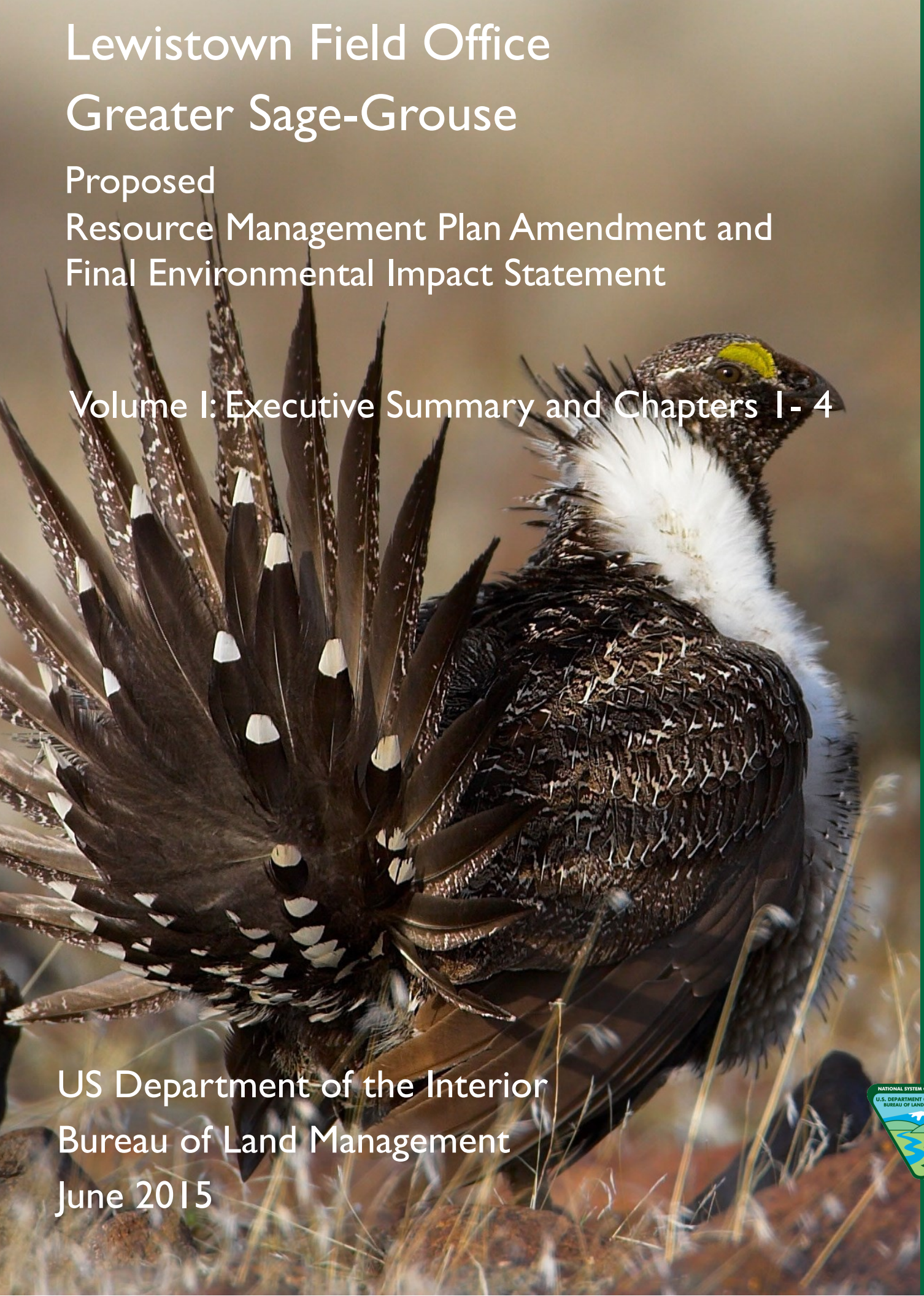
Lewistown Field Office
Greater Sage-Grouse

Proposed
Resource Management Plan Amendment and
Final Environmental Impact Statement



Volume I: Executive Summary and Chapters 1- 4

US Department of the Interior
Bureau of Land Management
June 2015

BLM

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

BLM/MT/PL-15/009+1610

DOI-BLM-MT-L060-2013-0032-EIS

Cover Photo: Steve Ting

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1. Responsible Agency: United States Department of the Interior
   Bureau of Land Management

2. Type of Action: Administrative (X) Legislative ( )

3. Document Status: Draft ( ) Final (X)

4. Abstract: The Proposed Resource Management Plan Amendment (RMPA) and Final Environmental Impact Statement (EIS) has been prepared by the Bureau of Land Management (BLM) with assistance from the following cooperating agencies: US Fish and Wildlife Service; Natural Resources Conservation Service; Lewis and Clark National Forest; Montana Department of Fish, Wildlife and Parks; Montana Department of Natural Resources and Conservation; Fergus County; Judith Basin County; Petroleum County; Petroleum County Conservation District; Indian Butte Cooperative State Grazing District (CSGD); Winnett CSGD; and Chain Buttes CSGD. The Final EIS considers and analyzes four alternatives that address future management of approximately 345,560 acres of BLM-administered surface and 639,927 acres of federal mineral estate in central Montana administered by the BLM's Lewistown Field Office (LFO).

   Alternative A is a continuation of current management (No Action Alternative). Under this alternative, use of BLM-administered lands and resources would continue to be managed under the Judith Resource Area and Headwaters RMPs, as amended. Alternative B describes management actions taken directly from the Sage-Grouse National Technical Team (NTT) *A Report on National Greater Sage-Grouse Conservation Measures*. Alternative C describes management actions submitted by various citizen groups. Alternative D describes management actions developed by adapting the NTT measures to Lewistown Field Office and was the BLM's preferred alternative in the Draft EIS. The Proposed RMPA is largely based on Alternative D, the preferred alternative in the Draft EIS. The Proposed RMPA is not a final agency decision but instead an indication of the agencies' preference that reflects the best combination of decisions to achieve BLM goals and policies, meets the purpose and need, addresses the key planning issues, and considers public comments and the recommendations of cooperating agencies and BLM specialists. The alternatives present a range of management actions to achieve the goal of Greater Sage-Grouse conservation for the Lewistown Field Office. Major planning issues addressed include realty actions, oil and gas, minerals, travel management, grazing, and fuels management.

5. Protests: Protests must be postmarked or received no later than 30 days after publication of the US Environmental Protection Agency Notice of Availability in the Federal Register. Refer to the instructions in the letter preceding this abstract for additional information on how to protest. The close of the protest period will be announced in news releases and on the Lewistown Field Office website: http://blm.gov/f9kd.

6. For further information contact:

Adam Carr, Team Leader
Bureau of Land Management,
Lewistown Field Office
920 NE Main Street
Lewistown, MT 59457
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United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Montana State Office
5001 Southgate Drive
Billings, Montana 59101-4669
www.blm.gov/mt

In Reply Refer To:
1610 (MT930)

June 2015

Dear Reader:

Enclosed is the Lewistown Field Office Sub-regional Greater Sage-Grouse (GRSG) Proposed Resource Management Plan Amendment (PRMPA) and Final Environmental Impact Statement (FEIS), one of fifteen sub-regional efforts being conducted as part of the Bureau of Land Management (BLM) National Greater-Sage Planning Strategy. The BLM prepared the PRMPA/FEIS in consultation with cooperating agencies, taking into account public comments received during this planning effort. The purpose of the PRMPA is to amend the Judith Resource Area and Headwaters RMPs to identify and incorporate appropriate conservation measures to conserve, enhance and/or restore GRSG habitat by reducing, eliminating, or minimizing threats to that habitat. The need for action is in response to the U.S. Fish and Wildlife Service's (USFWS) March 2010 "warranted, but precluded" Endangered Species Act listing petition. The USFWS found that the inadequacy of regulatory mechanisms was identified as a significant threat to GRSG in their finding on the petition to list the GRSG. RMP conservation measures were identified as the BLM's principal regulatory mechanism.

This PRMPA and FEIS have been developed in accordance with the National Environmental Policy Act of 1969, as amended, and the Federal Land Policy and Management Act of 1976, as amended. The PRMPA is largely based on Alternative D, the preferred alternative in the Draft Resource Management Plan Amendment/Environmental Impact Statement (DRMPA/DEIS), which was released on November 8, 2013. The PRMPA/FEIS contains the Proposed Plan, a summary of changes made between the DRMPA/DEIS and PRMPA/FEIS, impacts of the Proposed Plan, a summary of the written and verbal comments received during the public review period for the DRMPA/DEIS, and responses to the comments.

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

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

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

Regular Mail:	Overnight Delivery:
Director (210)	Director (210)
Attn: Protest Coordinator	Attn: Protest Coordinator
P.O. Box 71383	20 M Street SE, Room 2134LM
Washington, D.C. 20024-1383	Washington, D.C. 20003

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

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

Upon resolution of all land use plan protests, the BLM will issue an Approved RMPA and Record of Decision (ROD). The Approved RMPA and ROD will be mailed or made available electronically to all who participated in the planning process and will be available on the BLM website at http://blm.gov/f9kd.

Sincerely,

Sandra S. Leach

for Jamie E. Connell
State Director

1 Enclosure
1-Protest Regulations

Protest Regulations

[CITE: 43CFR1610.5-2]

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

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

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

(2) The protest shall contain:

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

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

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

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

The Federal Land Policy and Management Act of 1976 (FLPMA) directs the United States (US) Department of the Interior (DOI), Bureau of Land Management (BLM) to develop and periodically revise or amend its resource management plans (RMPs), which guide management of BLM-administered lands.

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

ES.1.1 Rationale for the Greater Sage-Grouse Planning Strategy and Resource Management Plan Amendment

This land use plan amendment is the result of the March 2010 US Fish and Wildlife Service (USFWS) 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 *Federal Register* 13910, March 23, 2010). In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. A warranted, but precluded determination is one of three results that may occur after a petition is filed by the public to list a species under the Endangered Species Act (ESA). This finding indicates that immediate

publication of a proposed rule to list the species is precluded by higher-priority listing proposals; that is, a species should be listed based on the available science, but listing other species takes priority because they are more in need of protection.

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

Consistent with the National Greater Sage-Grouse Planning Strategy (BLM 2011),[1] the BLM as the lead agency, together with the US Department of Agriculture, Forest Service (Forest Service) as a cooperating agency, is preparing 15 environmental impact statements (EISs), with associated plan amendments and revisions. Although the Forest Service is a cooperating agency, the Lewistown Field Office Greater Sage-Grouse Resource Management Plan Amendment (RMPA)/EIS does not address National Forest System lands. These documents provide a set of management alternatives focused on specific conservation measures across the range of the GRSG (see **Figure ES-1**, Greater Sage-Grouse Planning Strategy Boundaries).

Science-based decision-making and collaboration with state and local partners are fundamental to the Greater Sage-Grouse Planning Strategy. The 15 GRSG plan amendments or revisions/EISs address threats to GRSG identified by state fish and wildlife agencies, the BLM National Technical Team, and the USFWS in the context of its listing decision and the Conservation Objectives Team (COT) report. The COT report was prepared by wildlife biologists from state and federal agencies and provides a blueprint for the overall conservation approach set forth in the BLM and Forest Service GRSG plan amendments or revisions/EISs (USFWS 2013).[2] Where consistent with conservation objectives, the GRSG LUP/EISs adopt unique state- and stakeholder-developed approaches and priorities. Additional science-based reviews by the US Geological Survey and related scientific literature provided further guidance on specific issues that arose in developing the final BLM and Forest Service GRSG LUP/EISs. In addition, regular meetings with the Western Governors Association Sage-

[1] BLM (US Department of the Interior, Bureau of Land Management). 2011. Instruction Memorandum 2012-044, BLM National. Greater Sage-Grouse Land Use Planning Strategy. Washington, DC. December 27, 2011.
[2] USFWS (US Department of the Interior, Fish and Wildlife Service). 2013. Greater Sage-grouse *(Centrocercus urophasianus)* Conservation Objectives: Final Report. USFWS, Denver, Colorado. February 2013.

Figure ES-1

Grouse Task Force provided additional opportunities for coordination with member states.[3]

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

The planning area is the geographic area within which the BLM will make decisions during this planning effort. The planning area boundary includes all lands regardless of jurisdiction. The Lewistown Field Office sub-regional GRSG planning area covers all or a portion of Chouteau, Fergus, Judith Basin, Meagher, and Petroleum counties in central Montana. While the planning area consists of all lands regardless of ownership, decisions resulting from this land use plan RMPA would apply only to BLM-administered lands in GRSG habitats ("decision area"), including surface and split-estate lands with BLM-administered subsurface mineral rights. **Chapter 3**, Affected Environment, describes the current resource and resource use conditions in the planning area.

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

GRSG habitat management areas on BLM-administered lands in the decision area consist of lands allocated as PHMA and GHMA (**Table ES-1**, Habitat Management Areas in the Lewistown Field Office Planning Area, **Figure ES-2,** Greater Sage-Grouse Habitat Management Areas - Lewistown GRSG RMPA/EIS). PHMA and GHMA are defined as follows:

- PHMA (233,200 acres)—BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. The boundaries and management strategies for PHMA are derived from and generally follow the Preliminary Priority Habitat boundaries (see **Chapter 3**) identified in the Draft RMPA/EIS. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the COT report.
- GHMA (112,300 acres)—BLM-administered lands that require some special management to sustain GRSG populations. The boundaries and management strategies for GHMA are derived from and generally follow the Preliminary General Habitat boundaries (see **Chapter 3**) identified in the Draft RMPA/EIS.

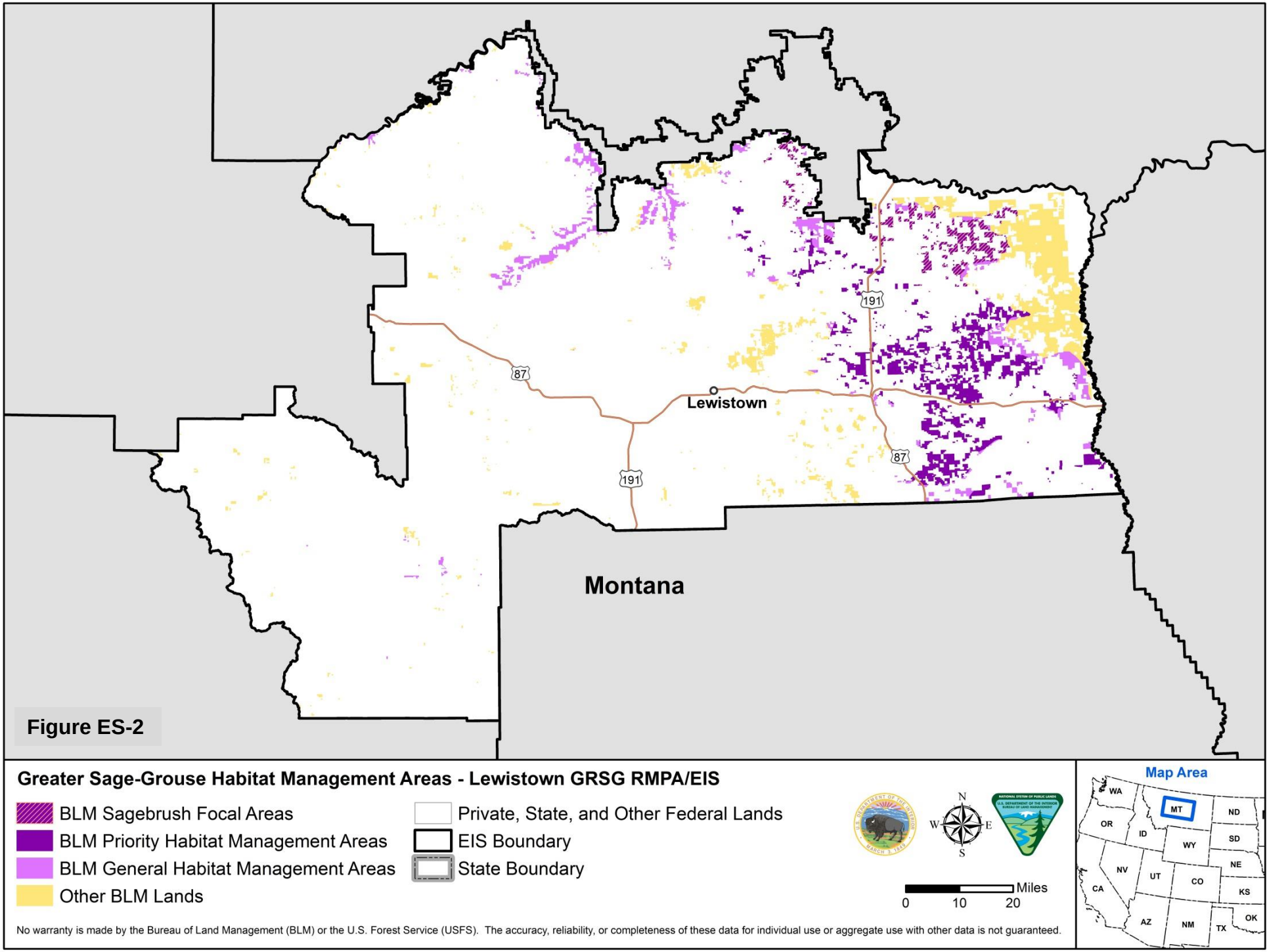
The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. The Lewistown Field Office Greater Sage-Grouse RMPA/EIS does not establish any additional management for these lands; they would be managed according to the existing, underlying land use plan for the area.

The Proposed Plan also identifies specific Sagebrush Focal Areas (SFA; 53,400 acres), which are a subset of PHMA. The SFA were derived from Greater Sage-Grouse "stronghold" areas described in a USFWS memorandum to the BLM titled *Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes* (USFWS 2014).[4] The memorandum and associated maps provided by the USFWS identify areas that represent recognized strongholds for GRSG that have been noted and referenced as having the highest densities of GRSG and other criteria important for the persistence of the species.

ES.2 PURPOSE AND NEED

The purpose of this RMPA is to identify and incorporate appropriate conservation measures to conserve, enhance, and restore GRSG habitat by reducing, minimizing, or eliminating threats to that habitat. The BLM would consider such measures in the context of the multiple-use and sustained yield

[4] USFWS (US Department of the Interior, Fish and Wildlife Service). 2014. Memorandum: Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes. October 27, 2014.


Lewistown
87
191
87
191
Montana
Figure ES-2
Greater Sage-Grouse Habitat Management Areas - Lewistown GRSG RMPA/EIS
BLM Sagebrush Focal Areas
BLM Priority Habitat Management Areas
BLM General Habitat Management Areas
Other BLM Lands
Private, State, and Other Federal Lands
EIS Boundary
State Boundary
N
W
E
S
Miles
0
10
20
Map Area
WA
OR
CA
ID
NV
MT
WY
UT
AZ
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NM
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OK
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No warranty is made by the Bureau of Land Management (BLM) or the U.S. Forest Service (USFS). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Table ES-1
Habitat Management Areas in the Lewistown Field Office Planning Area

Habitat Management Area	Acres of BLM-Administered Lands	Percent of BLM-Administered Lands in Planning Area
PHMA	233,200	40
GHMA	112,300	19
Other BLM-administered lands	248,400	41

mandates of FLPMA. The major threats identified by the USFWS in the March 2010 listing decision that apply to the Lewistown Field Office Sub-region include:

- Oil and gas development—This amendment would not make any decisions regarding new fluid mineral leases as described in **Chapter 1**, **Section 1.3**, Proposed Action**,** and **Section 1.6.4**, Issues Considered but Not Further Analyzed.
- Infrastructure—Fragmentation of GRSG habitat due to human development activities such as right-of-way (ROW) and renewable energy development
- Infrastructure—Fragmentation of GRSG habitat due to range improvements
- Invasive species—Conversion of GRSG habitat to invasive annual grass- (e.g., cheatgrass) dominated plant communities
- Wildfire—Loss of large areas of GRSG habitat due to wildfire
- Grazing—Loss of habitat components due to livestock and large wildlife use
- Agriculture and urbanization—Fragmentation of GRSG habitat or modification of GRSG behavior due to conversion of land to agricultural and urban uses
- Prescribed fire—Loss of GRSG sagebrush habitat
- Human uses—Fragmentation of GRSG habitat or modification of GRSG behavior due to human uses
- Conifer encroachment—Encroachment of pinyon and/or juniper into GRSG habitat
- Hard rock mining—Fragmentation of GRSG habitat due to mineral exploration and development

This RMPA with associated EIS is needed to respond to the USFWS's March 2010 "warranted, but precluded" ESA listing petition decision (75 *Federal Register* 13910, March 23, 2010). The USFWS identified inadequacy of regulatory mechanisms as a significant factor in its finding on the petition to list the GRSG.

In its listing decision, the USFWS noted that changes in management of GRSG habitats are necessary to avoid the continued decline of GRSG populations. Changes in land allocations and conservation measures in the BLM and Forest Service plan amendments/revisions provide a means to implement regulatory mechanisms to address the inadequacy identified by the USFWS.

ES.3 PROPOSED ACTION

The proposed federal action is the Proposed Plan, which identifies resource management actions in accordance with the multiple-use and sustained yield mandates of FLPMA. The proposed action is intended to provide a consistent framework for managing GRSG and its habitat on BLM-administered lands. The alternatives, including the Proposed Plan, comprise desired future outcomes and a range of management actions, allowable uses, and land use allocations that guide management on BLM-administered lands to conserve, restore, and enhance GRSG habitat.

There is an existing protest resolution decision affecting lands managed within the Lewistown Field Office. It does not allow oil and gas leasing of nominated parcels that would require a special stipulation to protect important wildlife values, which includes PHMA and GHMA. Areas within GRSG habitat that are nominated for leasing would be deferred. New leasing of areas with important wildlife values cannot occur until the BLM completes a plan amendment/EIS or a new/revised RMP/EIS, including oil and gas leasing decisions identified in a Record of Decision. Because this RMPA considers only management actions for GRSG and does not address oil and gas leasing options for other wildlife resource values, oil and gas leasing are not addressed in this RMPA/EIS. (The Lewistown Field Office is preparing an RMP revision, which will address oil and gas leasing for the entire Lewistown Field Office planning area boundary.)

