches above the snow. Sagebrush canopy cover used by sage-grouse above the snow may range from 10 to 30 percent. Foraging areas tend to be on flat to generally southwest-facing slopes and windswept ridges.

SALABLE MINERALS. Minerals that may be sold under the Material Sale Act of 1947, as amended. Included are common varieties of sand, stone, gravel, and clay.

SAWTIMBER. Trees that have reached sufficient size and maturity to be used for "dimension lumber" such as 2 x 4s.

SCENIC QUALITY. The visual appeal of a tract of land based on landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications in relationship to the natural landscape.

SCOPING. The process of identifying the range of issues, management concerns, preliminary alternatives, and other components of an environmental impact statement or land-use planning document. It involves both internal and public viewpoints.

SEASON OF USE. The time during which livestock graze a given area. It is manipulated to achieve resource objectives.

SENSITIVE SPECIES. Those species designated by a State Director, usually in cooperation with the state agency responsible for managing the species and state natural heritage programs. They are those species that: (1) could easily become endangered or extinct in a state; (2) are under status review by the USFWS and/or NMFS; (3) are undergoing significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution; (4) are undergoing significant current or predicted downward trends in population or density such that federal listing, proposal, or candidate status may become necessary; (5) typically have small and widely dispersed populations, or (6) inhabit ecological refugia or other specialized or unique habitats.

SERAL. Stages of vegetation maturity or succession, usually described as early, mid, or late, with different dominances of plant species or communities in each stage.

SHRUB. A low, woody plant, usually with several stems, that may provide food and/or cover for animals.

SMOKE MANAGEMENT. Application of fire intensities and meteorological processes to minimize degradation of air quality during prescribed fires or fires for resource benefit.

SPATIAL MANAGEMENT. As used in this document, intensive control of the location and level of surface disturbance that would be allowed in a particular area.

SPECIAL RECREATION MANAGEMENT AREA (SRMA). An area that requires explicit recreation management to achieve recreation objectives and provide specific recreation opportunities.

SPECIAL STATUS SPECIES (SSS). Includes proposed species, listed species, and candidate species under the ESA; state-listed species; and BLM State Director-designated sensitive species (see BLM Manual 6840—Special Status Species Policy).

SPLIT ESTATE. Surface and minerals of a given area in different ownerships. Frequently, the surface will be privately owned and the minerals federally owned.

STANDARD. A description of the physical and biological conditions or degree of function required for healthy, sustainable lands (e.g., land health standards).

STATE LISTED SPECIES. Species proposed for listing or listed by a state in a category implying, but not limited to, potential endangerment or extinction. Listing is either by legislation or regulation.

STIPULATION. A condition or requirement attached to a lease or contract, usually dealing with protection of the environment or recovery of a mineral.

STRUTTING GROUND. An area used by sage-grouse in early spring for elaborate, ritualized courtship displays. (See also Lek.)

SUBSTRATE. The mineral or organic material that forms the bed of a stream; the base upon which an organism lives; or the surface on which a plant or animal grows or is attached.

SUPPRESSION. All the work of extinguishing or containing a fire, beginning with its discovery.

SURFACE DISTURBANCE. Any action created through mechanized or mechanical means that would cause soil mixing or result in alteration or removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation. Examples of surface disturbance include construction of well pads, pits, reservoirs, pipelines, and facilities (e.g., parking lot and tanks).

SURFACE OCCUPANCY. Placement or construction on the land surface of semipermanent or permanent facilities requiring continual service or maintenance. Casual use is not included.

TAKE. As defined by the Endangered Species Act, "to harass, harm, pursue, hunt, shoot, wound, kill, capture, or collect, or attempt to engage in any such conduct."

TEMPORAL MANAGEMENT. As used in this document, intensive control of the period during which BLM will allow activities that are physiologically disturbing or disrupting to normal wildlife activities.

THERMAL COVER. Vegetation or topography that prevents radiational heat loss, reduces wind chill during cold weather, and intercepts solar radiation during warm weather.

THREATENED SPECIES. Any plant or animal species that is likely to become an endangered species throughout all or a significant portion of its range, as defined by the USFWS under the Authority of the ESA 1973, as amended.

TRANSPORTATION AND UTILITY CORRIDOR. A parcel of land, without fixed limits or boundaries, this is used as the location for one or more transportation or utility ROW.

TREATMENT. Any method (or combination of methods, i.e., Integrated Management) used to control/contain, manage, or eradicate a species or community using biological (insects, goats), mechanical (thinning, mowing, pulling, chaining), cultural (livestock management), or chemical (pesticides) means.

TROPHY GAME ANIMAL. Black bear, grizzly bear, or mountain lion.

TURBIDITY. Interference with the passage of light through water due to insoluble particles of soil, organics, microorganisms and other materials.

UNDERSTORY. The least height-dominant story of vegetation present in a multilevel vegetation community.

UNDETERMINED LEK. Any lek that has not been documented as active in the last 10 years but that has not been sufficient documented to be designated unoccupied. Management protection will be afforded to undetermined leks until their status has been documented as unoccupied.

UNKNOWN LEK. Leks that have not been documented either active or inactive during the course of a strutting season.

UNOCCUPIED LEK. (Formerly termed "historical lek".) There are two types of unoccupied leks, "destroyed" or "abandoned." Management protection will not be afforded to unoccupied leks.

UNSUITABILITY CRITERIA. Criteria of the federal coal management program by which lands can be assessed as unsuitable for all or certain stipulated methods of coal mining.