The Proposed Plan (see **Section ES.6**, Greater Sage-Grouse Habitat Management Proposed Plan and Environmental Effects, and **Section 2.6.2**, Proposed Plan Amendment) represents the BLM's approach for addressing the purpose and need.

ES.4 DEVELOPMENT OF THE RMPA/EIS

ES.4.1 Scoping

The BLM initiated the RMPA/EIS process on December 9, 2011, with the publication in the *Federal Register* of a Notice of Intent (NOI) to begin a planning effort. A public scoping process began in January 2012 and included one public open house in Lewistown on January 10. Scoping is an early and open process for determining the scope, or range, of issues to be addressed and for identifying the significant issues to consider in the planning process. The scoping process included soliciting input from interested state and local governments, tribal governments, other federal agencies and organizations, and individuals. Its purpose is to identify the scope of issues to be addressed in the plan

amendment, and to assist in the formulation of a reasonable range of alternatives (See **Section 6.5.1**, Scoping Process).

The final Scoping Summary Report, available online at http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html, was prepared in conjunction with all the GRSG plan amendments and revisions. It summarizes the scoping and issue-identification process and describes 13 broad issue categories identified during the scoping process. Ten of the range-wide planning issues identified in the Scoping Summary Report are applicable for the Lewistown Field Office Greater Sage-Grouse RMPA/EIS (see **Section 1.6.3**, Issues Identified).

ES.4.2 Cooperating Agency Collaboration

Throughout this planning effort, the BLM has engaged with multiple federal, state, and local government agencies as well as Native American tribes. Consistent with the BLM Land Use Planning Handbook (H-1601), cooperating agencies share knowledge and resources to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks. A total of 12 agencies signed Memoranda of Understanding to formalize their cooperating agency relationship. The BLM met with and provided relevant information to cooperating agencies throughout the planning process. For more information, see **Chapter 6**, Consultation and Coordination.

ES.4.3 Development of the Draft RMPA/EIS

Development of Management Alternatives

In accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality implementing regulations (40 CFR, Part 1500), the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning team considered public input and developed a reasonable range of alternatives for the Draft RMPA/EIS.

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

- Respond to USFWS-identified issues and threats to GRSG and its habitat, including specific threats identified in the COT report
- Address the 10 planning issues
- Fulfill the purpose and need for the RMPA
- Meet the mandates of the FLPMA

Collectively, the three action alternatives (Alternatives B, C, and D) analyzed in the Draft RMPA/EIS offer a range of possible management approaches for responding to the purpose and need as well as the planning issues and concerns

identified through public scoping. While the overarching goal of the long-term conservation of GRSG and its habitat is the same across alternatives, each alternative contains a discrete set of objectives and management actions, which, if selected as the final plan, would constitute a unique RMPA.

Publication of Draft RMPA/EIS

Public Comment Period

A Notice of Availability (NOA) for the Draft RMPA/EIS was published in the *Federal Register* on November 8, 2013. The NOA initiated a 90-day public comment period, which ended on February 6, 2014. The BLM also held two public comment open houses for the Draft RMPA/EIS in December 2013.

Comment Analysis

During the Draft RMPA/EIS 90-day public comment period, the BLM received written comments by mail, e-mail, and submissions at the public meetings. Comments covered a wide spectrum of thoughts, opinions, ideas, and concerns. Upon receipt, the BLM reviewed the comments, grouped similar substantive comments under an appropriate topic heading, and evaluated and wrote summary responses addressing the comment topics. The response indicated whether the commenters' points would result in new information or changes being included in the Proposed RMPA/Final EIS. **Section 6.5.3**, Summary of Comments Received on the Draft RMPA/EIS, provides a detailed description of the comment analysis methodology and an overview of the public comments received on the Draft RMPA/EIS. Complete comment summaries and responses, including rationale and any associated changes made in the Proposed RMPA/Final EIS, can be found in **Appendix O**, Response to Comments on the Draft Resource Management Plan Amendment/Environmental Impact Statement.

ES.5 RMPA/EIS Alternatives and Environmental Effects

ES.5.1 Alternative A: No Action

Under Alternative A, the BLM would not develop new management actions to protect GRSG habitat. Management of existing threats to GRSG populations and habitat, such as infrastructure, invasive species, grazing, mineral development, and wildfire, would continue in accordance with existing land use planning documents.

ES.5.2 Alternative B

Alternative B would apply management actions to PHMA and GHMA, including actions that would exclude ROW development in PHMA and would avoid development in GHMA, would close PHMA to mineral material sales and nonenergy leasable minerals, and would recommend proposed withdrawal from locatable mineral entry in PHMA. These management actions would reduce surface disturbance in PHMA and would minimize disturbance in GHMA, thereby maintaining GRSG habitat.

Management actions for wildfire would focus on suppression in PHMA, while limiting certain types of fuels treatments. Vegetation management would emphasize sagebrush restoration. The BLM would prioritize completion of land health assessments in PHMA and would implement actions to modify grazing management to meet GRSG habitat requirements. Collectively, range management, vegetation, and wildfire management would conserve GRSG habitat.

ES.5.3 Alternative C

Alternative C is the most restrictive approach to GRSG conservation. Alternative C would eliminate all future ROWs, nonenergy leasable mineral development, and mineral material sales on GRSG habitat. Alternative C would also recommend proposed withdrawal from locatable mineral entry for all GRSG habitat. This alternative would substantially reduce surface disturbance in all GRSG habitat.

Management actions for wildfire would focus on suppression in PHMA and GHMA, while limiting certain types of fuels treatments. Under Alternative C, the BLM would prioritize implementing restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. Additionally, all GRSG habitat would be unavailable for livestock grazing.

ES.5.4 Alternative D

Alternative D, the BLM's preferred alternative from the Draft RMPA/EIS, presents a balanced approach to maintaining and enhancing GRSG populations and habitat.

Alternative D would limit disturbance in GRSG habitat by avoiding all ROW development in PHMA and GHMA and applying appropriate mitigation measures on nonenergy leasable mineral development and mineral material sales. These management actions would protect GRSG habitat while allowing other activities, subject to conditions.

Management actions for wildfire would be similar to Alternative B. Under Alternative D, the BLM would make meeting GRSG habitat restoration objectives in PHMA and GHMA a high priority, while considering other species. Range management would be similar to Alternative B.

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

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

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

The Proposed Plan would maintain and enhance GRSG populations and habitat. The Proposed Plan would apply management actions, subject to valid existing rights, to other uses and resources, such as:

- Providing a framework for prioritizing areas in PHMA and GHMA for wildfire, invasive annual grass, and conifer treatments
- Managing areas as ROW avoidance or exclusion for certain types of lands and realty uses, requiring specific design features, and limiting new development where a disturbance cap has been reached
- Adjusting grazing practices as necessary based on GRSG habitat objectives, Land Health Standards, and ecological site potential
- Applying Conditions of Approval (COAs) to existing fluid mineral leases in PHMA and GHMA and closing PHMA to nonenergy leasable development and mineral material sales

The Proposed Plan would also establish screening criteria and conditions for new anthropogenic activities in PHMA and GHMA to ensure a net conservation gain to GRSG. The Proposed Plan would reduce habitat disturbance and fragmentation through limitations on surface-disturbing activities, while addressing changes in resource condition and use through monitoring and adaptive management.

The Proposed Plan adopts key elements of the State of Montana Greater Sage-Grouse Habitat Conservation Strategy by establishing conservation measures and focusing restoration efforts in the same key areas most valuable to the GRSG. The Governor of the State of Montana issued Executive Order 10-2014, which created the Montana Sage Grouse Oversight Team (MSGOT) and the Montana Sage Grouse Habitat Conservation Program. The executive order outlines a number of conservation strategies for state agencies to follow for land uses and activities in GRSG habitat, in addition to establishing the MSGOT and habitat conservation program.

If the BLM finds that the State of Montana is implementing a GRSG Habitat Conservation Program that is effectively conserving the GRSG, the BLM will

review the management goals and objectives to determine if they are being met and whether amending the BLM Proposed Plan is appropriate to achieve consistent and effective conservation and GRSG management across all lands regardless of ownership.

For a full description of the BLM Proposed Plan, see **Section 2.6.2**.

Table ES-2
Key Components of the Lewistown Field Office Proposed Plan Addressing COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Component of the Lewistown Field Office Proposed Plan
All threats	• Implement the Adaptive Management Plan, which allows for more restrictive land use allocations and management actions to be implemented if habitat or population hard triggers are met. • Require and ensure mitigation that provides a net conservation gain to GRSG. • Monitor implementation and effectiveness of conservation measures in GRSG habitats according to the Habitat Assessment Framework. • Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat. • Apply Required Design Features (RDF) when authorizing actions in GRSG habitat.
All development threats, including mining, infrastructure, and energy development	• PHMA: Implement an anthropogenic disturbance cap of 3% within the Biologically Significant Unit (BSU) and proposed project analysis areas. • PHMA: Implement a density cap of an average of 1 energy and mining facility per 640 acres.
Energy development—fluid minerals	• *Note: oil and gas leasing will not be addressed in this RMPA/EIS.* • PHMA and GHMA: Apply COAs to existing fluid mineral leases.
Energy development—wind energy	• PHMA: Exclusion area (not available for wind energy development under any conditions) • GHMA: Avoidance area (may be available for wind energy development with special stipulations).
Energy development—solar energy	• PHMA: Exclusion area (not available for solar energy development under any conditions). • GHMA: Avoidance area (may be available for wind energy development with special stipulations).
Infrastructure—major ROWs	• PHMA: Avoidance area (may be available for major ROWs with special stipulations). • GHMA: Avoidance area (may be available for major ROWs with special stipulations).
Infrastructure—minor ROWs	• PHMA: Avoidance area (may be available for minor ROWs with special stipulations).
Mining—locatable minerals	• SFA: Recommend withdrawal from the Mining Law of 1872.

Table ES-2
Key Components of the Lewistown Field Office Proposed Plan Addressing COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Component of the Lewistown Field Office Proposed Plan
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals).
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met).
Mining—coal	• PHMA is essential habitat for GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).
Livestock grazing	• Prioritize the review and processing of grazing permits/leases in SFA followed by PHMA. • The NEPA analysis for renewals and modifications of grazing permits/leases would include specific management thresholds, based on the GRSG Habitat Objectives Table, Land Health Standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis. • Prioritize field checks in SFAs followed by PHMA to ensure compliance with the terms and conditions of grazing permits.
Free-roaming equid management	• Not Applicable; Free-Roaming equids do not occur within the planning area.
Range management structures	• Allow range improvements which do not impact GRSG, or which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats.
Recreation	• PHMA: Do not construct new recreation facilities. • Allow special recreation permits in PHMA only if their effects on GRSG and its habitat are neutral or beneficial for GRSG habitat.
Fire	• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection. • Prioritize post-fire treatments in PHMA.
Nonnative, invasive plant species	• Improve GRSG habitat by restoring native (or desirable) plants and create landscape patterns that most benefit GRSG. • PHMA and GHMA: Monitor for and treat invasive and noxious weed species associated with existing range improvement projects. • Integrated vegetation management would be used to control, suppress, and eradicate, where possible, noxious and invasive species.
Sagebrush removal	• PHMA: Maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover. • All BLM use authorizations would contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG.
Pinyon and/or juniper expansion	• Remove conifers encroaching into sagebrush habitats, prioritizing occupied GRSG habitat.

Table ES-2
Key Components of the Lewistown Field Office Proposed Plan Addressing COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Component of the Lewistown Field Office Proposed Plan
Agricultural conversion and exurban development	• GRSG habitat would be retained in federal management.

ES.7 SUMMARY

Since the release of the Draft RMPA/EIS, the BLM has continued to work closely with a broad range of governmental partners, including the United States Department of Agriculture Natural Resources Conservation Service, the USFWS and US Geological Survey in DOI, Indian tribes, governors, state agencies, and county commissioners. Through this cooperation, the BLM has developed the Proposed Plan that, in accordance with applicable law, achieves the long-term conservation of GRSG and its habitat.

Conservation of the GRSG is a large-scale challenge that requires a landscape-scale solution that spans 11 western states. The Lewistown Field Office Greater Sage-Grouse RMPA/EIS achieves consistent, range-wide conservation objectives, as outlined below. Additionally, the Lewistown Field Office Greater Sage-Grouse RMPA/EIS aligns with the State of Montana's priorities and land management approaches consistent with conservation of GRSG.

Minimize additional surface disturbance. The most effective way to conserve the GRSG is to protect existing, intact habitat. The BLM aims to reduce habitat fragmentation and protect key habitat areas. The Lewistown Field Office Greater Sage-Grouse RMPA/EIS minimizes surface disturbance on over 300,000 acres of BLM-administered lands by allocating lands as SFA, PHMA, and GHMA with decisions that aim to conserve GRSG habitat.

The implementation of a disturbance cap, lek buffers, and management on BLM-administered lands and federal mineral estate would act in concert to promote GRSG conservation and reduce disturbance. The Proposed Plan prioritizes oil and gas development outside of GRSG habitat and focuses on a landscape-scale approach to conserving GRSG habitat. In the context of the planning area, land use allocations in the Proposed Plan would limit or eliminate new surface disturbances in PHMA, while minimizing disturbance in GHMA.

Improve habitat condition. While restoring sagebrush habitat can be very difficult in the short term, particularly in the most arid areas, it is often possible to enhance habitat quality through purposeful management. The Lewistown Field Office Greater Sage-Grouse RMPA/EIS commits to management actions

necessary to achieve science-based vegetation and GRSG habitat management objectives established in the Proposed Plan.

Habitat restoration and vegetation management actions would improve GRSG habitat and prioritize restoration to benefit PHMA. The Proposed Plan would require the use of native seeds, designing post-restoration management to ensure the long-term persistence of restoration, considering changes in climate, and monitoring and controlling invasive species.

Reduce threat of rangeland fire to sage-grouse and sagebrush habitat. Rangeland fire can destroy sagebrush habitat and lead to the conversion of previously healthy habitat into nonnative cheatgrass-dominated landscapes. While energy development has been identified as the primary threat to the GRSG within its eastern range, this area is not immune to the threat of wildfire.

The Lewistown Field Office Greater Sage-Grouse RMPA/EIS includes requirements (referred to as GRSG Wildfire and Invasive Species Habitat Assessment) that landscape-scale fire and invasives assessments be completed and updated regularly to more accurately define specific areas to be treated to address threats to sagebrush steppe habitat. Additionally, Secretarial Order 3336 includes prioritization and allocation of fire resources and the integration of emerging science, enhancing existing tools to implement the RMPA and improving the BLM's ability to protect sagebrush-steppe from damaging wildfires.

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
ACEC	Area of Critical Environmental Concern
AMP	allotment management plan
APD	application for permit to drill
AQI	air quality index
AUM	animal unit month
BER	Baseline Environmental Report
BLM	Bureau of Land Management
BMP	best management practice
BSU	Biologically Significant Unit
CEA	cumulative effects analysis
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm	centimeter
CO	carbon monoxide
COA	conditions of approval
COT	Conservation Objectives Team
CSGD	Cooperative State Grazing District
CSU	controlled surface use
CTTM	comprehensive travel and transportation management
DDCT	density and disturbance calculation tool
DOI	Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EPA	Environmental Protection Agency
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act of 1973
ES&R	emergency stabilization and rehabilitation
ESD	ecological site descriptions
FACA	Federal Advisory Committee Act
FLPMA	Federal Land Policy and Management Act of 1976
FMU	Fire Management Unit
Forest Service	United States Department of Agriculture, Forest Service
FRCC	fire regime condition class
ft	foot
GHMA	general habitat management area
GHG	greenhouse gas
GIS	geographic information system
GRSG	Greater Sage-Grouse
HAF	Habitat Assessment Framework
IM	Instruction Memorandum

IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
km	kilometer
kV	kilovolt
LFO	Lewistown Field Office
m	meter
MCF	thousand cubic feet
MFWP	Montana Fish, Wildlife, and Parks
MOU	memorandum of understanding
MSGOT	Montana Sage Grouse Oversight Team
MTDEQ	Montana Department of Environmental Quality
MTNHP	Montana Natural Heritage Program
MZ	Management Zone
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969, as amended
NO_2	nitrogen dioxide
NOC	National Operations Center
NRCS	National Resource Conservation Service
NSHT	National Scenic/Historic Trails
NSO	no surface occupancy
NTT	National Technical Team
OHV	off-highway vehicle
PAC	Priority Area for Conservation
PCPI	per capita personal income
PFC	proper functioning condition
PGH	preliminary general habitat
PHMA	priority habitat management area
$PM_{2.5}$	particulate matter with a diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with a diameter less than or equal to 10 microns
PPH	preliminary priority habitat
RDF	required design feature
ReGAP	Regional Gap Analysis Program
RMP	resource management plan
RMPA	resource plan amendment
ROD	record of decision
ROW	right-of-way
SAIPE	Small Area Income and Poverty Estimates
SFA	sagebrush focal area
SGI	NRCS Sage-Grouse Initiative
SO_2	sulfur dioxide
SRMA	Special Recreation Management Area
SRP	special recreation permit

TL	timing limitation
TPI	total personal income
US	United States
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAFWA	Western Association of Fish and Wildlife Agencies
WAPA	Western Area Power Administration
WSA	Wilderness Study Area

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Introduction

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CHAPTER 1
INTRODUCTION

1.1 INTRODUCTION

The Federal Land Policy and Management Act of 1976 (FLPMA) directs the United States Department of the Interior (DOI), Bureau of Land Management (BLM) to develop and periodically revise or amend its resource management plans (RMPs), which guide management of BLM-administered lands.

In March 2010, the US Fish and Wildlife Service (USFWS) published its listing decision for the Greater Sage-Grouse (GRSG) as "warranted but precluded" (75 *Federal Register* 13910, March 23, 2010). Inadequacy of regulatory mechanisms was identified as a major threat in the USFWS finding on the petition to list the GRSG under the Endangered Species Act (ESA). The USFWS has identified conservation measures in RMPs as the principal regulatory mechanism for protecting GRSG on BLM-administered lands. Based on the identified threats to the GRSG and the USFWS's timeline for making a listing decision on this species, the BLM needs to incorporate objectives and adequate conservation measures into RMPs to conserve GRSG and avoid the potential of listing as a threatened or endangered species under the ESA. In response to the USFWS findings, the BLM will evaluate the adequacy of its RMPs and will address, as necessary, amendments and revisions to RMPs throughout the range of the GRSG.

Consistent with its national policy, the BLM is preparing several environmental impact statements (EISs), with associated plan amendments. These documents will address a range of alternatives focused on specific conservation measures across the range of the GRSG. Several on-going RMP revisions will also be addressing specific conservation measures. The plan amendments and revisions will be coordinated under two administrative planning regions across the entire range of the GRSG. The Rocky Mountain Region and the Great Basin Region boundaries are drawn roughly to correspond with the threats identified by the USFWS in the 2010 listing decision, along with the Western Association of Fish

and Wildlife Agencies (WAFWA) management zones framework (Stiver et al. 2006). The management zones reflect ecological and biological issues and similarities. In addition, management challenges within management zones are similar, and GRSG and their habitats are likely responding similarly to environmental factors and management actions. The Rocky Mountain Region consists of land use plans in North Dakota, South Dakota, Wyoming, Colorado, and portions of Montana and Utah. The Great Basin Region consists of land use plans in California, Nevada, Oregon, Idaho, and portions of Utah and Montana.

As identified above, this effort is the result of the March 2010 publication of the USFWS 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered. In that document, the agency concluded that the GRSG is warranted for listing as a threatened or endangered species. The USFWS reviewed the status and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the ESA. The USFWS determined that Factor A, "the present or threatened destruction, modification, or curtailment of the habitat or range of the Greater Sage-Grouse," and Factor D, "the inadequacy of existing regulatory mechanisms," both posed "a significant threat to the Greater Sage-Grouse now and in the foreseeable future" (75 *Federal Register* 13910, March 23, 2010). This plan amendment, along with the other plan amendments and revisions referenced above, propose to address both Listing Factors A and D and proposes to provide consistency in the management of GRSG habitat.

This plan amendment addresses GRSG habitat within the Lewistown Field Office (LFO). This habitat has been preliminarily mapped by the BLM Montana State Office in coordination with Montana Fish, Wildlife, and Parks (MFWP). GRSG habitat falls into one of the two following categories:

- **Priority habitat (PH)—**Areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations. These areas include breeding, late brood-rearing, and winter concentration areas
- **General habitat (GH)—**Areas of seasonal or year-round habitat outside of priority habitat

Through the land use planning process and plan amendment, the BLM will refine PH and GH data to (1) delineate priority habitat management areas (PHMA) and analyze actions within PHMA to conserve GRSG habitat functionality, or where possible, improve habitat functionality; and (2) identify general habitat management areas (GHMA) and analyze actions within GHMA that provide for major life history function (e.g., breeding, migration, or winter survival) in order to maintain genetic diversity needed for sustainable GRSG populations.

Range-wide, approximately 51 percent of sagebrush habitat within GRSG management zones is BLM-administered land; within the LFO, approximately 16

percent of sagebrush habitat is on BLM-administered lands. Changes in management of GRSG habitats are necessary to avoid the continued decline of populations that are anticipated across the species' range. Range-wide, conservation measures, in the form of land use decisions will focus on areas affected by threats. Examples of these threats are wildfire, energy development, disease, and infrastructure development, depending on the threats identified for each sub-region within the Rocky Mountain and Great Basin regions. The BLM administers a large portion of GRSG habitat within the affected states, because of this, changes in its management of GRSG habitats is anticipated to have a considerable impact on existing GRSG populations across the range of GRSG.

On October 27, 2014, the USFWS provided the BLM a memorandum titled "Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes" (http://www.fws.gov/greatersagegrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf). The memorandum and associated maps provided by the USFWS identify areas that represent recognized "strongholds" for GRSG that have been noted and referenced as having the highest densities of GRSG and other criteria important for the persistence of the species. The USFWS did recognize areas within the Lewistown Field Office Greater Sage-Grouse planning area as "strongholds" for GRSG.

On November 21, 2014 the US Geological Survey (USGS) published "Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review" (Manier et. al. 2014). The USGS review provided a compilation and summary of published scientific studies that evaluate the influence of anthropogenic activities and infrastructure on GRSG populations. The BLM has reviewed this information and examined how lek buffer-distances were addressed through land use allocations and other management actions in the Lewistown Field Office Draft Resource Management Plan Amendment (RMPA)/EIS. Based on this review, in undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third party actions, the BLM would apply the lek buffer-distances in the USGS Report "Conservation Buffer Distance Estimates for Greater Sage Grouse-A Review (Open File Report 2014-1239)" in both GHMA and PHMA as detailed in **Appendix M**, Applying Lek Buffer Distances When Approving Actions.

While energy development has been identified as the primary threat to the GRSG within its eastern range, this area is not immune to the threat of wildfire. Within the Rocky Mountain Region, wildfire was identified by the Conservation Objectives Team (COT) Final Report (2013) as a present and widespread threat in seven of thirteen priority areas of conservation (PACs) and as a present but localized threat in the remaining PACs. While fire is a naturally occurring disturbance in the sagebrush steppe, the incursion of non-native annual grasses is facilitating an increase in mean fire frequency, which can preclude the

opportunity for sagebrush to become re-established. As such, the RMPA includes requirements (referred to as GRSG Wildfire and Invasive Species Habitat Assessment in **Appendix K**) that landscape scale fire and invasives assessments be completed and updated regularly to more accurately define specific areas to be treated to address threats to sagebrush steppe habitat. Within the Rocky Mountain region, assessments have not yet been completed but will be scheduled based on the need to identify and address potential threats. Additionally, the Secretary of Interior issued Secretarial Order 3336 on January 5, 2015, which establishes the protection, conservation and restoration of "the health of the sagebrush-steppe ecosystem and, in particular, greater sage-grouse habitat, while maintaining safe and efficient operations as a critical fire management priority for the Department." The Secretarial Order will result in a final report of activities to be implemented prior to the 2016 Western fire season. This will include prioritization and allocation of fire resources and the integration of emerging science, enhancing existing tools to implement the RMPA and improve our ability to protect sagebrush-steppe from damaging wildfires.

1.2 PURPOSE AND NEED

The BLM is preparing RMPAs and revisions with associated EISs for RMPs containing GRSG habitat. This effort responds to the USFWS's March 2010 "warranted, but precluded" ESA listing petition decision. Inadequacy of regulatory mechanisms was identified as a significant threat in the USFWS finding on the petition to list the GRSG. The USFWS identified the principal regulatory mechanism for the BLM as conservation measures embedded in RMPs. Changes in management of GRSG habitats are necessary to avoid the continued decline of populations that are anticipated across the species' range. These plan amendments and revisions (BLM plans being amended or revised across the entire GRSG range) would focus on areas affected by threats to GRSG habitat identified by the USFWS in the March 2010 listing decision. A threats cross-walk table is included in **Section 2.5**, BLM Resource Programs for Addressing GRSG Threats, to show what threats are being addressed in the range of alternatives for this RMPA/EIS.

The purpose for the RMPAs and revisions is to identify and incorporate appropriate conservation measures to conserve, enhance and/or restore GRSG habitat by reducing, eliminating, or minimizing threats to that habitat.

Because BLM administers a large portion of GRSG habitat within the affected states, changes in BLM management of GRSG habitats are anticipated to have a considerable beneficial impact on present and future GRSG populations and could reduce the need to list the species as threatened or endangered under the ESA.

1.3 PROPOSED ACTION

This proposed Lewistown Field Office Greater Sage-Grouse RMPA/EIS provides future management direction to maintain or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem on which populations depend throughout the LFO portion of WAFWA Management Zones (MZ) 1 and 4 (Stiver et al. 2006). MZ 1 includes all of Montana (except the Dillon Field Office), North Dakota, South Dakota, and northeastern Wyoming. Additionally, a small portion of MZ 4 is within the LFO in Meagher County. The portions of MZs 1 and 4 within the LFO are analyzed as part of this RMPA/EIS.

The planning area is currently managed under the Judith Resource Area Resource Management Plan (BLM 1994) and the Headwaters Resource Management Plan/Environmental Impact Statement Record of Decision (ROD; BLM 1984). There is an existing protest resolution decision affecting lands managed within the LFO that does not allow oil and gas leasing of nominated parcels that would require a special stipulation to protect important wildlife values, which includes PH and GH, or PHMA and GHMA. Existing fluid mineral leases within GRSG habitat that expire can be re-nominated for leasing, but would be deferred as described above. New leasing of areas with important wildlife values cannot occur until the BLM completes a plan amendment/EIS or a new/revised RMP/EIS, including oil and gas leasing decisions identified in a ROD. Because this RMPA only considers management actions for GRSG and does not address oil and gas leasing options for other wildlife resource values, oil and gas leasing will not be addressed in this RMPA/EIS. (*The LFO is in the process of preparing a RMP revision, which will address oil and gas leasing for the entire LFO planning area boundary.*)

The Lewistown Field Office Greater Sage-Grouse RMPA/EIS would amend both the Judith Resource Area and Headwaters RMPs. Proposed amendments include allowable uses and management actions for select resources and resource uses. Allowable uses indicate which uses are allowed, restricted, or prohibited and may include stipulations. Allowable uses also identify lands where specific uses are excluded to protect resource values. Management actions include management measures that will guide future and day-to-day activities to conserve GRSG and GRSG habitat. In addition, this RMPA would include identifying required design features (RDFs). Implementation decisions generally constitute site-specific on-the-ground actions and are not addressed in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS.

The decisions to be made in this document are (1) to delineate PHMA and GHMA and (2) to identify the management actions, restrictions, and constraints that would be placed on allowable uses on BLM-administered lands to conserve, restore, and enhance GRSG habitat.

1.4 DESCRIPTION OF THE GREATER SAGE-GROUSE PLANNING AREA

1.4.1 Overview

The planning area for the Lewistown Field Office Greater Sage-Grouse RMPA/EIS is in Chouteau, Fergus, Judith Basin, Meagher, and Petroleum counties in central Montana. These lands are either private or are administered by the BLM; the US Department of Agriculture (USDA), Forest Service (Forest Service); the USFWS; the US Department of Defense; or the State of Montana (**Table 1-1**). **Figure 1-1**, in **Appendix A**, is a map of the planning area.

The planning area incorporates the PH, GH and additional lands not considered GRSG habitat. Though the planning area includes private lands, decisions in this Proposed RMPA/Final EIS are made only for BLM-administered federal surface and federal minerals. Management direction and actions outlined in this Proposed RMPA/Final EIS apply only to these BLM-administered lands in the planning area and to federal mineral estate under BLM jurisdiction that may lie beneath other surface ownership. Unlike other RMPAs or revisions that are part of the National Greater Sage-Grouse Planning Strategy, the Lewistown Field Office Greater Sage-Grouse RMPA/EIS does not address a range of alternatives for Forest Service-managed surface/federal minerals. The Lewis & Clark National Forest is a cooperating agency; however, it has had minimal involvement in the planning process as the planning area does not include any Forest Service land that is considered GRSG habitat.

The current GRSG habitat on BLM-administered lands in the LFO consists of 233,219 acres of PH (19 percent of all PH in the planning area) and 112,341 acres of GH (11 percent of all GH in the planning area). PH and GH were mapped in cooperation with the MFWP. **Table 1-1** provides acres of PH and GH by landowner, and **Figure 1-1** (**Appendix A**) includes areas mapped as PH and GH.

Table 1-1
Land Ownership within the Planning Area

	Chouteau County		Fergus County		Judith Basin County		Meagher County		Petroleum County		Planning Area			
	PH Acres	GH Acres	PH Acres	GH Acres	PH Acres	GH Acres	PH Acres	GH Acres	PH Acres	GH Acres	Planning Area Acres[1]	PH Acres	GH Acres	Non-Habitat Acres
Surface Ownership														
BLM[2]	0	18,696	83,148	55,855	0	3,692	0	439	150,071	33,659	593,995	233,219	112,341	248,435
Other Federal	0	0	113	2	0	0	0	1,626	3,575	89	1,010,816	3,688	1,717	1,005,411
State Lands	0	11,787	54,903	21,234	0	2,129	0	36,031	35,684	12,257	526,504	90,587	83,438	352,479
Private	0	107,728	506,694	275,159	0	25,627	0	265,747	371,477	142,608	5,168,165	878,171	816,869	3,473,125
Water	0	573	0	0	0	0	0	0	2,329	97	12,039	2,329	670	9,040
Total	**0**	**138,784**	**644,858**	**352,250**	**0**	**31,448**	**0**	**303,843**	**563,136**	**188,710**	**7,311,519**	**1,207,994**	**1,015,035**	**5,088,490**
Federal Mineral Estate[3]														
All Minerals	0	30,202	98,885	79,412	0	6,679	0	11,910	163,178	43,795	88,417	262,063	171,998	448,356
Other	0	3,058	12,310	8,375	0	260	0	4,417	20,561	7,060	85,615	32,871	23,170	29,474
Total	**0**	**34,433**	**111,195**	**87,788**	**0**	**6,939**	**0**	**16,327**	**183,739**	**50,855**	**968,032**	**294,935**	**195,168**	**477,930**

Source: BLM 2012a
[1]Planning area acres include PH, GH, and non-habitat.
[2]For the purpose of this planning process, all BLM-administered lands have subsurface minerals.
[3]These terms are derived primarily from master title plats and indicate what minerals are reserved by the federal government.

1.5 BLM PLANNING PROCESS

FLPMA requires the BLM to use RMPs as tools by which "present and future use is projected" (43 United States Code [USC], Section 1701 [a][2]). FLPMA's implementing regulations for planning, 43 Code of Federal Regulations (CFR), Part 1600, state that land use plans are a preliminary step in the overall process of managing BLM-administered lands. The regulations state that the plans are "designed to guide and control future management actions and the development of subsequent, more detailed and limited scope plans for resources and uses" (43 CFR, Part 1601.0-2). Public participation and input are important components of land use planning. This EIS analyzes the impacts of the Proposed Plan Amendment and four draft alternatives for the RMPA planning area, including the No Action Alternative. The No Action Alternative reflects current management (the existing plans). The National Environmental Policy Act (NEPA) requires analysis of a No Action Alternative.

The BLM uses a nine-step planning process (**Diagram 1-1**) when developing or revising RMPs, as required by 43 CFR, Part 1600, and planning program guidance in the BLM Handbook H-1601-1, *Land Use Planning Handbook* (BLM 2005a). The planning process is designed to help the BLM identify the uses of BLM-administered lands desired by the public and to consider these uses to the extent they are consistent with the laws established by Congress and the policies of the executive branch of the federal government.

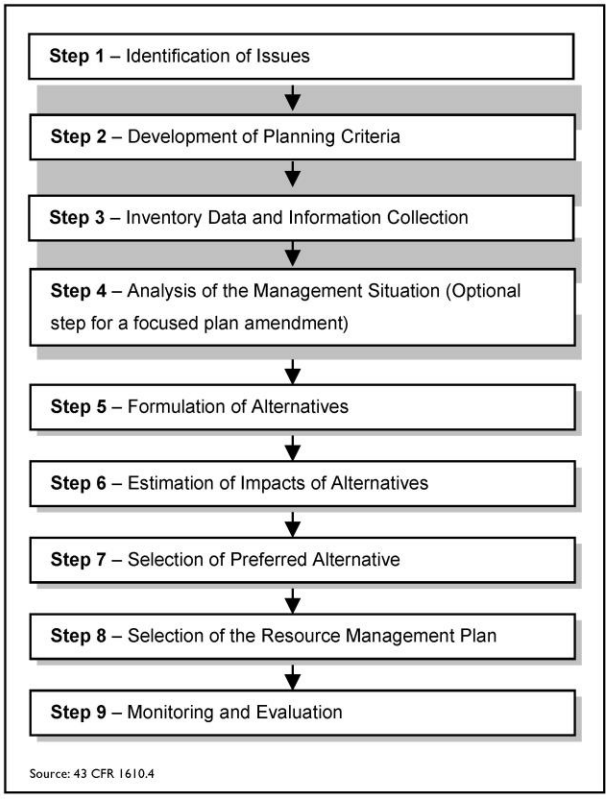
Once an RMP is approved, the RMP may be changed through an amendment. An amendment is initiated by the need to consider monitoring and evaluation findings, new data, new or revised policy, a change in circumstances or a proposed action that may result in a change in the scope of resource uses or a change in the terms, conditions, and decisions of the approved plan. If a decision is made to prepare a NEPA document, the amending process would follow the same procedure required for preparing and approving the plan, but the focus would be limited to that portion of the plan being amended (43 CFR, Part 1610.5-5).

The planning process is issue driven and is undertaken to resolve management issues and problems, as well as to take advantage of management opportunities. The BLM uses the public scoping process to identify planning issues to revise or modify an existing plan. The scoping process (see **Section 1.6.1**, The Scoping Process) is also used to introduce the public to preliminary planning criteria, which set the parameters for conducting the planning process.

1.5.1 Implementation of Land Use Plans

When an approved land use plan or land use plan amendment decision document is signed, the land use plan decisions in the plan generally are effective immediately and require no additional planning or NEPA analysis. Upon approval of the land use plan, subsequent implementation decisions are put into effect by

Diagram 1-1
Nine-Step Planning Process



developing activity-level or project-specific implementation plans. An activity-level plan typically describes multiple projects in detail that will lead to on-the-ground action. These plans traditionally focused on single resource programs (e.g., habitat management plans, allotment management plans (AMPs), and recreation management plans). Implementation decisions are made with the appropriate level of NEPA analysis along with any procedural and regulatory requirements for individual programs.

The BLM develops strategies to facilitate implementation of land use plans. An implementation strategy lists prioritized decisions that will help achieve the desired outcomes of one or more land use plans and can be implemented given existing or anticipated resources. Developing implementation strategies enables the BLM to prioritize the preparation of implementation decisions. Implementation strategies can include such steps as: (1) developing a framework to portray the work; (2) identifying priorities for a given timeframe; (3) developing a budget for a given timeframe; (4) and developing an outreach strategy to support implementation.

Future proposed actions that need a level of analysis beyond that contained in this Proposed RMPA/Final EIS would undergo their own NEPA review before they could be approved or implemented. Also, all proposed actions in the future

must conform to the Judith Resource Area RMP and the Headwaters RMP (as amended by this GRSG amendment) and ROD when completed (43 CFR, Part 1601.0-5(b)).

1.5.2 Monitoring

The regulations in 43 CFR, Part 1610.4-9 require that land use plans establish intervals and standards for monitoring, based on the sensitivity of the resource decisions involved. Land use plan monitoring is the process of tracking the implementation of land use planning decisions (implementation monitoring) and collecting data/information necessary to evaluate the effectiveness of land use planning decisions (effectiveness monitoring). The level and intensity of monitoring will vary, depending on the sensitivity of the resource or area and the scope of the proposed management activity. See **Section 2.7.2**, Monitoring for the Greater Sage-Grouse Planning Strategy, and **Appendix B**, The Greater Sage-Grouse Draft Monitoring Framework, for more information related to monitoring in Lewistown Field Office Greater Sage-Grouse RMPA/EIS.

1.6 SCOPING AND IDENTIFICATION OF ISSUES

1.6.1 The Scoping Process

Scoping is an early and open process for determining the scope, or range, of issues to be addressed and for identifying the significant issues to consider in the planning process. Scoping is designed to meet the public involvement requirements of FLPMA and NEPA. It identifies the affected public and agency concerns and defines the relevant issues and alternatives that will be examined in detail in the RMPA. A planning issue is defined as a major controversy or dispute regarding management or uses on BLM-administered lands that can be addressed through a range of alternatives.

A 60-day public scoping period for the purpose of developing this document was initiated on December 9, 2011, with the publication in the Federal Register of a notice of intent to begin planning. The scoping period was extended through a notice of extension published February 10, 2012; the period ended on March 23, 2012. This cooperative process included soliciting input from interested state and local governments, tribal governments, other federal agencies and organizations, and individuals to identify the scope of issues to be addressed in the RMPA and to assist in the formulation of reasonable alternatives.

The scoping process opened dialogue between the BLM and the public about managing GRSG and its habitats on BLM-administered lands. The process also identified the concerns of those who have an interest in this subject and in the GRSG habitats. As part of the scoping process, the BLM also requested that the public submit nominations for potential Areas of Critical Environmental Concern (ACECs) for GRSG and their habitat.

Scoping included an open-house meeting in Lewistown, Montana, on January 10, 2012. In addition, news releases were used to notify the public regarding the scoping period and to invite the public to provide written comments. Public comments obtained during the scoping period were used to define the relevant issues that would be addressed by a reasonable range of alternatives in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS.

The *National Greater Sage-Grouse Planning Strategy Scoping Summary Report* (BLM 2012b) is available at the project website for the national conservation effort at http://www.blm.gov/wo/st/en/prog/more/sagegrouse.html. The discussion below provides an overview of the scoping results, both range-wide and specific to eastern Montana.

1.6.2 Scoping Comments

During the public scoping period, the BLM received 272 unique written submissions for the Rocky Mountain Region (which includes eastern Montana) and 585 unique written submissions for the Great Basin Region. Submissions resulted in 7,472 unique comments; in addition, 30,397 form letters were received.

In the *National Greater Sage-Grouse Planning Strategy Scoping Summary Report* (BLM 2012b), the comments that pertain to the LFO are listed in the eastern Montana section. Out of the 7,472 unique comments received, only 67 were specific to eastern Montana.

Commenter Affiliation

For comments specific to eastern Montana, individual members of the public submitted 50 percent of the comments; representatives from the commercial sector accounted for eight percent of the commenters and nonprofit or citizen groups represented 33 percent. Local government agencies represented eight percent of comments; federal and state agencies submitted no comments.

Number of Comments by Process Category

Of the 67 comments received specific to eastern Montana, 52 (85 percent) were related to a planning issues that are addressed in the RMPA. These issues are summarized below (**Section 1.6.3**, Issues Identified) and are discussed in Chapter 3, Issue Summary, of the *National Greater Sage-Grouse Planning Strategy Scoping Summary Report* (BLM 2012b). It should be noted that some comments addressed multiple planning issues. In addition, nine comments (15 percent) were related to issues that will be addressed in the EISs but do not fall within a specific planning issue category. These were general comments on the BLM planning process, alternatives development, collaboration, and requirements of NEPA and other regulations. The remaining 5 comments were on issues that are beyond the scope of the EISs (four comments, 67 percent) and issues that will be resolved through national policy or administrative action (two comments, 33 percent).

1.6.3 Issues Identified

Issues to be addressed in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS were identified by the public and the agencies during the scoping process for the range-wide planning effort. The issues identified in the *National Greater Sage-Grouse Planning Strategy Scoping Summary Report* (BLM 2012b) and other resource and use issues identified in the *BLM Planning Handbook and Manual* (H-1610-1) were considered in developing the alternatives brought forward for analysis. Range-wide issues identified in the *National Greater Sage-Grouse Planning Strategy Scoping Summary Report* (BLM 2012b) that are applicable for the LFO are included in **Table 1-2.**

Table 1-2
Range-Wide Planning Issues for the Lewistown Field Office

Issue	Planning Issue Category	Planning Issue
1.	Greater Sage-Grouse and habitat	How would the BLM use the best available science to designate PH, GH, and no-habitat categories and accurately monitor the impact of land uses on GRSG?
2.	Energy and mineral development	How would energy and mineral development, including renewable energy, be managed within GRSG habitat, while recognizing valid existing rights?
3.	Livestock grazing	What measures would the BLM put into place to protect and improve GRSG habitat while maintaining permitted grazing use?
4.	Vegetation management	How would the BLM conserve, enhance, or restore GRSG habitat, such as sagebrush communities, and minimize or prevent the introduction or spread of noxious weeds and invasive species?
5.	Lands and realty	What opportunities exist to adjust public land ownership that would increase management efficiency for GRSG and habitat?
6.	Social, economic, and environmental justice	How could the BLM promote or maintain activities that provide social and economic benefit to local communities, while providing protection for GRSG habitat?
7.	Recreation and travel management	How would motorized, nonmotorized, and mechanized travel be managed to provide access to federal lands and a variety of recreation opportunities, while protecting GRSG habitat?
8.	Fire management	What measure should be undertaken to manage fuels and wildland fires, while protecting GRSG habitat?
9.	Special management areas	What special management areas would the BLM designate to benefit the conservation, enhancement, and restoration of GRSG and habitat?
10.	Drought/climate change	How would the BLM incorporate the impacts of a changing climate on GRSG habitat?

Issues Specific to Lewistown Field Office

Issues discussed in the comments for the LFO included GRSG habitat, energy and mineral development, livestock grazing, fish and wildlife, social and economic concerns, vegetation management, recreation and travel management, and special management areas. No additional unique comment themes were identified outside of the issues identified in the range-wide analysis (**Table 1-2**).

1.6.4 Issues Considered but Not Further Analyzed

National Policy or Administrative Action

Policy or administrative actions are those that the BLM implements because they are standard operating procedure, because federal law requires them, or because they are BLM policy. They are, therefore, issues that are eliminated from detailed analysis in this planning effort. Administrative actions do not require a planning decision to implement (BLM 2005a).

The following issues were determined to be outside the scope of the range-wide planning effort, including the Lewistown Field Office Greater Sage-Grouse RMPA/EIS:

- **Hunting sage-grouse—**Many commenters questioned why GRSG hunting is allowed if the bird is in need of protection. Hunting is an allowed use on BLM-administered lands and is regulated by MFWP; these comments therefore relate to state-regulated actions and are outside the scope of the RMPA.
- **Predator control—**Many commenters stated that predator control was needed to protect GRSG from predation. The State of Montana possesses primary authority and responsibility for managing wildlife within the state, while the BLM is responsible for managing habitat. Consistent with a memorandum of understanding (MOU) between the BLM and the USDA, Animal and Plant Health Inspection Service-Wildlife Services, the BLM would continue to work with the MFWP and USDA Wildlife Services to meet state wildlife population objectives. Predator control is allowed on BLM-administered lands and is regulated by MFWP; these comments therefore relate to state-regulated actions and are outside the scope of the RMPA. The BLM will continue to work with agencies, such as MFWP, to address current predation of GRSG. The BLM-administered lands in the planning area will remain open to predator control under state laws. However, for the purpose of this document, the indirect effects on GRSG from predators are analyzed in **Chapter 4**, Environmental Consequences, and **Chapter 5**, Cumulative Effects.
- **Warranted but precluded decision—**Commenters questioned population levels and the need to incorporate range-wide

conservation measures. Others questioned the effectiveness of ESA listing as a method of species conservation. These comments relate to decisions under the purview of the USFWS and are not addressed in this RMPA.