UPLANDS. Lands at higher elevations than alluvial plains or low stream terraces; all lands outside the riparian-wetland and aquatic zones.

UTILIZATION. The proportion of the current year's forage production that is consumed by grazing animals. Utilization is usually expressed as a percentage.

VEGETATION COVER. The proportion of land or ground surface of an area covered by vegetation.

VISUAL RESOURCE. Visible feature of the landscape, such as land, water, vegetation, and other features that make up the scenery of an area.

VISUAL RESOURCE MANAGEMENT (VRM). The system by which BLM classifies and manages scenic values and visual quality of public lands. The system is based on research that has produced ways of assessing aesthetic qualities of the landscape in objective terms. After inventory and evaluation, lands are given relative visual ratings (management classes) that determine the amount of modification allowed for the basic elements of the landscape.

VISUAL RESOURCE MANAGEMENT (VRM) CLASSES. Classes that define the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. The four classes are described below:

- **Class I** provides for natural ecological changes only. This class includes primitive areas, some natural areas, some wild and scenic rivers, and other similar areas where landscape modification activities should be restricted.
- **Class II** areas are those areas where changes in any of the basic elements (i.e., form, line, color, or texture) caused by management activity should not be evident in the characteristic landscape.

- **Class III** includes areas where changes in the basic elements (i.e., form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.
- **Class IV** applies to areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.

VITAL HABITATS. Habitat that limits a community, population, or sub-population, and of which restoration or replacement may not be possible.

WATER TABLE. The planer surface between the zone of saturation and the zone of aeration. Measured as the elevation where the groundwater surface is at equilibrium with atmospheric pressure. The water table is typically measured with a shallow groundwater well and is equal to the elevation of the water surface in the well. This term is typically not used in reference to confined aquifers or aquifers under pressure. Also known as the groundwater table, groundwater surface, water level, and saturated surface, among other terms.

WATERSHED. All lands that are enclosed by a continuous hydrologic drainage divide and lie upslope from a specified point on a stream.

WETLANDS. A term that varies in meaning depending on the methodology used to determine wetland characteristics. Typically wetlands must have plants associated with anaerobic soil conditions (no oxygen and saturated with water), evidence of modeling (metal deposits) or other hydric soil indicators, and have the hydrology to allow for the location to be fully saturated at or near the soil surface for at least 2 weeks in a typical year. Wetlands can include standing water at or near the surface (typically not more than 2 meters deep) or saturated banks along flowing water such as riparian areas. (See also Wetlands/Riparian.)

WETLANDS/RIPARIAN. Areas exhibiting vegetation or physical characteristics that reflect the influence of surface or subsurface water. These areas include lands adjacent to, or contiguous with, perennially and intermittently flowing rivers, streams, springs and seeps; meadows, playas, and the shores of lakes and reservoirs with stable water levels, among others. Excluded are ephemeral streams or washes that lack typical riparian vegetation. These areas can typically be identified by the plant communities that are present. (See definitions for wetland and riparian plant communities.)

WILD HORSE HERD MANAGEMENT AREA (WHHMA) or (HMA). An area that has been designated for continuing management of wild horses.

WILD AND SCENIC RIVERS (WSR). A system of nationally designated rivers and their immediate environments that have outstanding scenic, recreational, geologic, fish and wildlife, historic, cultural, and other similar values and are preserved in a free-flowing condition. Types of streams include flowing bodies of water or estuaries or a section, portion, or tributary thereof, including rivers, streams, creeks, runs, kills, rills, and small lakes. The system consists of three types of streams: (1) recreation—rivers or sections of rivers that are readily accessible by road or railroad and that may have some development along their shorelines and may have undergone some impoundments or diversion in the past, (2) scenic—rivers or sections of rivers free of impoundments with shorelines or watersheds still largely undeveloped but accessible in places by roads, and (3) wild—rivers or sections of rivers free of impoundments and generally inaccessible except by trails, with watersheds or shorelines essentially primitive and waters unpolluted. (See Appendix 3.)

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 (1) generally appears to have been affected mainly by the forces of nature, with human imprints substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres or is large enough to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historic value.

WILDERNESS CHARACTERISTICS. Characteristics of lands that include: permanent human improvements or habitation, primeval character intact, affected primarily by the forces of nature, and/or the presence of outstanding opportunities for solitude or a primitive and unconfined type of recreation.

WILDERNESS STUDY AREA (WSA). Areas under study for possible inclusion as a Wilderness Area in the National Wilderness Preservation System.

WILDLAND FIRE. Any non-structural fire that occurs on wildland.

WILDLAND FIRE SITUATION ANALYSIS (WFSA). A decision-making process that evaluates alternative suppression strategies against selected environmental, social, political, and economic criteria. Provides a record of decisions.

WILDLAND URBAN INTERFACE (WUI). The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

WILDLAND. Land that is uninhabited or uncultivated.

WILDLIFE SERVICES (WS). Wildlife Services is a division of the USDA Animal and Plant Health Inspection Service (APHIS) and is responsible for the control of animals that are causing economic losses to agriculture, damage to property, or hazards to human health. (See also Animal Damage Control.)

WITHDRAWAL. An action that restricts the use of described public lands from operation of certain laws, which are also described in the withdrawal order. Withdrawal also may be used to transfer jurisdiction or management to other federal agencies. This term can also refer to the amount of water removed from an aquifer or surface water system, such as a well or a diversion for irrigation.

WOODLANDS. Those lands with 5 percent or greater crown cover in tree species *not* typically used in commercially processed wood products, including such species as limber pine, juniper, and aspen.

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