- **Elimination of livestock grazing—**Commenters asked that grazing be limited or completely stopped on all National System of Public Lands administered by the BLM due to detrimental ecosystem effects. Others stated that national grazing policies should be reformed as the requirements are too limiting and impact ranchers' livelihoods. In addition, some commenters state that grazing provides habitat enhancements for certain sensitive species. Decisions about livestock grazing national policies are outside the scope of this RMPA and are not made in this planning effort.

  However, for the purposes of this document, the removal of livestock in all PHMA and GHMA within the planning area (i.e., no authorized livestock grazing) is considered in Alternative C. This is consistent with Instruction Memorandum (IM) 2012-169, *RMP Alternative Development for Livestock Grazing* (BLM 2012c). Note that this document is specific to PH and GH, not an entire planning area. Additionally, IM MT-2012-042, *Guidance to Address Alternative Development in Livestock Grazing Permit Renewals*, directs the BLM in Montana to analyze a no grazing alternative as part of the grazing permit renewal process (BLM 2012d).

- **Renewable energy policies—**Commenters stated concerns about renewable energy development, including economic instability due to government subsidies and risk of wildlife deaths, specifically bats and birds. General policy decisions about renewable energy management on BLM-administered lands will be determined by national policy and are not addressed in this RMPA.

Range-Wide Issues not Carried Forward in the Lewistown Field Office Amendment

The following range-wide issues are not being carried forward in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS:

- **Fluid mineral leasing—**As discussed in **Section 1.3**, Proposed Action, an existing protest resolution decision affecting lands managed within the LFO does not allow oil and gas leasing of nominated parcels that would require a special stipulation to protect important wildlife values, which includes PH and GH. Existing fluid mineral leases within GRSG habitat that expire can be re-nominated for leasing, but would be deferred as described above New leasing of areas with important wildlife values cannot occur until the BLM completes a plan amendment/EIS or a new/revised RMP/EIS, including oil and gas leasing decisions identified in a ROD.

This RMPA is only considering management actions for GRSG and it will not include consideration of oil and gas leasing options for lands with other important wildlife resource values. Therefore, oil and gas leasing will not be addressed in this RMPA/EIS. (*The LFO is in the process of preparing a RMP revision, which will address oil and gas leasing for the entire LFO planning area boundary.*)

- **Fish and wildlife—**Fish and wildlife management is not a main issue that would drive alternatives design for this RMPA; however, management activities that impact these resources, such as oil and gas and grazing, are addressed in this EIS.
- **Water and soil—**Soil and water management is not a main issue that would drive alternatives design for this RMPA; however, management activities that impact these resources, such as oil and gas and grazing, are addressed in this EIS.
- **Wild horse and burros—**As there are no wild horse and burros, or wild horse and burro herd management areas in the LFO, this issue is not relevant to this RMPA.

1.6.5 Issues Beyond the Scope of the Plan

Issues beyond the scope of the RMP planning process are those not related to decisions that would occur as a result of the planning process. Such issues include decisions that are not under the jurisdiction of the BLM or that are beyond BLM's capability to resolve as part of the RMPA. Issues identified in this category are the following:

- New wilderness or Wilderness Study Area (WSA) proposals
- Elimination of grazing, mineral development, and off-highway vehicle (OHV) use on all public lands
- Activities and uses beyond the jurisdiction of the BLM
- Compensation of private landowners for conservation efforts and off-site mitigation
- Changing existing laws, policies, and regulations
- Availability of funding and personnel for managing programs, and for NEPA procedures and costs

Lands with Wilderness Characteristics

The purpose and need of the National Greater Sage-Grouse Planning Strategy is limited to making land use planning decisions specific to the conservation of GRSG habitats. No decisions related to the management of lands with wilderness characteristics will be made as part of this planning effort; therefore, management of lands with wilderness characteristics is considered outside the scope of this RMPA process. As part of the original FLPMA Section 603-mandated inventories, inventories were conducted for the LFO beginning in

1979. The intensive inventories published in the early 1980's resulted in the designation of two WSAs that are located outside of this planning area. No other inventories have been completed for lands with wilderness characteristics since then; however, inventories are currently underway as part of the RMP revision process.

National Historic Trails

The purpose and need of the National Greater Sage-Grouse Planning Strategy is limited to making land use planning decisions specific to the conservation of GRSG habitats. No decisions related to the management of National Scenic/Historic Trails (NSHT) will be made as part of this planning effort; therefore, management of NSHT is considered outside the scope of this RMPA process. The Nez Perce National Historic Trail is the only NSHT within the planning area. The portion of the trail on BLM-administered lands in the planning area consists of three segments of trail in LFO, totaling two miles of trail route, none being a High Potential Route segment. Management of the trail will continue to be consistent with the Forest Service's Nez Perce (Nee-Me-Poo) National Historic Trail Comprehensive Plan (Forest Service 1990) and BLM's Manual direction for administration and management of National Scenic and Historic Trails (6250; BLM 2012e/6280; BLM 2012f). As part of the LFO RMP revision, a trail corridor will be defined to assist in resource identification and management.

1.7 DEVELOPMENT OF PLANNING CRITERIA

Planning criteria are based on appropriate laws, regulations, BLM Manual sections, and policy directives. Criteria are also based on public participation and coordination with cooperating agencies, other federal agencies, state and local governments, and Indian tribes. Planning criteria are the standards, rules, and factors used as the parameters to resolve issues and develop alternatives. Planning criteria have been developed to guide the development of the Proposed Plan Amendment and draft alternatives. The planning criteria to be considered in the development of the RMPA are as follows:

- The BLM will use the USFWS's *Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report* (USFWS 2013), WAFWA's *Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats* (Connelly et al. 2004), USGS *Summary of Science, Activities, Programs and Policies that Influence the Rangewide Conservation of Greater Sage-Grouse* (Centrocercus urophasianus) (Manier et al 2013), Management Plan and Conservation Strategies for Sage-Grouse in Montana (MFWP 2005), and any other appropriate resources to identify GRSG habitat requirements and best management practices (BMP)s.
- The approved RMPA will be consistent with the BLM's National Sage-Grouse Conservation Strategy.

- The approved RMPA will comply with FLPMA, NEPA, and Council on Environmental Quality (CEQ) regulations at 40 CFR, Parts 1500-1508, and DOI regulations at 43 CFR, Part 46, and 43 CFR, Part 1600; the BLM H-1601-1 Land Use Planning Handbook, "Appendix C: Program-Specific and Resource-Specific Decision Guidance Requirements" (as amended) for affected resource programs (BLM 2005a); the 2008 BLM NEPA Handbook (H-1790-1; BLM 2008a); and all other applicable BLM policies and guidance.
- The RMPA will be limited to making land use planning decisions specific to the conservation of GRSG habitat.
- The BLM will consider allocations and prescriptive standards to conserve GRSG habitat, as well as objectives and management actions to restore, enhance, and improve GRSG habitat.
- The RMPA will recognize valid existing rights.
- Lands addressed in the RMPA will be BLM-administered lands (including surface-estate/split-estate lands) managed by the BLM in GRSG habitats. Any decisions in the RMPA will apply only to BLM-administered lands.
- The BLM will use a collaborative and multi-jurisdictional approach, where appropriate, to determine the desired future condition of BLM-administered lands for the conservation of GRSG and their habitats.
- As described by law and policy, the BLM will strive to ensure that conservation measures are as consistent as possible with other planning jurisdictions within the planning area boundaries.
- The BLM will consider a range of reasonable alternatives, including appropriate management prescriptions that focus on the relative values of resources, while contributing to the conservation of the GRSG and its habitat.
- The BLM will analyze socioeconomic impacts of the alternatives using an accepted input-output quantitative model, such as IMPLAN.
- The BLM will endeavor to use current scientific information, research, and technologies and results of inventory, monitoring, and coordination to determine appropriate local and regional management strategies that will enhance or restore GRSG habitats.
- For BLM-administered lands, all activities and uses within GRSG habitats will follow existing land health standards. Guidelines for livestock grazing and other programs will be applicable to all alternatives for BLM-administered lands.

- The BLM will consult with Native American tribes to identify sites, areas, and objects important to their cultural and religious heritage within GRSG habitats.
- The BLM will coordinate with state, local, and tribal governments to ensure that it considers provisions of pertinent plans; it will seek to resolve inconsistencies between state, local, and tribal plans and will provide ample opportunities for state, local, and tribal governments to comment on the development of the RMPA.
- The BLM will develop vegetation management objectives, including objectives for managing noxious weeds and invasive species and identifying the desired future condition for specific areas, within GRSG habitat.
- The RMPA will be based on the principles of adaptive management.
- The RMPA will be developed using an interdisciplinary approach to identify alternatives and to analyze resource impacts, including cumulative impacts on natural and cultural resources and the social and economic environment.
- The most current, approved, BLM corporate spatial data will be supported by current metadata and will be used to ascertain GRSG habitat extent and quality. Data will be consistent with the principles of the Information Quality Act of 2000 (Data Quality Act).
- State game and fish agencies' GRSG data and expertise will be used to the fullest extent practicable in making management determinations on federal lands. State game and fish agencies have the responsibility and authority to manage wildlife.
- Analysis of impacts in the plan amendments will address the resources and resource programs identified in the National Technical Team (NTT) report (A Report on National Greater Sage-Grouse Conservation Measures; NTT 2011) and alternatives; these contain specific management measures for conservation of GRSG habitat.
- Resources and resource programs that do not contain specific management direction for GRSG that may be indirectly affected by proposed management actions will be identified and discussed only to the degree required to fully understand the range of effects of the proposed management actions.
- Where more restrictive land use allocations or decisions are made in the Judith Resource Area RMP and the Headwaters RMP for other resources (e.g., cultural and riparian), those more restrictive land use allocations or decisions will remain in effect and will not be amended by this RMPA.

1.8 RELATIONSHIP TO OTHER POLICIES, PLANS, AND PROGRAMS

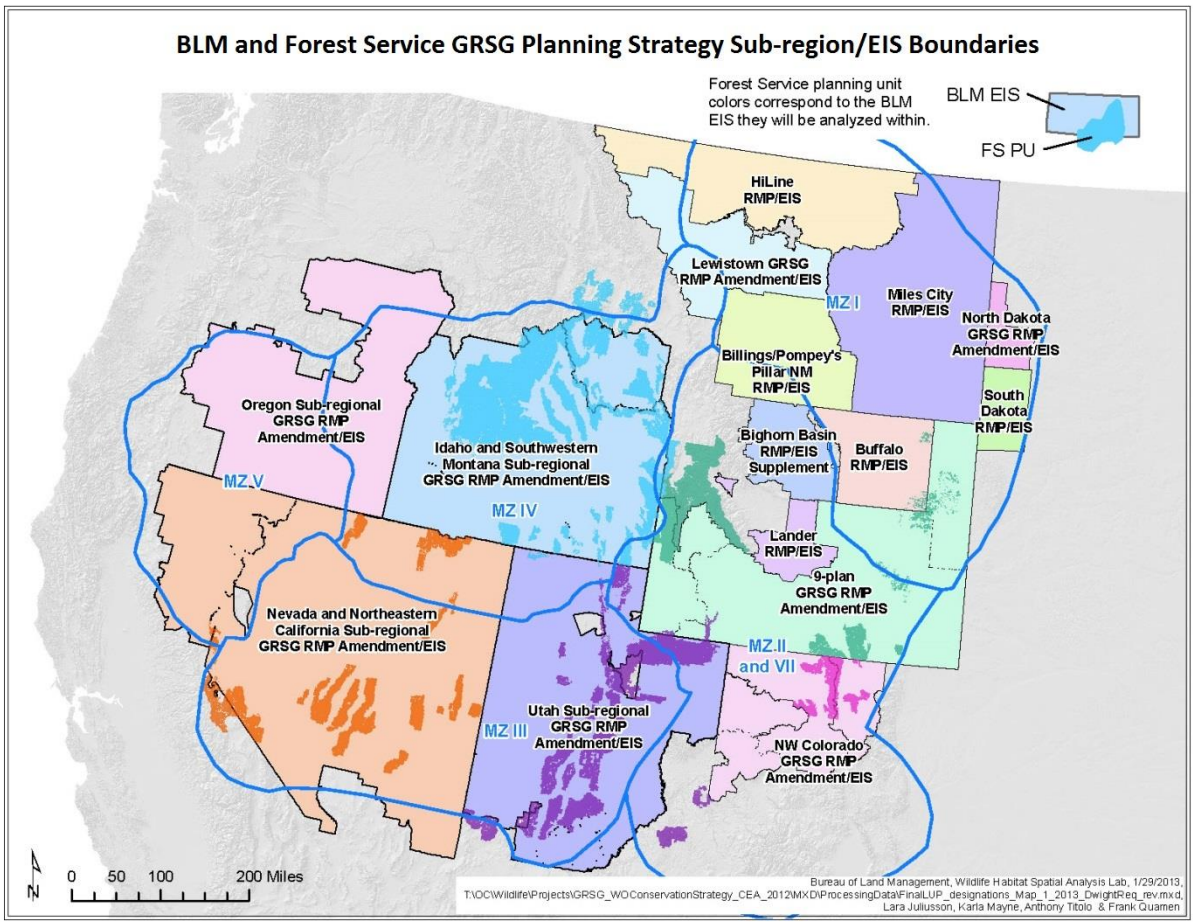
Currently, lands within the planning area are managed according to the Judith Resource Area RMP (BLM 1994), as amended, and the Headwaters RMP/EIS (BLM 1984), as amended. This RMPA is a necessary step in the overall process of managing BLM-administered lands, specifically to include new policy for conservation of GRSG habitat. As a result, this planning process must recognize the many ongoing programs, plans, and policies that are being implemented in the planning area by other land managers and government agencies. While the BLM is not obligated to seek consistency related to the programs, plans, and policies, the agency is required to describe the inconsistencies between the proposed action and the other plans, policies, and/or controls in the decision record for the EIS. The BLM will seek to be consistent with other management actions whenever possible. Plans that need to be considered during GRSG planning are listed below.

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

1.8.1 National Greater Sage-Grouse Planning Strategy

On December 9, 2011, a Notice of Availability was published in the Federal Register to initiate the GRSG Planning Strategy across nine western states, including northeast California, Oregon, Nevada, Idaho, Utah, and southwest Montana in the Great Basin Region and northwest Colorado, Wyoming, Montana, South Dakota, and North Dakota in the Rocky Mountain Region (see **Diagram 1-2**). The BLM is the lead agency for this planning effort. On February 10, 2012, the BLM published a Notice of Correction that changed the names of the regions that are coordinating the EISs, extended the scoping period, and added 11 Forest Service land management plans to this process. This Lewistown Field Office Greater Sage-Grouse RMPA/EIS is one of 15 separate EISs that are

Diagram 1-2
BLM and Forest Service GRSG Planning Strategy Sub-region/EIS Boundaries



currently being conducted to analyze and incorporate specific conservation measures across the range of the GRSG, consistent with National BLM policy.

On December 27, 2011, the BLM Washington Office released IM No. 2012-044, which directed all of the planning efforts across the GRSG range to consider all applicable conservation measures when revising or amending its RMPs in GRSG habitat, including the measures developed by the NTT that were presented in their December 2011 document—*A Report on National Greater Sage-Grouse Conservation Measures*. The BLM's IM-2012-044 directs all planning efforts associated with the national strategy to consider and analyze (as appropriate) the conservation measures presented in the NTT report (BLM 2011a).

Along with the applicable measures that were outlined in the NTT report, planning efforts associated with this National GRSG Planning Strategy will also analyze applicable conservation measures that were submitted to the BLM from various state governments and from citizens during the public scoping process.

It is the goal of the BLM to make a final decision on these plans so that adequate regulatory mechanisms are integrated into the land use plans before the USFWS makes a listing decision in 2015.

1.8.2 Instruction Memorandum No. 2012-043, *Greater Sage-Grouse Interim Management Policies and Procedures*

This IM provides interim conservation policies and procedures to the BLM field officials to be applied to ongoing and proposed authorizations and activities that affect the GRSG and its habitat (BLM 2012g). This direction ensures that interim conservation policies and procedures are implemented when field offices authorize or carry out activities on BLM-administered land while the BLM develops and decides how to best incorporate long-term conservation measures for GRSG into applicable RMPs. This direction promotes sustainable GRSG populations and conservation of its habitat while not closing any future options in the LFO before the Lewistown Field Office Greater Sage-Grouse RMPA/EIS can be completed.

1.8.3 Greater Sage-Grouse (*Centrocercus urophasianus*) Conservation Objectives Final Report

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

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

The highest level objective in the COT report is identified as meeting the objectives of WAFWA's 2006 GRSG Comprehensive Strategy of "reversing negative population trends and achieving a neutral or positive population trend."

The COT report provides a WAFWA Management Zone and Population Risk Assessment. The report identifies localized threats from sagebrush elimination, fire, conifer encroachment, weed and annual grass invasion, mining, free-roaming wild horses and burros, urbanization, and widespread threats from energy development, infrastructure, grazing, and recreation (USFWS 2013, p. 18).

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

Within the Lewistown Field Office RMPA planning area, the PACs consist of 1,207,994 acres. Under the Proposed Plan Amendment, the PACs are comprised of 233,219 acres of PHMA managed by the BLM, 0 acres of GHMA managed by the BLM, and 0 acres of non-habitat managed by the BLM.

1.8.4 Summary of Science, Activities, Programs and Policies that Influence the Rangewide Conservation of Greater Sage-Grouse (*Centrocercus urophasianus*)

To augment this planning document at a biologically meaningful scale for GRSG, a *Summary of Science, Activities, Programs, and Policies that Influence the Range-Wide Conservation of Greater Sage-Grouse* (Centrocercus urophasianus)(also referred to as a baseline environmental report (BER) was produced by the USGS for BLM (Manier et. al. 2013). The BER is a science support document that provides information to put planning units and issues into the context of the larger WAFWA Sage-Grouse management zones. The BER examines each threat identified in the USFWS's listing decision published on March 15, 2010. For each threat, the BER summarizes the current, scientific understanding of various impacts to GRSG populations and habitats. When available, the BER also reports patterns, thresholds, indicators, metrics, and measured responses that quantify the impacts of each specific threat.

1.8.5 Greater Sage-Grouse Habitat Conservation Strategy

The Governor of the State of Montana issued Executive Order 10-2014 which created the Montana Sage Grouse Oversight Team (MSGOT) and the Montana Sage Grouse Habitat Conservation Program. The executive order outlines a number of conservation strategies for state agencies to follow for land uses and activities in GRSG habitat in addition to establishing the MSGOT and habitat conservation program. The State conservation efforts are complimentary to the conservation measures proposed in the BLM land use plans and when combined would provide conservation efforts across land ownership boundaries.

1.8.6 National Level Programmatic EISs and Agreements

- *Final Environmental Impact Statement Vegetation Treatment on BLM Lands in Thirteen Western States* (BLM 1991; common to the Proposed Plan Amendment and draft alternatives)
- *Final Vegetation Treatments on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement and Associated Record of Decision* (BLM 2007a)
- *Approved Resource Management Plan Amendments/Record of Decision for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* (BLM 2009a)
- *Record of Decision and Resource Management Plan Amendments for Geothermal Leasing in the Western United States* (BLM 2008b)

- *Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments Record of Decision* (BLM 2005b)
- National-level MOUs

1.8.7 Relevant Plan Amendments

- *Fire/Fuels Management Plan Environmental Assessment/Plan Amendment for Montana and the Dakotas* (BLM 2003a)
- *Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management for Montana and the Dakotas Record of Decision* (BLM 1997)

1.8.8 Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota

In the Montana-Dakotas region, the BLM has limited travel to existing roads and trails since the Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota was signed in 2003 (BLM 2003b). Therefore, travel in the LFO planning area is already managed as limited, and this designation will remain the same among all alternatives in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS. The following provides an explanation of the BLM's travel management process and the next steps for travel management once a ROD is signed:

1. Although travel has been limited (e.g., no cross-country travel allowed), additional detailed route inventory information still needs to be collected in order to complete site-specific travel planning once this ROD is signed. This data collection will provide the information needed to fully evaluate the impacts of these routes on other resource allocations, uses and to the public, in addition to the GRSG.
2. Once the inventories are underway and/or completed, the BLM will initiate travel and transportation implementation plans. The plans will undergo a NEPA analysis that includes further public involvement.
3. Through this subsequent NEPA and planning process, the BLM will consider road and trail permanent and seasonal closures, as well as area closures. The decision to close routes or areas (e.g., around leks) to OHV use in the travel and transportation plans would be based on the overall goal of protecting, preserving and enhancing GRSG and their habitats.

1.8.9 County Land Use Plans

The following county plans have been reviewed for consistency with this amendment:

- Fergus County Land Use Policy (Revised February 16, 2011) (Fergus County 2011)
- Choteau County Growth Policy (Choteau County 2004)

The other three counties within the planning area, Petroleum, Judith Basin and Meagher Counties do not have land use or county growth plans that can be considered.

1.9 DESCRIPTION OF THE PUBLIC COMMENT PROCESS AND DEVELOPMENT OF THE PROPOSED RMPA/FINAL EIS

A notice of availability announcing the release of the Draft RMPA and EIS was published in the *Federal Register* on November 8, 2013 (78 *Federal Register* 67186-67187), initiating a 90-day public comment period. The BLM issued a news release on November 8, 2013, announcing the release of the Draft RMPA and EIS, which provided the dates and times of the public commenting open houses. An article regarding the release of the Draft RMPA and EIS was published in the Lewistown News Argus on November 13, 2013.

During the public comment period, the BLM hosted an open house in Lewistown, Montana on December 10 and in Winnett, Montana on December 18. The public open houses provided opportunities for the public to ask questions and submit comments. BLM managers, resource specialists, and other representatives of the BLM were present during these open houses to discuss and answer questions. A total of 40 unique comment letters, forms, and emails were received during the 90-day public comment period. These documents resulted in 257 substantive comments. See **Section 6.5.3**, Summary of Comments Received on the Draft RMPA/EIS, for a detailed description of the comments received during the public comment period, as well as the comment analysis methodology used.

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMPA/EIS, the BLM has developed the Proposed Plan Amendment for managing BLM-administered land within the Lewistown Field Office sub-region planning area. In developing the Proposed Plan Amendment, the BLM made modifications to the Preferred Alternative identified in the Draft RMPA/EIS. The Proposed Plan Amendment focuses on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates.

1.10 CHANGES BETWEEN THE DRAFT RMPA/EIS TO THE PROPOSED RMPA/FINAL EIS

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMPA/EIS, the BLM has developed the Proposed RMPA/Final EIS for managing BLM-administered lands in the Lewistown Field Office GRSG sub-region. The Proposed RMPA/Final EIS focuses on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Plan Amendment is a variation of the

preferred alternative (D) and is within the range of alternatives analyzed in the Draft RMPA/EIS.

Changes included in the Proposed Plan Amendment from the preferred alternative (D) in Draft RMPA/EIS are the following:

- Allocations for PHMA and GHMA—Allocations in the Proposed Plan Amendment provide more opportunities for uses in GHMA, while still maintaining conservation management by establishing screening criteria for project/activity review in GRSG habitat.
  - Language was added to clarify major and minor right-of-way (ROW) actions that were analyzed under Alternative D in the Draft RMPA/EIS. PHMA and GHMA would be managed as ROW avoidance areas for high voltage transmission lines and large pipelines with limited exceptions. PHMA would also be managed as a minor ROW avoidance area. GMHA would be open to minor ROWs.
  - PHMA would be managed as a ROW exclusion area for wind and solar energy and GHMA would be managed as a ROW avoidance area for wind and solar energy. These allocations were analyzed under Alternative B in the Draft RMPA/EIS.
  - PHMA would be closed to nonenergy leasable minerals. This allocation was analyzed under Alternative B in the Draft RMPA/EIS.
  - PHMA would be closed to mineral materials. This allocation was analyzed under Alternative B in the Draft RMPA/EIS.
- Sagebrush Focal Areas (SFAs)—These areas have been identified in the Proposed Plan Amendment based on recommendations in the October 27, 2014 USFWS memorandum, and are proposed to be managed as PHMA with the following additional management: recommended for withdrawal and prioritized for management and conservation actions including, but not limited to review of livestock grazing permits/leases. Alternative B identified recommendation for withdrawal and or prioritization for grazing .and analyzed the impacts of those decisions. As such, the management of these areas as SFAs and the impacts of the associated management decisions were addressed in the Draft RMPA/EIS and is qualitatively within the spectrum of alternatives analyzed.

  BLM will manage these areas, totaling approximately 53,440 acres within the LFO sub-region, as SFAs because of the importance of these necessary pockets of habitat to the conservation of the species range-wide. Specifically, SFAs include characteristics such as existing high-quality sagebrush habitat; highest breeding densities;

have been identified as essential to conservation and persistence of the species; represent a preponderance of current federal ownership and in some cases are adjacent to protected areas that serve to anchor the conservation importance of the landscape. In light of the landscape level approach to GRSG conservation provided through this planning effort and as defined by the characteristics set forth above, as well as additional considerations, including potential for impacts from climate change, fire and invasives, these areas have been identified as SFAs. See **Section 2.4.6**, Alternative D, in the Draft RMPA/EIS for a discussion of managing at a landscape level and taking into account the conservation of the species at a landscape/range-wide scale. As stated in **Section 2.4.3**, Elements Common to Alternatives B, C, and D, data would be refined to (1) delineate PH and analyze actions within PH to conserve GRSG habitat functionality, or where possible, improve habitat functionality; and (2) delineate GH and analyze actions within GH that provide for major life history function (e.g., breeding, migration, or winter survival). The purpose of this would be to maintain genetic diversity needed for sustainable GRSG populations.

As noted in the Draft RMPA/EIS, one of the goals/objectives of this planning effort is to protect both the habitat and the species (see goal in **Table 2-4**, Description of Alternatives A, B, C, and D, in the Draft RMPA/EIS). The habitat in the SFAs exhibits areas of high-quality sagebrush habitat, areas with highest breeding densities, and areas identified as essential to conservation and persistence of the species.

- USGS Buffer Study—Included a management action to incorporate the lek buffer-distances identified in the USGS report titled "Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review" (Manier et. al. 2014) during NEPA analysis at the implementation stage. Although the buffer report was not available at the time of the Draft RMPA/EIS release, applying these buffers was addressed in the Draft RMPA/EIS and is qualitatively within the spectrum of alternatives analyzed. Specifically, (Alternatives B and C) identified and analyzed allocation restrictions such as recommendation for withdrawal, eliminate of grazing, etc. Accordingly, the management decision to require lek buffers for development within certain habitat types is within the range of alternatives analyzed. Alternatives B and C in the Draft RMPA/EIS analyzed four-mile buffers around leks when constructing roads.
- Adaptive management—Identification of hard and soft adaptive management triggers for population and habitat and identified appropriate management responses. Chapter 2 of the Draft RMPA/EIS identified that the BLM would further develop the

adaptive management approach by identifying hard and soft triggers and responses. All of the adaptive management hard trigger responses were analyzed within the range of alternatives. For example, if a hard trigger is reached in GHMA, and GHMA would be managed as open to saleable minerals in the Proposed Plan Amendment, the response would be to manage it as closed to saleable minerals. This closure was analyzed under Alternative C in the Draft RMPA/EIS.

- Monitoring and Disturbance—The monitoring framework was further refined in the Proposed RMPA/Final EIS, and further clarification as to how disturbance cap calculations would be measured were developed for the Proposed RMPA/Final EIS. During the public comment period, BLM received comments on how monitoring and disturbance cap calculations would occur at implementation. The Draft RMPA/EIS outlined the major components of the monitoring strategy, as well as provided a table portraying a list of anthropogenic disturbances that would count against the disturbance cap. A BLM Disturbance and Monitoring Sub-team further enhanced the two Appendices (**Appendix B**, The Greater Sage-Grouse Monitoring Framework, and **Appendix N**, Greater Sage-Grouse Disturbance Caps) in the Final EIS.
- Mitigation Strategy; Net Conservation Gain—The net conservation gain strategy is in response to the overall landscape-scale goal which is to enhance, conserve, and restore GRSG and its habitat. All of the action alternatives in the Draft RMPA/EIS provided management actions to meet the landscape-scale goal (see **Table 2-4** in the Draft RMPA/EIS).

Changes made to **Chapter 3**, Affected Environment, in Proposed RMPA/Final EIS are the following:

- A discussion of predators and predation was added in **Section 3.4.1**, Predation (GRSG). Range-wide and Montana-specific average vitality rates for GRSG are provided in **Table 3-1**, Average Range of Vital Rates for GRSG, range-wide and in Montana. Drilling and production statistics were updated in **Section 3.8.1**, Conditions of the Planning Area (Fluid Minerals). Air Quality Data was updated in **Section 3.16.1**, Conditions of the Planning Area (Air Resources). Special status species listing data was updated in **Section 3.20.1**, Conditions of the Planning Area (Special Status Species – Other).

Changes made to **Chapter 4**, Environmental Consequences, in Proposed RMPA/Final EIS are the following:

- The likely direct and indirect impacts on the human and natural environment that could occur from implementing the Proposed Plan

Amendment presented in **Chapter 2** were incorporated into **Chapter 4**. Analysis shown under the draft alternatives may be referenced in the Proposed Plan Amendment analysis with such statements as "impacts would be the same as, or similar to, Alternative D" or "impacts would be the same as Alternative D, except for...," as applicable.

Changes made to **Chapter 5**, Cumulative Impacts, in Proposed RMPA/Final EIS are the following:

- WAFWA Management Zone Cumulative Effects Analysis on GRSG—A quantitative cumulative effects analysis for GRSG was included in the Final EIS. This analysis was completed to analyze the effects of management actions on GRSG at a biologically significant scale which as determined to be at the WAFWA Management Zone. The Draft RMPA/EIS, in **Chapter 5**, included a qualitative analysis and identified that a quantitative analysis would be completed for the Final EIS at the WAFWA Management Zone.

Public Comment on Draft RMPA/EIS—Updated the Proposed RMPA/Final EIS based on public comment received on the Draft RMPA/EIS (see **Appendix O,** Response to Comments on the Draft Resource Management Plan Amendment/Environmental Impact Statement).

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

The Proposed Plan Amendment includes components of the alternatives analyzed in the Draft RMPA/EIS. Taken together, these components present a suite of management decisions that present a minor variation of alternatives identified in the Draft RMPA/EIS and are qualitatively within the spectrum of alternatives analyzed.

As such, the BLM has determined that the Proposed Plan Amendment is a minor variation and that the impacts of the Proposed Plan Amendment would not affect the human environment in a substantial manner or to a significant extent not already considered in the EIS. Therefore, this proposed RMPA/FEIS does not require a supplement. The impacts disclosed in the Proposed RMPA/Final EIS are similar or identical to those described Draft RMP/EIS.

Chapter 2
Proposed Action and Alternatives

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CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 CHANGES BETWEEN THE DRAFT EIS AND FINAL EIS

As a result of public comments, best science, cooperating agency coordination, and internal review of the Draft RMPA/EIS, the BLM has developed the Proposed RMPA/Final EIS for managing BLM-administered lands in the LFO GRSG sub-region. The Proposed RMPA/Final EIS focuses on addressing public comments, while continuing to meet the BLM's legal and regulatory mandates. The Proposed Plan Amendment is a variation of the preferred alternative (D) and is within the range of alternatives analyzed in the Draft RMPA/EIS.

Changes made to the Proposed Plan Amendment from the preferred alternative (D) in Draft RMPA/EIS are the following:

- Allocations for PHMA and GHMA—Allocations in the Proposed Plan Amendment provide more opportunities for uses in GHMA, while still maintaining conservation management by establishing screening criteria for project/activity review in GRSG habitat.
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  - PHMA would be closed to nonenergy leasable minerals. This allocation was analyzed under Alternative B in the Draft RMPA/EIS.
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  BLM would manage these areas, totaling approximately 53,440 acres within the LFO sub-region, as SFAs because of the importance of these to the conservation of the species range-wide. Specifically, SFAs include characteristics such as existing high-quality sagebrush habitat; highest breeding densities; have been identified as essential to conservation and persistence of the species; represent a preponderance of current federal ownership and in some cases are adjacent to protected areas that serve to anchor the conservation importance of the landscape. In light of the landscape level approach to GRSG conservation provided through this planning effort and as defined by the characteristics set forth above, as well as additional considerations, including potential for impacts from climate change, fire and invasives, these areas have been identified as SFAs. See **Section 2.4.6**, Alternative D, in the Draft RMPA/EIS for a discussion of managing at a landscape level and taking into account the conservation of the species at a landscape/range-wide scale. As stated in **Section 2.4.3**, Elements Common to Alternatives B, C, and D, data would be refined to (1) delineate PH and analyze actions within PH to conserve GRSG habitat functionality, or where possible, improve habitat functionality; and (2) delineate GH and analyze actions within GH that provide for major life history function (e.g., breeding, migration, or winter survival). The purpose of this would be to maintain genetic diversity needed for sustainable GRSG populations.

As noted in the Draft RMPA/EIS, one of the goals/objectives of this planning effort is to protect both the habitat and the species (see goal in **Table 2-4** in the Draft RMPA/EIS). The habitat in the SFAs exhibits areas of high-quality sagebrush habitat, areas with highest breeding densities, and areas identified as essential to conservation and persistence of the species.

- USGS Buffer Study—Included a management action to incorporate the lek buffer-distances identified in the USGS report titled "Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review" (Manier et. al. 2014) during NEPA analysis at the implementation stage. Although the buffer report was not available at the time of the Draft RMPA/EIS release, applying these buffers was addressed in the Draft RMPA/EIS and is qualitatively within the spectrum of alternatives analyzed. Specifically, (Alternatives B and C) identified and analyzed allocation restrictions such as recommendation for withdrawal, eliminate of grazing, etc. Accordingly, the management decision to require lek buffers for development within certain habitat types is within the range of alternatives analyzed. Alternatives B and C in the Draft RMPA/EIS analyzed four-mile buffers around leks when constructing roads.
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- Monitoring and Disturbance—The monitoring framework was further refined in the Proposed RMPA/Final EIS, and further clarification as to how disturbance cap calculations would be measured were developed for the Proposed RMPA/Final EIS. During the public comment period, BLM received comments on how monitoring and disturbance cap calculations would occur at implementation. The Draft RMPA/EIS outlined the major components of the monitoring strategy, as well as provided a table portraying a list of anthropogenic disturbances that would count against the disturbance cap. A BLM Disturbance and Monitoring Sub-team further enhanced the two Appendices (**Appendix B**, The Greater Sage-Grouse Monitoring Framework, and **Appendix N**, Greater Sage-Grouse Disturbance Caps) in the Final EIS.

- Mitigation Strategy; Net Conservation Gain—The net conservation gain strategy is in response to the overall landscape-scale goal which is to enhance, conserve, and restore GRSG and its habitat. All of the action alternatives in the Draft RMPA/EIS provided management actions to meet the landscape-scale goal (see **Table 2-4** in the Draft RMPA/EIS).

2.2 INTRODUCTION

This Proposed RMPA/Final EIS complies with NEPA, which directs the BLM to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources…" (NEPA Section 102[2][e]). At the heart of the alternative development process is the required development of a reasonable range of alternatives. Public and internal (within BLM) scoping (see **Section 1.6**, Scoping and Identification of Issues) identified issues that present opportunities for alternative courses of action, while the purpose and need for action described in **Section 1.2**, Purpose and Need, provides sideboards for determining "reasonableness."

This chapter introduces and details the Proposed Plan Amendment. The BLM's Preferred Alternative, identified as Alternative D in the Draft RMPA/EIS, has been modified and is now the Proposed Plan Amendment. The Proposed Plan Amendment is based on best science, public scoping comments, public comments on the Draft RMPA/EIS and internal agency discussion. The alternatives that were in the Draft RMPA/EIS are also included in this chapter. These include the No Action Alternative, which would continue the existing policies of the BLM; three action alternatives; and the alternatives considered but eliminated from detailed analysis.

The identification of the Preferred Alternative in the Draft RMPA/EIS did not constitute a commitment or decision in principle, and there is no requirement to select the Preferred Alternative or any of the separate alternatives presented in the Draft RMPA/EIS in the Final RMPA/EIS as the Proposed Plan Amendment. The BLM has the discretion to select any of the alternatives as their Preferred Alternative in the Draft RMPA/EIS. The BLM also has the discretion to modify the Preferred Alternative between the Draft EIS and the Final EIS into the Proposed Plan Amendment. The modifications are allowable as long as the actions presented in the Proposed Plan Amendment within the Proposed RMPA/Final EIS were within the range of alternatives analyzed in the Draft EIS. The various parts of the separate alternatives that were analyzed in the Draft EIS can be "mixed and matched" to develop an alternative—known as the Proposed Plan—in the Final EIS, as long as the reasons for doing so are explained (40 CFR, Part 1506.2(b)).

2.3 INTRODUCTION TO ALTERNATIVES

RMP decisions consist of identifying and clearly defining goals and objectives (desired outcomes) for resources and resource uses, followed by developing

allowable uses and management actions necessary for achieving the goals and objectives. These critical determinations guide future land management actions and subsequent site-specific implementation actions to meet multiple use and sustained yield mandates while sustaining land health.

2.3.1 Components of Alternatives

Goals are broad statements of desired (RMP-wide and resource- or resource-use-specific) outcomes and are not quantifiable or measurable. Objectives are specific measurable desired conditions or outcomes intended to meet goals. Goals and objectives can vary across alternatives, resulting in different allowable uses and management actions for some resources and resource uses.

Management actions and allowable uses are designed to achieve objectives. Management actions are measures that guide day-to-day and future activities. Allowable uses delineate which uses are permitted, restricted, or prohibited, and may include stipulations or restrictions. Allowable uses also identify lands where specific uses are excluded to protect resource values, or where certain lands are open or closed in response to legislative, regulatory, or policy requirements. Implementation decisions are site-specific on-the-ground actions and are typically not addressed in RMPs.

2.3.2 Purpose of Alternatives Development

Land use planning and NEPA regulations require the BLM to formulate a reasonable range of alternatives. Alternative development is guided by established planning criteria (as outlined for the BLM at 43 CFR, Part 1610; see **Chapter 1**).

The NEPA regulations at 40 CFR, Part 1501.2(c) state that Federal agencies shall: "Study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflict concerning alternatives uses of available resources…."

The basic goal of alternatives development is to produce distinct potential management scenarios that:

- Address the identified major planning issues;
- Explore opportunities to enhance management of resources and resource uses;
- Resolve conflicts among resources and resource uses; and
- Meet the purpose of and need for the RMP or RMPA.

Pursuit of this goal provides the BLM and the public with an appreciation for the diverse ways in which conflicts regarding resources and resource uses might be resolved, and offers the decision maker a reasonable range of alternatives from which to make an informed decision. The components and broad aim of each alternative considered for the Lewistown Field Office Greater Sage-Grouse RMPA/EIS are discussed below.

2.4 ALTERNATIVES DEVELOPMENT PROCESS FOR THE LEWISTOWN FIELD OFFICE GREATER SAGE-GROUSE PLAN AMENDMENT

The Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning team employed the BLM planning process (outlined in **Section 1.5**, BLM Planning Process) to develop a reasonable range of alternatives for the Lewistown Field Office greater Sage-Grouse RMPA/EIS. The BLM complied with NEPA and the CEQ implementing regulations at 40 CFR, Part 1500 in the development of alternatives for this Proposed RMPA/EIS, including seeking public input and analyzing reasonable alternatives. Where necessary to meet the planning criteria, to address issues and comments from cooperating agencies and the public, or to provide a reasonable range of alternatives, the alternatives include management options for the planning area that would modify or amend decisions made in the applicable RMP. Since this RMPA/EIS is aimed at addressing GRSG conservation, many decisions within existing RMPs that do not impact GRSG are acceptable and reasonable; in these instances, there is no need to develop alternative management prescriptions.

Public input received during the scoping process was considered to identify significant issues deserving of detailed study to help identify alternatives. The planning team developed planning issues to be addressed in the RMPA/EIS, based on broad concerns or controversies related to conditions, trends, needs, and existing and potential uses of planning area lands and resources. All comments were reviewed to determine whether they identified significant issues or unresolved conflicts.

2.4.1 Developing a Reasonable Range of Alternatives

Based on scoping and collaboration efforts, the BLM finalized its planning criteria and identified 10 key planning issues to help frame the alternatives development process. Following the close of the public scoping period on March 29, 2012, the BLM began the alternatives development process. Between May and September 2012, the planning team (BLM and cooperating agencies) met to develop management goals and to identify objectives and actions to address the goals. The various groups met numerous times throughout this period to refine their work. As outcomes of this process, the planning team developed one No Action Alternative (Alternative A) and three preliminary action alternatives (Alternatives B-D) that were set forth in the Draft RMPA/EIS.

- The first action alternative (Alternative B) is based on *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011).
- The second action alternative (Alternative C) is based on a proposed alternative submitted by conservation groups.
- The third action alternative (Alternative D) customized the goals, objectives, and actions from Alternative B that strives for balance among competing interests.

Each of the preliminary action alternatives in the Draft RMPA/EIS was designed to:

- Address the 10 planning issues (refer to **Section 1.6.3**)
- Fulfill the purpose and need for the RMPA (outlined in **Section 1.2**)
- Meet the multiple use mandate of FLPMA (43 USC, Section 1732).

2.4.2 Resulting Range of Alternatives in Draft RMPA/EIS

The three action alternatives (Alternatives B, C, and D) in the Draft RMPA/EIS offer a range of management approaches to maintain or increase GRSG abundance and distribution of GRSG by conserving, enhancing, or restoring the sagebrush ecosystem upon which GRSG populations depend in collaboration with other conservation partners. While the goal is the same across all the alternatives, each alternative contains a discrete set of objectives and management actions constituting a separate RMPA. The goal would be met in varying degrees by application of each of the alternatives, with the potential for different long-range outcomes and conditions.

The relative emphasis given to particular resources and resource uses differs as well, including allowable uses, restoration measures, and specific direction pertaining to individual resource programs. When resources or resource uses are mandated by law or are not tied to planning issues, there are typically few or no distinctions between alternatives.

The meaningful differences among the alternatives are described in **Section 2.9**, Summary Comparison of Proposed Plan Amendment and Draft Alternatives. **Section 2.10**, Detailed Description of Draft Alternatives, also provides a complete description of the proposed decisions for each alternative, including the project goal and objectives, management actions, and allowable uses for individual resource programs. Maps in **Appendix A** provide a visual representation of differences between alternatives. In some instances, varying levels of management overlap a single area, or polygon, due to management prescriptions from different resource programs. In instances where varying levels of management prescriptions overlap a single polygon, the stricter of the management prescriptions would apply.

2.5 BLM Resource Programs for Addressing GRSG Threats

The action alternatives are directed toward responding to USFWS-identified issues and threats (from the 2010 warranted but precluded finding and COT report) to GRSG and its habitat. The issues and threats USFWS identified do not necessarily align with BLM resource program areas, and are often integrated into several different agency resource program areas. **Table 2-1** provides a cross-walk between each of the USFWS listing decision and COT identified threats and the BLM resource program areas and shows how those threats were addressed in the Proposed RMPA/Final EIS.

Table 2-1
USFWS Threats to GRSG and Their Habitat and Applicable BLM Resource Program Areas Addressing these Threats

USFWS-Identified Threats to GRSG and Its Habitat (2010 warranted but precluded finding)	COT Report-Identified Threats to GRSG and Its Habitat (2013)	Applicable BLM Resource Program Addressing Threat*
Wildland Fire	Fire	Fire and Fuels Management
Invasive Species	Nonnative, Invasive Plants Species	Habitat Restoration/Vegetation Management; Range Management; Fire and Fuels Management; Lands and Realty
Oil and Gas For wind energy development, see *Infrastructure – power lines/pipelines, roads (below)*	Energy Development	Lands and Realty; Fluid Minerals
Prescribed Fire	Sagebrush Removal	Habitat Restoration/Vegetation Management; Fire and Fuels Management
Grazing	Grazing	Range Management; Special Status Species; Habitat Restoration/Vegetation Management; Fire and Fuels Management
See *Grazing Management (above)*	Range Management Structures	Range Management
No similar threat identified	Free-Roaming Equid Management	Not Applicable; Free-Roaming equids do not occur within the planning area.
Conifer Encroachment	Pinyon and/or Juniper Expansion	Fire and Fuels Management; Habitat Restoration/Vegetation Management
Agriculture and Urbanization	Agricultural Conversion and Ex-Urban Development	Lands and Realty
Hard Rock Mining	Mining	Lands and Realty; Locatable Minerals; Nonenergy Leasable Minerals; Salable Minerals
See Infrastructure, Roads	Recreation	Recreation; Travel and Transportation Management

Table 2-1
USFWS Threats to GRSG and Their Habitat and Applicable BLM Resource Program Areas Addressing these Threats

USFWS-Identified Threats to GRSG and Its Habitat (2010 warranted but precluded finding)	COT Report-Identified Threats to GRSG and Its Habitat (2013)	Applicable BLM Resource Program Addressing Threat*
Infrastructure - Power lines/ pipelines - Roads - Communication sites - Railroads Range improvements (see below)	Infrastructure	Lands and Realty; Travel and Transportation Management
Infrastructure – Range Improvements	Range Management Structures	Range Management
Water Developments	No similar threat identified	All applicable programs
Climate Change	No similar threat identified	*There is no BLM resource program in the proposed plan addressing this threat.*
Weather	No similar threat identified	*There is no BLM resource program in the proposed plan addressing this threat.*
Predation	No similar threat identified	*There is no BLM resource program in the proposed plan addressing this threat* (see **Chapter 1**, **Section 1.6.4**).
Disease	No similar threat identified	Range Management (see **Section 2.6.2**- RM 1.18 and 1.28)
Hunting	No similar threat identified	*There is no BLM resource program in the proposed plan addressing this threat.*
Contaminants	No similar threat identified	*There is no BLM resource program in the proposed plan addressing this threat.*

*See **Section 2.6.2** and **Table 2-5**.
Source: USFWS 2010, 2013

2.6 PROPOSED PLAN AMENDMENT

2.6.1 Development of the Proposed Plan Amendment for Greater Sage-Grouse Management

In developing the Proposed Plan Amendment, the BLM modified the Preferred Alternative identified in the Draft RMPA/EIS. The modifications are based on public comments received on the Draft RMPA/EIS, internal BLM review, new information and best available science, the need for clarification in the plans, and ongoing coordination with stakeholders across the range of the GRSG. As a result, the Proposed Plan Amendment provides consistent GRSG habitat management across the range, prioritizes development outside of GRSG habitat, and focuses on a landscape-scale approach to conserving GRSG habitat.

The Proposed Plan Amendment is a variation of the preferred alternative (D) and is within the range of alternatives analyzed in the Draft EIS.

Since release of the Draft RMPA/EIS, the BLM has continued to work closely with a broad range of governmental partners, including governors, state fish and wildlife agencies, the USFWS, Indian tribes, and county commissioners. Through this cooperation, the BLM has developed a Proposed Plan Amendment that takes into account state, Tribal, and local plans, policies, and strategies in accordance with applicable law and contributes to the long-term conservation of the GRSG. The BLM also received many substantive public comments on the Draft RMPA (see **Appendix O**), which greatly informed the BLM's development of the Proposed Plan Amendment.

The BLM's Proposed Plan Amendment considers documents related to conserving GRSG that have been released since the publication of the Draft RMPA/EIS. For example, this Proposed Plan Amendment considers the USFWS's October 27, 2014 memorandum *Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes* (see **Section 1.1**) and the USGS' November 21, 2014 report *Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (*Manier et. al. 2014*)*. Based on these documents, the BLM is proposing to designate SFAs to further protect highly valuable habitat. The agency is proposing to include buffer distances when authorizing activities near leks. The BLM also updated the Proposed Plan Amendment to reflect new GRSG state conservation strategies, including recent state executive orders.

On October 27, 2014, the USFWS provided the BLM a memorandum titled "Greater Sage-Grouse: Additional Recommendations to Refine Land Use Allocations in Highly Important Landscapes" (http://www.fws.gov/greatersagegrouse/documents/ESA%20Process/GRSG%20Strongholds%20memo%20to%20BLM%20and%20USFS%20102714.pdf). The memorandum and associated maps provided by the USFWS identify areas that represent recognized "strongholds" for GRSG that have been noted and

referenced as having the highest densities of GRSG and other criteria important for the persistence of the species. Within these areas, the BLM identified Sagebrush Focal Areas (SFAs) (**Figure 2-1**, Sagebrush Focal Area - Proposed Plan, in **Appendix A**, Figures), which are PHMA with the following additional management:

1. Recommended for withdrawal from the Mining Law of 1872, subject to valid existing rights.
2. Prioritized for management and conservation actions in these areas, including, but not limited to review of livestock grazing permits/leases (see livestock grazing section in **Section 2.6.2**, Proposed Plan Amendment, for additional actions).

The BLM has refined the Proposed Plan Amendment to provide a layered management approach that offers the highest level of protection for GRSG in the most valuable habitat. Land use allocations in the Proposed Plan Amendment would limit or eliminate new surface disturbance in PHMA, while minimizing disturbance in GHMA. In addition to establishing protective land use allocations, the Proposed Plan Amendment would implement a suite of management tools such as disturbance limits, GRSG habitat objectives and monitoring (see **Section 2.7.2**), mitigation approaches (see **Section 2.7.3**), adaptive management triggers and responses (see **Section 2.7.1**), and lek buffer-distances (see **Appendix M**) throughout the range. These overlapping and reinforcing conservation measures would work in concert to improve GRSG habitat condition and provide clarity and consistency on how the BLM would manage activities in GRSG habitat.

2.6.2 Proposed Plan Amendment

This section lists the Proposed Plan Amendment goal, objectives, and management actions developed by the BLM with input from cooperating agencies and the public. The alternatives direction/management actions are organized by resource programs identified in the NTT report (*A Report on National Greater Sage-Grouse Conservation Measures*; NTT 2011).

Special Status Species (SS)
Goal SS-1. Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners.
Management Objectives
Objective SS-1.1—Protect PHMA from anthropogenic disturbances that would reduce distribution or abundance of GRSG**.**
Objective SS-1.2—Habitat Delineation: Delineate PHMA to encompass the 75% breeding bird density map: 233,219 BLM surface acres (19% of total PHMA acres). See **Figure 1-1 (Appendix A).**

Objective SS-1.3—Habitat Delineation: Delineate GHMA to encompass the remainder of the habitat presented in the 100% breeding bird density map: 112,341 BLM surface acres (11% of total GHMA acres). See **Figure 1-1 (Appendix A).**

Objective SS-1.4— The habitat objectives in **Table 2-2** summarize the characteristics that research has found represent the seasonal habitat needs for GRSG. The specific seasonal components identified in **Table 2-2** were adjusted based on local science and monitoring data to define the range of characteristics used in this sub-region. Thus, the habitat objectives provide the broad vegetative conditions we strive to obtain across the landscape that indicate the seasonal habitats used by GRSG These habitat indicators are consistent with the rangeland health indicators used by the BLM (see **Appendix F**, Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the Bureau of Land Management for Montana and the Dakotas).

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

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

Table 2-2
Habitat Objectives

Attribute	Indicators	Desired Condition	Reference
Breeding, Nesting and Early Brood Rearing (Seasonal Use Period March 1—June 30)			
Lek Security	Proximity of trees	Trees or other tall structures are not within line of sight of lek and absent or uncommon within 3 kilometers (km) (1.9 miles) of the lek.	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985.
	Collision Risks	Fences and other structures that pose a high collision risk are absent or mitigated with visual markers.	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin 28*(4):967-985. Stevens, B.S. 2011. Impacts of Fences on Greater Sage-Grouse in Idaho: Collision, Mitigation, and Spatial Ecology. M.S. thesis. University of Idaho, Moscow, Idaho.
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 100 meters (m; 328 feet [ft.]) of an active lek.	Stiver, S. J., E. T. Rinkes, D. E. Naugle, 2010. *Sage-Grouse Habitat Assessment Framework.* U.S. Bureau of Land Management, Idaho State Office, Boise, Idaho.
Cover	Percent of seasonal habitat meeting desired	Maintain or increase areas meeting recommended	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats."

	conditions	vegetation characteristics for nesting habitat within 5 km (3.1 miles) of active GRSG leks.	*Wildlife Society Bulletin* 28(4):967-985. Holloran, M.J. and S.H. Anderson. 2005. Spatial Distribution of Greater Sage-Grouse Nests in Relatively Contiguous Sagebrush Habitats. The Condor 107(4): 742-755. http://www.jstor.org/stable/4096476 Taylor, R. L., B. L. Walker, D. E. Naugle, and L. S. Mills. 2012. Managing multiple vital rates to maximize greater sage-grouse population growth. Journal of Wildlife Management 76:336-347. USDA, NRCS, Montana, *Ecological Site Descriptions.* Accessed January 28, 2014. Available at: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/technical/landuse/pasture/?cid=nrcs144p2_057024
	Sagebrush cover	10-25%	Berkeley, L., J. Smith and M. Szczypinski. 2013. Evaluating Sage-Grouse and Habitat Responses to Sage-Grouse Friendly Livestock Grazing Strategies: 3-yr Preliminary Findings. Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Doherty, K.E., D.E. Naugle, B.L. Walker, 2010. *Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales.* The Journal of Wildlife Management 74 (7):1544-1553. Lane, V.R. 2005. Sage-Grouse (*Centrocercus urophasianus*) Nesting and Brood-Rearing Sagebrush Habitat Characteristics in Montana and Wyoming. Master's thesis, Montana State University, Bozeman. Hagen, C.A., J.W. Connelly, M.A. Schroedeer. 2007. "A Meta-analysis of Greater Sage-grouse *Centrocercus urophasianus* Nesting and Brood-rearing Habitats." *Wildlife Biology,* 13 (1):42-50. Sant, E.D., G.E. Simonds, R.D. Ramsey and R.T. Larsen. 2014. "Assessment of sagebrush cover using remote sensing at multiple spatial and temporal scales." *Ecological Indicators* 43: 297-305.
	Sagebrush height	40-80 centimeters (cm) (15.7-31.5 inches) individual sagebrush available within stand	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985.

		(for nesting) with a variety of heights (including those <40 cm [<15.7 inches]).	Lane, V.R. 2005. "Sage-Grouse (*Centrocercus urophasianus*) Nesting and Brood-Rearing Sagebrush Habitat Characteristics in Montana and Wyoming." Master's thesis, Montana State University, Bozeman.
	Predominant sagebrush shape	Spreading	Stiver, S. J., E. T. Rinkes, and D. E. Naugle. 2010. *Sage-Grouse Habitat Assessment Framework.* US Bureau of Land Management, Idaho State Office, Boise.
	Perennial grass cover	≥15%	Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Lane, V.R. 2005. "Sage-Grouse (*Centrocercus urophasianus*) Nesting and Brood-Rearing Sagebrush Habitat Characteristics in Montana and Wyoming." Master's thesis, Montana State University, Bozeman. Sant, E.D., G.E. Simonds, R.D. Ramsey and R.T. Larsen. 2014. "Assessment of sagebrush cover using remote sensing at multiple spatial and temporal scales." *Ecological Indicators* 43: 297-305.
	Perennial grass and forb height	≥18 cm (≥7.1 inches)	Berkeley, L., J. Smith and M. Szczypinski. 2013. Evaluating Sage-Grouse and Habitat Responses to Sage-Grouse Friendly Livestock Grazing Strategies: 3 Year Preliminary Findings. Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Doherty, K.E. D.E. Naugle, J.D. Tack, B.L.. Walker, J.M. Graham, and J.L. Beck. 2014. "Linking conservation actions to demography: grass height explains variation in greater sage-grouse nest survival." *Wildlife Biology* 20 (6):320-326. Hagen, C.A., J.W. Connelly, and M.A. Schroedeer. 2007. "A Meta-analysis of Greater Sage-grouse *Centrocercus urophasianus* Nesting and Brood-rearing Habitats." *Wildlife Biology*, 13 (1):42-50. Taylor, R. L., B. L. Walker, D. E. Naugle, and L. S. Mills. 2012. "Managing multiple vital rates to maximize greater sage-grouse population growth." *Journal of Wildlife Management* 76:336-347.

			USDA, NRCS, Montana, *Ecological Site Descriptions.* Internet website: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/technical/landuse/pasture/?cid=nrcs144p2_057024
	Perennial forb cover	≥10%	Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Sant, E. D., G. E. Simonds, R. D. Ramsey, and R. T. Larsen. 2014. "Assessment of sagebrush cover using remote sensing at multiple spatial and temporal scales." *Ecological Indicators* 43:297-305.
Late Brood-Rearing/Summer (Seasonal Use Period July 1—October 31)			
Cover	Percent of seasonal habitat meeting desired condition	Maintain or increase areas meeting recommended vegetation characteristics for brood rearing habitat within 5 km (3.1 miles) of active GRSG leks.	Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Holloran, M. J., and S. H. Anderson. 2005. "Spatial distribution of greater sage-grouse nests in relatively contiguous sagebrush habitats." *The Condor* 107(4):742-755. Taylor, R. L., B. L. Walker, D. E. Naugle, and L. S. Mills. 2012. "Managing multiple vital rates to maximize greater sage-grouse population growth." *Journal of Wildlife Management* 76:336-347. USDA, NRCS, Montana, *Ecological Site Descriptions.* Internet website: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mt/technical/landuse/pasture/?cid=nrcs144p2_057024
	Sagebrush cover	5-25%	Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985 Lane, V. R. 2005. "Sage-grouse (*Centrocercus urophasianus*) nesting and brood-rearing sagebrush habitat characteristics in Montana and Wyoming." Master's thesis, Montana State University, Bozeman. Hagen, C. A., J. W. Connelly, and M. A. Schroedeer. 2007. "A meta-analysis of greater sage-grouse *Centrocercus urophasianus* nesting and brood-rearing habitats." *Wildlife Biology* 13:(1):42-50. Sant, E. D., G. E. Simonds, R. D. Ramsey, and R.

			T. Larsen. 2014. "Assessment of sagebrush cover using remote sensing at multiple spatial and temporal scales." *Ecological Indicators* 43:297-305.
	Sagebrush height	40-80 cm (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]).	Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Lane, V. R. 2005. "Sage-grouse (*Centrocercus urophasianus*) nesting and brood-rearing sagebrush habitat characteristics in Montana and Wyoming." Master's thesis, Montana State University, Bozeman.
	Perennial grass and forb cover	≥25%	Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Hagen, C. A., J. W. Connelly, and M. A. Schroedeer. 2007. "A meta-analysis of greater sage-grouse *Centrocercus urophasianus* nesting and brood-rearing habitats." *Wildlife Biology* 13:(1):42-50. Sant, E. D., G. E. Simonds, R. D. Ramsey, and R. T. Larsen. 2014. "Assessment of sagebrush cover using remote sensing at multiple spatial and temporal scales." *Ecological Indicators* 43:297-305.
	Riparian areas/mesic meadows	80% or more of PHMA in Proper Functioning Condition (PFC) or higher.	Prichard, D., F. Berg, S. Leonard, M. Manning, W. Hagenbuck, R. Krapf, C. Noble. 1999. *Riparian Area Management A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lentic Areas (TR 1737-16).* Prepared for the United States Department of the Interior and the United States Department of Agriculture. BLM, National Applied Resource Sciences Center. Denver, Colorado. Schroeder et al. 1999. "Greater Sage-Grouse *(Centrocercus urophasianus*)." *The Birds of North America Online* (A. Poole, editor). Cornell Laboratory of Ornithology, Ithaca, New York. Internet website: http://bna.birds.cornell.edu/bna/ species/425/articles/introduction USDI, BLM. 1997. Record of Decision for Standards for Rangeland Health and Guidelines for Livestock Grazing Management Final Environmental Impact Statement for Montana and North and South Dakota. BLM, Montana State Office, Billings. August 7, 1997.
	Upland and	Preferred forbs are	Connelly, J. W., M. A. Schroeder, A. R. Sands,

	riparian perennial forb availability	common with several preferred species present.	and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Stiver, S. J., E. T. Rinkes, D. E. Naugle, 2010. *Sage-Grouse Habitat Assessment Framework.* U.S. Bureau of Land Management, Idaho State Office, Boise.
Winter (Seasonal Use Period November 1—February 28)			
Cover and Food	Percent of seasonal habitat meeting desired conditions	Maintain acres meeting recommended vegetation characteristics for GRSG winter ranges when snow depth exceeds 12 inches.	Wallestad, R. 1975. Life History and Habitat Requirements of Sage Grouse in Central Montana. Game Management Division, Montana Department of Fish and Game, Helena.
	Sagebrush cover	≥10%	Wallestad, R. 1975. Life History and Habitat Requirements of Sage Grouse in Central Montana. Game Management Division, Montana Department of Fish and Game, Helena. Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985. Sant, E. D., G. E. Simonds, R. D. Ramsey, and R. T. Larsen. 2014. "Assessment of sagebrush cover using remote sensing at multiple spatial and temporal scales." *Ecological Indicators* 43:297-305.
	Sagebrush height	≥25cm (≥9.8 inches)	Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." *Wildlife Society Bulletin* 28(4):967-985.

Management Actions

Action SS-1.1—In undertaking BLM management actions in PHMA and GHMA, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM would apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with **Appendix M**.

Action SS-1.2—Disturbance: If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given Biologically Significant Unit (BSU), then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) would be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap. (BSU for this RMPA is the summary of all the PHMA within a GRSG population as delineated in the COT report.)

If the 3% anthropogenic disturbance cap were exceeded on lands (regardless of land ownership), or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended,

valid existing rights, etc.) would be permitted by BLM within a project analysis area until the disturbance has been reduced to less than the cap.

Action SS-1.3—Development Density: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities would be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area.

Action SS-1.4—Disturbance: If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational density and disturbance calculation tool (DDCT), the 3% disturbance cap would be converted to a 5% cap for all sources of habitat alteration within a project analysis area**.**

Action SS-1.5—Designate SFAs as shown on **Figure 2-1,** Sagebrush Focal Area—Proposed Plan (**Appendix A**) (53,440 acres). SFAs would be managed as PHMA, with the following additional management:

1) Recommended for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights.
2) Prioritized for management and conservation actions in these areas, including, but not limited to review of livestock grazing permits/leases (see Range Management (RM) section in for additional actions).

Travel and Transportation Management (TM)

Management Actions

Action TM-1.1 –BLM-administered lands are designated limited yearlong for OHVs (OHVs are restricted to existing roads, primitive roads, and trails). Implement a comprehensive travel and transportation management (CTTM) plan to designate roads and trails (when travel management plan is complete). Administrative off-road use for BLM personnel and BLM authorized activities would be allowed. BLM-implemented CTTM would not apply to private or other state or federal lands within the LFO.

Action TM-1.2—On completion of site-specific projects, roads used for commercial or administrative access on BLM-administered lands would be reclaimed, unless the route would provide specific benefits for public access, would minimize impacts on the resources, and would be considered on a case-by-case basis.

Action TM-1.3—The BLM would close or restore unauthorized, user created roads and trails to prevent resource damage, including impacts on GRSG.

Action TM-1.4—During route designation and travel planning in PHMA, travel management would evaluate the need for permanent or seasonal route or area closures where vehicle use is causing or would cause considerable adverse effects on habitat.

Action TM-1.5—Through site-specific planning, the BLM would designate roads, primitive roads, and trails for motorized use. Roads, primitive roads, and trails would be inventoried, mapped, and analyzed to the degree necessary to evaluate and designate the roads, primitive roads, and trails as open, seasonally open, or closed (BLM 2003b). All CTTM planning should be completed within 5 years of the signing of the ROD. The CTTM planning would be conducted using an interdisciplinary team approach to address all resource uses, including administrative, recreation, commercial, and

associated modes of travel (motorized, mechanized, and nonmotorized types; BLM—*Travel and Transportation Handbook* [H-8342]).

Action TM-1.6—In PHMA, during site-specific travel and transportation management planning, limit route construction to realignment of existing routes if that realignment has a minimal impact on GRSG habitat, if it eliminates the need to construct a new road, or if it is necessary for motorist safety.

Action TM-1.7—In PHMA, during site-specific travel and transportation management planning, use existing routes or realignments, as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing routes, then build any new route to the absolute minimum standard necessary.

Action TM-1.8—In PHMA, during site-specific travel and transportation management planning, the upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity may be allowed when there are minimal impacts on GRSG and GRSG habitat, if it is necessary for motorist safety, or if it eliminates the need to construct a new road. All upgrades to existing routes would be evaluated on a case-by-case basis and would be subject to valid existing rights (e.g., existing ROWs or easements).

Action TM-1.9—When travel plans are complete, restore roads, primitive roads and trails in PHMA that are not designated in travel management plans. This also includes primitive routes/roads that were not designated in WSAs that have been selected for protection in previous RMPs.

Action TM-1.10—When reseeding roads, primitive roads, and trails in PHMA, use appropriate seed mixes and consider the use of transplanted sagebrush.

Action TM-1.11—In PHMA and GHMA, temporary closures would be considered in accordance with 43 CFR, subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use).

Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or would cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.

Recreation (RE)

Management Actions

Action RE-1.1—Special recreation permits (SRP) in PHMA may be allowed if they are neutral or beneficial for GRSG habitat.

Action RE-1.2—In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) unless the development would have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection.

Lands and Realty (LR)

Rights-of-Way

Management Actions

Action LR-1.1 –PHMA and GHMA would be managed as ROW avoidance areas for high voltage transmission lines (100 kilovolt [kV] and over) and large pipelines (24 inches in width and over) (345,560 acres) with limited exceptions, which must be based on an explicit rationale that biological impacts on GRSG are being avoided with the exception. See **Figure 2-2**, Major Rights-of-Way Avoidance Areas—Proposed Plan (**Appendix A**).

- PHMA would also be managed as a minor ROW avoidance area (233,219 acres). See **Figure 2-3**, Minor Rights-of-Way Avoidance Areas—Proposed Plan (**Appendix A**).
- GMHA would be open to minor ROWs (112,341 acres).
- Where new ROWs are required, collocate new ROWs within existing ROWs or where it best minimizes impacts on GRSG and GRSG habitat.
- Appropriate RDFs identified within the terms of the authorization to minimize surface-disturbing and disruptive activities. See **Appendix D**, Required Design Features for Greater Sage-Grouse Habitat for Alternative D and Proposed Plan Amendment, for RDFs that may be applied based on site-specific project level NEPA analysis.

Action LR-1.2—PHMA would be managed as a ROW exclusion area for wind and solar energy (233,219 acres) and GHMA would be managed as a ROW avoidance area for wind and solar energy (112,341 acres). See **Figure 2-4**, Rights-of-Way Wind and Solar Energy—Proposed Plan (**Appendix A)**.

Action LR-1.3—When addressing ROW authorizations in PHMA, identify and evaluate opportunities to remove, bury, or modify power lines within PHMA. Financial and technical feasibility would be evaluated during the environmental analysis process.

Action LR-1.4—Current FLPMA ROWs have a stipulation that when the ROW terminates, the site must be remediated and restored by the grant holder to BLM's satisfaction (43 CFR, Part 2807.19).

Action LR-1.5—Many pre-FLPMA grant authorizations are for water, or electricity, to large areas and most of these grants are perpetual or non-expiring. If an amendment is needed the grant would be renewed/reauthorized under current authority with additional stipulations and/or mitigation requirements. If the pre-FLPMA authorizations are no longer needed, grantees would be required to reclaim sites by removing features/fixtures and restoring habitat. Grant authorizations under the Mineral Leasing Act would be renewed if they are still being used for their original purposes.

Action LR-1.6—Leases and permits (other than for cabin site leasing), which may be for occupancy, and film production, would be considered on a case-by-case basis; however, PHMA would be lease and permit avoidance areas. Leases and permits would be allowed in GHMA with appropriate stipulations and conservation measures identified within the terms of the authorization to minimize surface-disturbing and disruptive activities. Avoidance areas within GHMA may be identified.

Action LR-1.7—The holder of a ROW should be responsible for weed control on disturbed areas within the limits of the ROW. The holder should be responsible for invasive weed control for the life of the ROW. ROW holder is responsible for weed control and monitoring for three years after reclamation has been completed. The holder would be responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods.

Action LR-1.8—No utility corridors designated within the planning area.

Land Tenure Adjustment
Management Actions
Action LR-1.9—Lands classified as PHMA and GHMA would be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands would provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal of the lands would have no direct or indirect adverse impact on conservation of the GRSG.
Action LR-1.10—Land tenure adjustments in the Headwaters planning area would be subject to disposal/acquisition criteria identified (BLM 1984, page 20).
Action LR-1.11—Retain important wildlife habitat (one of the three main criteria for land tenure adjustments outlined in the Judith Resource Area RMP) (BLM 1994).
Action LR-1.12—Headwaters RMP land ownership adjustment criteria include nesting/breeding habitat for game animals (BLM 1984, page 20).
Action LR-1.13—When offered, PHMA would be a priority in consideration of land acquisitions (refer to **Appendix H**, Land Pattern Review and Land Adjustment). Consider GRSG for all land tenure actions.
Recommend Land Withdrawals
Management Actions
Action LR-1.14—Withdrawals from minerals on BLM surface (2,686 acres).
Action LR-1.15—SFAs (53,440 acres) would be recommended for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights.
Range Management (RM)
Management Actions
Action RM-1.1—GRSG habitat objectives would be considered when evaluating an allotment's conformance with land health standards (**Appendix F**) prior to renewing a grazing authorization.
Action RM-1.2—In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed and implemented within one year if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. **Appendix B** addresses mid-scale monitoring.
Action RM-1.3—Livestock grazing would be allowed on all areas not specifically closed to grazing (570,112 acres would be open to grazing and 103,806 animal unit months [AUM] available). See **Figure 2-5**, Areas Open and Closed, Grazing Allotments—Proposed Plan (**Appendix A**).
Action RM-1.4—In PHMA, cooperate with ranchers and other agencies on integrated ranch planning so operations with intermingled land ownerships within BLM allotments can be planned as single units.
Action RM-1.5—The BLM would prioritize (1) the review of grazing permits/leases in particular to determine if modification is necessary prior to renewal): and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence would be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. Land health evaluations and determinations, and grazing authorization renewals would be completed within the designated planning units as prioritized (see **Section 3.14.2**, Range Management; Conditions on BLM-Administered Lands).

The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA would include specific management thresholds, based on GRSG Habitat Objectives (**Table 2-2**), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that would allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.

Allotments within SFAs, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.

At the time a permittee or lessee voluntarily relinquishes a grazing permit or lease, the BLM would consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks.

Ecological site descriptions (ESD), riparian PFC protocols, water quality data, and various types of appropriate vegetative, riparian, habitat, and any other applicable data would continue to be used as the basis in allotment evaluations to determine conformance to Standards for Land Health and Guidelines for Livestock Grazing Management (**Appendix F**).

Action RM-1.6—Allotments that have the best opportunities for conserving, enhancing, or restoring habitat for GRSG would receive high priority for monitoring, evaluation, and management.

Action RM-1.7—In PHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. **Appendix B** addresses mid-scale monitoring.

Action RM-1.8—The BLM would monitor grazing permits/leases renewed or modified in accordance with the direction contained in this guidance as follows: Allotments within SFAs, followed by those in other PHMA, and focusing on those with riparian areas, would be prioritized for monitoring to ensure compliance with the terms and conditions in the permits. The BLM would collect, at a minimum, the following monitoring data:

- Vegetation Condition
- Actual Use
- Utilization
- Use Supervision

Implementation Management Action After Land Health Evaluations

Management Actions

Action RM-1.9—In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed if land health determinations indicate that an allotment is not meeting standards due to livestock grazing in accordance with BLM grazing regulations 43 CFR, Part 4100. **Appendix B** addresses mid-scale monitoring. Land health evaluations and determinations, and grazing authorization renewals would be completed within the designated planning units as prioritized (**Section 3.14.2**).

Action RM-1.10—Conserve, enhance, or restore PHMA based on ecological site descriptions (including wetlands and riparian areas). If an effective grazing system that meets GRSG habitat objectives is not already in place, analyze at least one allotment-specific alternative within the planning unit/permit renewal process that conserves, restores, or enhances PHMA.

Action RM-1.11—In PHMA, manage for vegetation composition and structure consistent with ecological site potential within the reference state to achieve GRSG seasonal habitat objectives. Natural ecological processes that impede localized site potential and that create a mosaic of habitat successional patterns would continue to occur.

Action RM-1.12—In PHMA, implement management actions within or outside of the watershed planning/permit renewal process to modify grazing management and to meet seasonal GRSG habitat objectives. Consider singly, or in combination, for changes in:

- Season or timing of use
- Numbers of livestock (includes temporary non-use or livestock removal)
- Distribution of livestock use
- Intensity of use
- Type of livestock

Action RM-1.13—During drought periods, prioritize evaluating effects of the drought in PHMA, relative to their needs for food and cover. Drought management would continue to be in accordance with the Montana/Dakotas drought policy (**Appendix I**, Drought Policy). Since there is a lag in vegetation recovery following drought, post-drought management would be implemented to allow for vegetation recovery that meets GRSG needs in PHMA. In accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, consultation, cooperation, and coordination with owners or lessees having lands or managing resources within the area, the affected cooperative state grazing district, and interested public would be completed prior to adjusting post-drought livestock management if the grazing permit is being modified to make these adjustments. Implementation of adjustments would be initiated through documented agreement or by decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.

Riparian Areas and Wet Meadows

Management Actions

Action RM-1.14—Riparian-wetland areas would be managed for PFC within the LFO. Within PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes.

Action RM-1.15—Riparian-wetland areas currently achieving PFC would be managed for desired future condition and the desired plant community, based on ecological site potential. Other values to be considered include important wildlife habitat, water quality impaired streams, fisheries, riparian woodland forest, and habitat for currently listed threatened, endangered, and sensitive species.

Action RM-1.16—Riparian-wetland areas with altered potential (i.e., those riparian-wetland areas that are incapable of reaching potential because of causes that are outside of the control of the BLM) would be managed for their capability.

Action RM-1.17—Human-made water developments, such as reservoirs and stock ponds, can develop riparian-wetland characteristics. Those that have the capability to support important wildlife values (such as GRSG habitats and fisheries) would be managed for such to the extent practical, with greater consideration given to the purpose of the development. When constructing or modifying water developments in PHMA, use RDFs (**Appendix D**) to reduce potential impacts from West Nile virus.

Action RM-1.18—Within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Use fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in summer. Hot season use of riparian and wet meadow complexes may be authorized where consistent with overall GRSG habitat objectives and where use is currently resulting in vegetative conditions that are in conformance with land health standards.

Action RM-1.19—In PHMA, management emphasis would be placed on riparian and wetland potential associated with springs and seeps. Water from other sources would be prioritized to develop grazing management infrastructure. New water development for diversion from spring or seeps would be authorized only when no other sources are available and where such considerations would be neutral or beneficial to GRSG.

Action RM-1.20—Analyze springs, seeps, and associated pipelines during the land health evaluation and determination process to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA. Make modifications, where necessary, in accordance with Montana water law, considering impacts on other water uses, when such considerations are neutral or beneficial to GRSG.

Treatments to Increase Forage for Livestock/Wild Ungulates

Management Objectives

Objective RM-1.1 —Develop and implement (as budgets and workloads allow) methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants.

Management Actions

Action RM-1.21—Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of a grazing management plan that is providing value in conserving or enhancing native rangelands in PHMA and other priority wildlife habitats, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health evaluation and determination process.

Action RM-1.22—Integrated vegetation management would be used to control, suppress, and eradicate, where possible, noxious and invasive species, in accordance with Chapter 6, sections II and III of BLM Handbook H-1740-2.

Action RM-1.23—Noxious weed control on affected grazing allotments would be implemented through Weed Control Cooperative Range Improvement Project Agreements, which requires as a term and condition of a grazing authorization that the operator control noxious weeds on the grazing allotment(s) they are authorized to use.

Structural Range Improvement and Livestock Management Tools

Management Actions

Action RM-1.24—In PHMA, site and design new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore said habitat through an improved grazing management system relative to GRSG habitat objectives. Structural range improvements, in this context, include cattle guards, fences, exclosures, corrals, or other livestock handling structures; pipelines, troughs, storage tanks (including movable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels, and spring developments).

Action RM-1.25—Potential for invasive species establishment or increase following construction would be considered in the project planning process and monitored and treated post-construction. Projects would be designed to the extent practical to reduce or eliminate the establishment of new two-track roads and trails that may be created during construction and maintenance.

Action RM-1.26—When developing or modifying water developments in PHMA and GHMA, use applicable RDFs (**Appendix D**) to reduce potential impacts from West Nile virus.

Action RM-1.27—During the land health evaluation and determination and grazing authorization renewal process (typically every 10 years), examine existing structural range improvements and location of supplements (salt or protein blocks) to ensure they conserve, enhance or restore PHMA.

- Identify and mark fences in high and moderate risk areas, as identified by the use of "The Fence Collision Risk Tool" (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/) within PHMA, based on proximity to lek, lek size, and topography (Stevens 2011, Stevens et al. 2013).
- During the allotment evaluation and determination and grazing authorization renewal process, examine existing structural range improvements to ensure they conserve, enhance, or restore PHMA.
- In PHMA and GHMA, monitor for and treat invasive and noxious weed species associated with existing range improvement projects.

Action RM-1.28—In PHMA and GHMA, site-specific requirements for resting or deferring areas from livestock grazing following fire would depend on a variety of factors, including resource objectives, the type of fuel, time and intensity of burn, accessibility of the burned area to livestock and post-burn climactic factors.

Fluid Minerals (FM)

Leased Federal Fluid Mineral Estate

Management Actions

Action FM-1.1—Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA areas. Allow only geophysical operations by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and other restrictions that may apply (see **Appendix D**).

Action FM-1.2—During implementation level review and decisions, (e.g., approval of an application for permit to drill [APD] or Sundry Notice) and on completion of the environmental record of review (43 CFR, Part 3162.5), include appropriate documentation of compliance with NEPA. In this process evaluate, among other things:

- Whether the conservation measure is reasonable (43 CFR, Part 3101.1-2) with the valid existing rights; and
- Whether the action is in conformance with the approved RMP.

The following operating constraints would be applied to existing leases as COA in PHMA and GHMA. Exceptions may be granted by the authorized officer if an environmental review demonstrates that effects could be mitigated to an acceptable level, if habitat for the species is not present in the area, or if portions of the area can be occupied without affecting GRSG. Exceptions may also be granted where the short-term effects on GRSG within PHMA and GHMA are mitigated by the long-term benefits.

Permanent (longer than two months) structures that create movement must be designed or sited to minimize impacts on GRSG.

- As reasonable (43 CFR, Part 3101.1-2), in consideration of valid existing rights, and to achieve a net conservation gain, the BLM would require compensatory mitigation when

impacts cannot be adequately avoided and minimized, and residual impacts would result in habitat loss and degradation. Compensatory mitigation actions would align with the recommendations in the Regional Mitigation Strategy (see **Section 2.7.3**), as appropriate. A priority may be given to compensatory mitigation actions in the same PHMA as is being impacted, unless a greater benefit can be achieved elsewhere. Compensatory mitigation would be considered when no feasible options remain to adequately avoid and minimize impacts within and immediately adjacent to the impacted site.

- Make applicable RDFs (**Appendix D**) mandatory as COAs within PHMA and GHMA. RDFs provided in **Appendix D** would be site-specific restrictions applied to permits to drill as COA after the completion of site- specific NEPA analysis. Standard stipulations (see **Appendix J**, Oil and Gas Lease Stipulations) apply to existing leases. Applied RDFs would have to be reasonable (43 CFR, Part 3101.1-2) with the valid existing rights and in conformance with the approved Judith and Headwaters RMPs.

Solid Minerals (SM)

Coal

Management Actions

Action SM-1.1—At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM would determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).

Locatable Minerals

Management Actions

Action SM-1.2—Recommend SFA (53,440 acres) for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights. See **Figure 2-6**, Withdrawals and Recommend for Withdrawal—Proposed Plan **(Appendix A).**

Analyze proposed action in Plan of Operations and apply mitigating measures needed to prevent unnecessary or undue degradation[1].

Action SM-1.3—Locatable minerals exploration and development under the mining laws are not authorized under the discretion of the field manager but are reviewed (Notice and Plan of Operations) and approved (Plan of Operations) to prevent unnecessary or undue degradation. Proposed actions under Plan of Operations would be analyzed on a case-by-case basis in coordination with Montana Department of Environmental Quality (MTDEQ), and RDFs apply to locatables to the extent consistent with applicable law (**Appendix D**).

Action SM-1.4—See **Figure 2-6** (**Appendix A**). At a minimum, annual compliance inspections would be conducted on each active Notice or Plan of Operations.

[1]Unnecessary or undue degradation means conditions, activities, or practices that (43 CFR, Part 3809.5): (1) Fail to comply with one or more of the following: the performance standards in Section 3809.420, the terms and conditions of an approved Plan of Operations, operations described in a complete notice, and other federal and state laws related to environmental protection and protection of cultural resources; (2) Are not "reasonably incident" to prospecting, mining, or processing operations as defined in Section 3715. 0-5 of this chapter; or (3) Fail to attain a stated level of protection or reclamation required by specific laws in areas such as the California Desert Conservation Area, Wild and Scenic Rivers, BLM-administered portions of the National Wilderness System, and BLM-administered National Monuments and National Conservation Areas.

Nonenergy Leasable Minerals

Management Actions

Action SM-1.5—Close PHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine. See **Figure 2-7**, Nonenergy Leasable Minerals—Proposed Plan (**Appendix A**)

Action SM-1.6—For existing nonenergy leasable mineral leases in PHMA, apply all appropriate RDFs from **Appendix D**, whether traditional or solution mining is used to extract resources.

Salable Minerals

Management Actions

Action SM-1.7—PHMA and GHMA are closed to salable minerals disposal. See **Figure 2-8**, Salable Minerals - Proposed Plan (**Appendix A**).

Action SM-1.8—PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:

- the activity is within the BSU and project area disturbance cap;
- the activity is subject to the provisions set forth in the mitigation framework (**Appendix G**); and
- all applicable RDFs are applied; and [if applicable] the activity is permissible under the specific sub-regional screening criteria.

In GHMA, the BLM would issue permits for salable minerals, where disposal is deemed to be in the public interest (**Figure 2-8, Appendix A**), while providing for reclamation of mined lands and preventing unnecessary or undue degradation, and meeting goals and objectives for PHMA, surface disturbance limits (applies only to PHMA), mitigation and other measures through the application of appropriate RDFs (**Appendix D**). Salable mineral permits are considered on a case-by-case basis and are issued at the discretion of the field manager. If activity under the permit application cannot be mitigated based on appropriate RDFs and strategies outlined in **Section 2.7.3** and **Appendix G** to achieve net conservation gain and prevent unnecessary or undue degradation to GRSG habitat.

Action SM-1.9—In PHMA, restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives.

Mineral Split Estate (ME)

Management Actions

Action ME-1.1—Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee (**Appendix D**).

Action ME-1.2—Where the federal government owns the mineral estate in PHMA and GHMA, and the surface estate is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs (**Appendix D**) applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.

Fire and Fuels Management (FF)

Fuels Management

Management Objectives

Objective FF-1.1—Design fuel treatments to protect, restore, enhance, or maintain GRSG habitat, consistent with vegetation and wildlife habitat objectives.

Management Actions

Action FF-1.1—If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plans would address:

- why alternative techniques were not selected as a viable options;
- how GRSG goals and objectives would be met by its use;
- how the COT report objectives would be addressed and met; and
- a risk assessment to address how potential threats to GRSG habitat would be minimized.

Prescribed fire as vegetation or fuels treatment should only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect GRSG habitat in PHMA (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).

Prescribed fire in known winter range should only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.

Action FF-1.2—Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area. This may require fuels treatments implemented in a more linear versus block design.

Action FF-1.3—During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels and implement grazing management that would accomplish this. Consult with an interdisciplinary team of resource specialists, as appropriate, to minimize impacts on native perennial grasses.

Action FF-1.4—Follow the most current RDFs for fire and fuels (**Appendix D**).

Action FF-1.5—If prescribed fire is used, the burn plan would clearly indicate how COT objectives would be addressed and met, and why alternative techniques are not applicable. A fire risk assessment would be completed for implementation of prescribed fire used to meet the GRSG goals and objectives in PHMA (see **Appendix K**, GRSG Wildfire and Invasive Species Habitat Assessment).

Fire Operations

Management Objectives

Objective FF-1.2—Manage wildfires to minimize loss of sage-brush and protect GRSG habitat.

Management Actions

Action FF-1.6—In PHMA, prioritize suppression, after life and property, to conserve the habitat. See **Appendix K**, which would be completed to help further refine fire management actions once this plan is completed.

Action FF-1.7—In GHMA, prioritize suppression where wildfires threaten PHMA.

Action FF-1.8—Follow the most current RDFs for fire and fuels (**Appendix D**).

Emergency Stabilization and Rehabilitation

Management Actions

Action FF-1.9—In PHMA, prioritize native seed allocation for use in GRSG habitat in years when preferred native seed is in short supply. This may require reallocating native seed from emergency stabilization and rehabilitation (ES&R) projects outside of PHMA to those inside it. Use of native plant seeds for ES&R seedings is required, based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, nonnative seeds may be used, as long as they meet GRSG habitat conservation objectives. Reestablishing appropriate sagebrush species/subspecies and important understory plants, relative to site potential, should be the highest priority for rehabilitation.

Action FF-1.10—In PHMA, design post ES&R management to ensure long-term persistence of seeded or pre-burn native plants. This could include changes in current resource management to achieve and maintain the desired condition of the restoration effort that benefits GRSG. Modifications to livestock grazing would be made in accordance with BLM grazing regulation 43 CFR, Part 4130.3-3 and after consultation, cooperation and coordination with owners or lessees having lands or managing resources within the affected allotment(s), affected cooperative state grazing districts and the interested public, if the grazing permit is being modified to make these adjustments. Temporary or long-term adjustments in post-restoration livestock use would be implemented by documented agreement or by the decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.

Action FF-1.11—In PHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collection from the warmer component of the species' current range when selecting native seed.

Action FF-1.12—Develop an appropriate seed mix for the location, based on current climatic data as well as soils/ecological site descriptions.

Action FF-1.13—Appropriate pre and post treatment monitoring would be established to document impacts and success of the treatments.

Action FF-1.14—Requirements for resting or deferring areas from livestock grazing following fire would depend on a variety of factors including resource objectives, the type of fuel, time and intensity of burn, accessibility of the burned area to livestock, and post-burn climatic factors. Compliance with land health standards (**Appendix F**).

Habitat Restoration/Vegetation Management (HV)

Management Objectives

Objective HV-1.1—In all SFAs and PHMA, the desired condition is to maintain a minimum of 70% of lands capable of producing sagebrush with 10 to 30% sagebrush canopy cover. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).

Objective HV-1.2—Within the analysis area, vegetation treatments may continue to be used to meet or support resource management objectives, given special consideration for the protection and maintenance of sagebrush ecosystems is incorporated into the design and implementation of treatments. The BLM would continue to cooperate with the MFWP to determine wildlife habitat needs.

Management Actions
Action HV-1.1—In PHMA, prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG.
Action HV-1.2—In PHMA and GHMA, prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution or abundance.
Action HV-1.3—In PHMA and GHMA, consideration for other threatened, endangered, or sensitive species would be evaluated in addition to GRSG when prioritizing restoration projects.
Action HV-1.4—Manage for suitable GRSG habitat within PHMA.
Action HV-1.5—In PHMA, require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Nonnative species would be considered when determined to be necessary for emergency stabilization and where required to facilitate natural succession of desired native vegetative communities.
Action HV-1.6—In PHMA, design post-restoration management to ensure long-term persistence. This could include changes in current resource management to achieve and maintain the desired condition of the restoration that benefits GRSG. Modifications to livestock grazing would be made in accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, and after consultation, cooperation, and coordination with owners or lessees having lands or managing resources within the affected allotment(s), affected cooperative state grazing districts and the interested public, if the grazing permit is being modified to make these adjustments. Temporary or long-term adjustments in post-restoration livestock use would be implemented by documented agreement or by the decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.
Action HV-1.7—In PHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collection from the warmer component of the species' current range when selecting native seed.
Action HV-1.8—Choose appropriate seed mix for the location.
Action HV-1.9—In PHMA, restore native (or desirable) plants and create landscape patterns that most benefit GRSG. Consideration for other threatened, endangered, or sensitive species would be evaluated, in addition to GRSG, when creating landscape habitat patterns.
Action HV-1.10—Make reestablishment of suitable GRSG habitat a high priority for restoration. Other restoration efforts within the field office may take precedence over sagebrush habitat projects, based on future threatened and endangered species listing decisions, funding sources and requirements, access to sites, landowner, and other agency cooperation, potential project success, as well as others. Decisions regarding restoration of habitats within the field office would remain at the discretion of the authorized officer.
Action HV-1.11—In PHMA with higher fire frequency, where sagebrush seed is required for GRSG habitat restoration, consider establishing seed harvest areas that are managed for seed production that receive a priority for protection from outside disturbances.
Action HV-1.12—Remove conifers encroaching into sagebrush habitats. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the FIAT report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment would help refine the location for specific priority areas to be treated.

Required Design Features

RDFs are required for certain activities in all GRSG habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis for the project or activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat
- A specific RDF would provide no additional protection to GRSG or its habitat.

The RDFs for the Proposed Plan Amendment are presented in **Appendix D**.

2.7 ADAPTIVE MANAGEMENT, MONITORING, AND MITIGATION

2.7.1 Adaptive Management Plan

Adaptive management is a decision process that promotes flexible resource management decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps with adjusting resource management directions as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a "trial and error process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits.

In relation to the BLM's National Greater Sage-Grouse Planning Strategy, adaptive management would help identify if GRSG conservation measures presented in this EIS contain the needed level of certainty for effectiveness. Principles of adaptive management are incorporated into the conservation measures in the Proposed Plan Amendment to ameliorate threats to a species, thereby increasing the likelihood that the conservation measures and plan would be effective in reducing threats to that species. The following provides the BLM's adaptive management strategy for the Lewistown Field Office Greater Sage-Grouse RMPA/EIS. The adaptive management plan described below would

only apply to the Proposed Plan Amendment, and not the alternatives (Alternatives A—D) presented in the Draft EIS.

If the BLM finds that the State of Montana is implementing a GRSG Habitat Conservation Program that is effectively conserving the GRSG, the BLM will review the management goals and objectives to determine if they are being met and whether amendment of the BLM plan is appropriate to achieve consistent and effective conservation and GRSG management across all lands regardless of ownership.

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

Adaptive Management and Monitoring

This Proposed RMPA/Final EIS contains a monitoring framework plan (**Appendix B**) that includes an effectiveness monitoring component. The BLM intends to use the data collected from the effectiveness monitoring to identify any changes in habitat conditions related to the goals and objectives of the plan and other range-wide conservation strategies (DOI 2004; Stiver et al. 2006; USFWS 2013). The information collected through the Monitoring Framework Plan outlined in **Appendix B** would be used by the BLM to determine when adaptive management hard and soft triggers (discussed below) are met. The GRSG adaptive management plan provides regulatory assurance that a means of addressing and responding to unintended negative impacts to GRSG and its habitat before consequences become severe or irreversible.

The Montana Sage Grouse Habitat Conservation Program established by the Montana Governor's Executive Order # 10-2014, states under the General Provisions heading, item # 22 "Montana Sage Grouse Oversight Team (MSGOT) shall regularly reevaluate the effectiveness of the Conservation Strategy, at a minimum annually, as new science, information and data emerge regarding the habitats and behavior of sage grouse, and shall recommend such changes as are appropriate."

Adaptive Management Triggers

Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting GRSG conservation objectives. The BLM would use soft and hard triggers.

Soft Triggers

Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action. The soft trigger is any negative deviation from normal trends in habitat or population in any given year, or if observed across two to three consecutive years. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. BLM field offices, local MFWP offices, and GRSG

working groups would evaluate the metrics. The purpose of these strategies is to address localized GRSG population and habitat changes by providing the framework in which management would change if monitoring identifies negative population and habitat anomalies.

Each major project (EIS level) would include adaptive management strategies in support of the population management objectives for GRSG set by the State of Montana, and would be consistent with this GRSG Adaptive Management Plan. These adaptive management strategies would be developed in partnership with the State of Montana, project proponents, partners, and stakeholders, incorporating the best available science.

Soft Triggers Response

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

Hard Triggers

Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG objectives as set forth in the BLM plans.

Hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts.

Within the context of normal population variables, hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the BSU in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a three-year time period within a five-year range of analysis. A minimum of three years is used to determine trends, with a five- year period preferred to allow determination of three actual time periods (Y1-2-3, Y2-3-4, Y3-4-5). Baseline population estimates are established by pre-disturbance surveys, reference surveys and account for regional and statewide trends in population levels. Population count data in Montana are maintained by MFWP. Estimates of population are determined based upon survey protocols determined by MFWP, and are implemented consistently throughout the state. Population counts are tracked for individual leks and are then summarized for PHMA.

Hard Trigger Response

Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM plans. As such, the Proposed Plan Amendment includes a

"hard-wired" plan-level response; that is, it provides that, upon reaching the trigger, a more restrictive alternative, or an appropriate component of a more restrictive alternative analyzed in the EIS would be implemented without further action by the BLM. Specific "hard-wired" changes in management are identified in **Table 2-3**. In addition to the specific changes identified in **Table 2-3** the BLM would review available and pertinent data, in coordination with GRSG biologists and managers from multiple agencies including the USFWS, National Resource Conservation Service (NRCS), and the State of Montana, to determine the causal factor(s) and implement a corrective strategy. The corrective strategy would include the changes identified in **Table 2-3**, and could also include the need to amend or revise the RMP to address the situation and modify management accordingly. When a hard trigger is hit in a BSU, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team would convene to determine the causal factor, put project level responses in place, as appropriate and discuss further appropriate actions to be applied. (BSU for this Proposed RMPA/Final EIS is the total of all the PHMA within a GRSG population as delineated in the COT report.) Adoption of any further actions at the plan level may require initiating a plan amendment process.

Table 2-3
Specific Management Responses

Program	Adaptive Management Response
GRSG Management	Areas within and adjacent to PHMA where a hard trigger has been reached would be the top priority for regional mitigation, habitat restoration and fuels reduction treatments.
Vegetation Management	PHMA would be the top priority for regional mitigation, habitat restoration and fuels reduction treatments.
Wildland Fire Management	Reassess GRSG habitat needs to determine if priorities for at risk habitats, fuels management areas, preparedness, suppression and restoration have changed.
Livestock Grazing	For areas not achieving the GRSG habitat objectives due to grazing, apply adjustments to livestock grazing to achieve objectives.
Rights of Way – Existing Corridors	Retain the corridors as mapped, but limit the size of new lines within the corridors to same as existing structures, or not larger than 100 kilovolt (kV).
Wind Energy Development	No change from Proposed Plan Amendment.
Industrial Solar	No change from Proposed Plan Amendment.
Comprehensive Travel and Transportation Management	If travel management planning has not been completed within GRSG habitat, PHMA areas where the hard trigger was met would be the highest priority for future travel management planning efforts. If travel management has been completed within GRSG habitat in the PHMA where the hard trigger was met, re-evaluate designated routes to determine their effects on GRSG. If routes are found to be causing population-level impacts, revise their designation status to reduce the effect.

Table 2-3
Specific Management Responses

Program	Adaptive Management Response
Fluid Minerals	No change from Proposed Plan Amendment.
Locatable Minerals	No change from Proposed Plan Amendment.
Salable Minerals	No change from Proposed Plan Amendment.
Nonenergy Leasable Minerals	No change from Proposed Plan Amendment.

In addition to implementing the hard wired plan-level response, in the event that new scientific information becomes available demonstrating that the hard wired response would be insufficient to stop a severe deviation from GRSG conservation objectives set forth in the BLM plans, the BLM would immediately implement a formal directive to protect GRSG and its habitat and to ensure that conservation options are not foreclosed. To the extent that it is supported scientifically, this formal directive would be drawn from the range of alternatives analyzed in the RMPA.

2.7.2 Monitoring for the Greater Sage-Grouse Planning Strategy

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

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

On March 5, 2010, USFWS' 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered were posted as a Federal Register notice (75 Federal Register 13910-14014, March 23, 2010). This notice stated:

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

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

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

More specifically, the framework discusses how the BLM would monitor and track implementation and effectiveness of planning decisions (e.g., tracking of waivers, modifications, and site-level actions). The BLM would monitor the effectiveness of RMP decisions in meeting management and conservation objectives. Effectiveness monitoring would include monitoring disturbance in habitats, as well as landscape habitat attributes. To monitor habitats, the BLM would measure and track attributes of occupied habitat, PHMA, and GHMA at the broad scale, and attributes of habitat availability, patch size, connectivity, linkage/connectivity habitat, edge effect, and anthropogenic disturbances at the mid-scale. Disturbance monitoring would measure and track changes in the amount of sagebrush in the landscape and changes in the anthropogenic footprint, including change energy development density. The framework also

includes methodology for analysis and reporting for field offices, states, and BLM districts, including geospatial and tabular data for disturbance mapping (e.g., geospatial footprint of new permitted disturbances) and management actions effectiveness.

2.7.3 Regional Mitigation

Consistent with the proposed plan's goal outlined in **Section 2.6.2**, the intent of the Proposed Plan Amendment is to provide a net conservation gain to the species. To do so, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM would require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This would be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. This is also consistent with BLM Manual 6840 – Special Status Species Management, Section .02B, which states "to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of the need for listing of these species under the ESA. Actions which result in habitat loss and degradation include those identified as threats which contribute to GRSG disturbance as identified by the USFWS in its 2010 listing decision (75 FR 13910) and shown in Table B-2 in **Appendix B**.

Mitigation Standards

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

Greater Sage-Grouse Conservation Team

The BLM would establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (Team) to help guide the conservation of GRSG, within 90 days of the issuance of the ROD. This Team would develop a WAFWA Management Zone Regional Mitigation Strategy (Regional Mitigation Strategy).

The Team would also compile and report on monitoring data (including data on habitat condition, population trends, and mitigation effectiveness) from States across the WAFWA Management Zone (see **Section 2.7.2**). Subsequently, the Team would use these data to either modify the appropriate Regional Mitigation Strategy or recommend adaptive management actions (see **Section 2.7.1**).

The BLM would invite governmental and Tribal partners to participate in this Team, including MFWP and USFWS, in compliance with the exemptions provided for committees defined in the Federal Advisory Committee Act (FACA) and FACA's implementing regulations. The BLM would strive for a collaborative and unified approach between federal agencies (e.g., USFWS and BLM), Tribal governments, state and local government(s), and other stakeholders for GRSG conservation. The Team would provide advice to the BLM, but would not make any decisions that impact federal lands. The BLM would remain responsible for making decisions that affect federal lands.

Developing a Regional Mitigation Strategy

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

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

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

Incorporating the Regional Mitigation Strategy into NEPA Analyses

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

Implementing a Compensatory Mitigation Program

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

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

2.8 DRAFT RMP/EIS ALTERNATIVES

The following are alternatives to the Proposed Plan Amendment and were presented and analyzed in the Draft RMPA/EIS.

2.8.1 Alternative A (No Action)

Alternative A meets the CEQ requirement that a no action alternative be considered. This alternative continues current management direction and prevailing conditions derived from existing planning documents. Goals and objectives for resources and resource uses are based on the Judith Resource Area RMP and the Headwaters RMP/EIS and ROD, along with associated amendments, activity and implementation level plans, and other management decision documents. Laws and regulations that supersede RMP decisions would apply.

No PHMA or GHMA would be delineated under Alternative A. Goals and objectives for BLM-administered lands and mineral estate would not change. Appropriate and allowable uses and restrictions pertaining to such activities as mineral leasing and development, recreation, construction of utility infrastructure, and livestock grazing would also remain the same. The BLM would not modify existing criteria or establish additional criteria to identify site-specific use levels.

2.8.2 Management Common to Action Alternatives

Alternatives B, C, and D have two basic components: delineated PHMA and GHMA, and RDFs.

Where more restrictive land use allocations or decisions are made in existing RMPs, those more restrictive land use allocations or decisions would remain in effect and would not be amended by this RMPA.

Delineate Lands as Priority and General Habitat Management Areas

Under Alternatives B, C, and D, PH and GH data would be refined to (1) delineate PHMA and analyze actions within PHMA to conserve GRSG habitat functionality, or where possible, improve habitat functionality; and (2) delineate GHMA and analyze actions within GHMA that provide for major life history function (e.g., breeding, migration, or winter survival). The purpose of these delineations would be to maintain genetic diversity needed for sustainable GRSG populations. The areas delineated as PHMA and GHMA would be the same under each alternative; however, the allowable uses and management actions within PHMA and GHMA may vary between alternatives to meet the goal of the RMPA and objectives of the alternative.

Required Design Features

RDFs are means, measures, or practices intended to reduce or avoid adverse environmental impacts. This Proposed RMPA/Final EIS proposes a suite of design features that would establish the minimum specifications for certain activities, such as water developments, certain mineral development, and fire and fuels management, to mitigate adverse impacts.

In general, the RDFs are accepted practices that are known to be effective when implemented properly at the project level. However, their applicability and overall effectiveness cannot be fully assessed except at the project-specific level, when the project location and design are known. Because of site-specific circumstances, some features may not apply to some projects (e.g., a resource is not present on a given site) or may require slight variations from what is described in the RMPA/EIS (e.g., a larger or smaller protective area). All variations in RDFs would require appropriate analysis and disclosure as part of future project authorizations. Additional mitigation measures may be identified and required during individual project development and environmental review. The proposed RDFs are presented in **Appendix C**, Required Design Features for Greater Sage-Grouse Habitat for Alternatives B and C, and **Appendix D**.

Table 2-4 summarizes select proposed decisions, and **Table 2-5** includes details of all proposed decisions for the draft alternatives. **Appendix C** and **Appendix D** provide RDFs for surface-disturbing activities.

2.8.3 Alternative B

GRSG conservation measures in *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011) provide BLM management direction under Alternative B. Management actions by the BLM, in concert with other state and federal agencies and private landowners, play a critical role in the future trends of GRSG populations. To ensure BLM management actions are effective and based on the best available science, the National Policy Team created an NTT in August 2011. The BLM's objective for chartering this planning strategy was to develop new or revised regulatory mechanisms, through RMPs, to conserve and restore the GRSG and its habitat on BLM-administered lands. Conservation

measures under Alternative B are focused on PHMA (areas that have the highest conservation value to maintaining or increasing GRSG populations).

Travel and transportation management—Alternative B would limit motorized travel to existing roads, primitive roads, and trails at a minimum until travel management planning is complete and routes are either designated or closed. Under Alternative B, route construction in PHMA would be limited to realignments of existing designated routes, except to access valid existing rights; this would require additional mitigation for disturbances greater than three percent for that area. Alternative B would emphasize restoration of nondesignated roads, primitive roads, and trails in PHMA.

Recreation—SRPs would be allowed only in PHMA if they have neutral or beneficial effects on GRSG.

Lands and realty—PHMA would be designated as ROW exclusion area for new land use authorizations (approximately 233,219 acres), and GHMA would be designated as ROW avoidance areas for new land use authorizations (approximately 112,341 acres). Lands within PHMA would be recommended for mineral withdrawal proposals, and other withdrawal proposals in PHMA would need to be consistent with GRSG conservation measures. No utility corridors have been designated within the planning area. If high voltage transmission or major pipeline or other major ROWs were applied for a separate plan amendment would be required.

Range management—Grazing would be allowed on all lands identified as suitable (approximately 570,112 acres). Alternative B would consider retiring permitted grazing use on allotments in PHMA when the current permittee is willing. Within PHMA, GRSG habitat objectives and management considerations would be incorporated into all BLM grazing allotments through AMPs or permit renewals. The BLM would prioritize completion of land health assessments in PHMA and implement actions to modify grazing management to meet GRSG habitat requirements. Alternative B would focus forage treatments and restrictions to range improvements in PHMA.

Energy and mineral development—Existing fluid mineral leases in PHMA would be subject to conservation measures through RMP implementation decisions and on completion of the environmental record of review. All mitigation/conservation measures not already required as stipulations would be analyzed in a site-specific NEPA document, and be incorporated, as appropriate, into COAs of the permit, plan of development, or other use authorizations. Helicopter exploration would be allowed in PHMA, only in accordance with applicable restrictions.

Where the federal government owns the surface, and the mineral estate is not in federal ownership in PHMA, the BLM would apply appropriate fluid mineral RDFs (**Appendix C**) to surface development.

Surface coal mining would be considered unsuitable in PHMA (approximately 284,975 acres), and no subsurface coal mining disturbances and facilities would be allowed in PHMA. All PHMA (approximately 284,337 acres) would be closed to salable minerals and nonenergy leasable minerals, and would be recommended for withdrawal for locatable minerals.

Fire and fuels management—In PHMA, the BLM would design and implement fuels treatments and suppression, with an emphasis on protecting sagebrush ecosystems. Sagebrush canopy cover would not be reduced to less than 15 percent, unless a fuels management objective were to require additional reduction in sagebrush cover to meet strategic protection of PHMA and conserve habitat quality for the species. Under Alternative B, fuels management projects in PHMA would be designed to reduce wildfire threats in the greatest area.

Habitat restoration/vegetation management—The BLM would prioritize implementing restoration projects. Decisions would be based on environmental variables that would improve chances for project success in areas most likely to benefit GRSG. The BLM would make meeting habitat restoration objectives within PHMA areas the highest restoration priority.

Special designations—GRSG habitat would not be designated as an ACEC. GRSG PHMA and GHMA areas would be protected and managed consistent with the identified management actions and constraints in this alternative.

2.8.4 Alternative C

During scoping for the National Greater Sage-Grouse Planning Strategy, individuals and conservation groups submitted management direction recommendations for protecting and conserving GRSG and habitat at the range-wide level. These recommendations, in conjunction with resource allocation and management options and internal sub-regional BLM input, were reviewed in order to develop BLM management direction for GRSG under Alternative C. Conservation measures under Alternative C are focused on both PHMA and GHMA (seasonal or year-round habitat outside of PHMA).

Travel and transportation management—Alternative C, would limit motorized travel in PHMA and GHMA to existing roads, primitive roads, and trails, at a minimum. Alternative C would have the most restrictive requirements for constructing routes to existing valid rights, requiring a four-mile buffer from leks. Under Alternative C, route construction in PHMA and GHMA would be limited to realignments of existing designated routes. Like Alternative B, this alternative would also emphasize restoration of nondesignated roads, primitive roads, and trails in PHMA. Alternative C would have the most restrictions on travel and transportation.

Lands and realty—PHMA and GHMA would be designated as ROW exclusion areas (approximately 345,560 acres). Lands within PHMA would be recommended for mineral withdrawal proposals, and other withdrawal

proposals in PHMA and GHMA would need to be consistent with effective GRSG conservation measures. Alternative C would have the most restrictions on ROW development and withdrawals.

Range management—Alternative C would remove livestock grazing from all allotments in PHMA and GHMA. Under this alternative, 232,947 acres would remain open to grazing. Under Alternative C, the BLM would consider retiring permitted grazing use on allotments in PHMA and GHMA when the current permittee is willing. Alternative C would focus forage treatments and restrictions on range improvements in PHMA and GHMA.

Energy and mineral development—Existing fluid mineral leases in PHMA and GHMA habitat would be subject to conservation measures as COAs at the project and well permitting stages, and through RMP implementation decisions on completion of the environmental record of review. All mitigation and conservation measures not already required as stipulations would be analyzed in a site-specific NEPA document and incorporated, as appropriate, into COAs of the permit, plan of development, and/or other use authorizations. Helicopter exploration would be allowed in PHMA and GHMA in accordance with applicable restrictions.

Where the federal government owns the surface, and the mineral estate is not under federal ownership in PHMA and GHMA, the BLM would apply appropriate fluid mineral RDFs (**Appendix C**) to surface development.

Surface coal mining would be considered unsuitable in PHMA and GHMA (approximately 464,178 acres), and no subsurface coal mining disturbances or facilities would be allowed in PHMA and GHMA. All PHMA and GHMA (approximately 457,774 acres) would be closed to salable minerals and nonenergy leasable minerals. PHMA and GHMA would be recommended for withdrawal for locatable minerals.

Fire and fuels management—This is similar to management under Alternative B; however, all management would apply to both PHMA and GHMA.

Habitat restoration/vegetation management—The BLM would prioritize implementing restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. The BLM would make meeting habitat restoration objectives within PHMA and GHMA the highest restoration priority.

Special designations—All PHMA for GRSG with at least 4,000 acres of contiguous BLM surface ownership would be designated as an ACEC to protect GRSG habitat (98,091 acres; see **Appendix E**, Area of Critical Environmental Concern Evaluation of Relevance and Importance Criteria). Management actions for the ACEC would be consistent with the management actions/constraints identified in Alternative C to protect GRSG habitat.

2.8.5 Alternative D

Alternative D seeks to allocate limited resources among competing human interests, land uses, and the conservation of natural resource values. At the same time, it would sustain and enhance ecological integrity across the landscape, including plant, and wildlife habitat. This alternative incorporates cooperating agency adjustments to *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011) and habitat boundaries to provide a balanced level of protection, restoration, enhancement, and use of resources and services to meet ongoing programs and land uses. Conservation measures under Alternative D are focused on both PHMA and GHMA.

Travel and transportation management—Similar to Alternative A, Alternative D would limit motorized travel in the planning area to existing roads, primitive roads, and trails. Similar to Alternative B, route construction in PHMA would be limited to realignments of existing designated routes. However, construction of access roads to existing rights would be less restrictive and would be evaluated on a case-by-case basis. Similar to Alternative B, Alternative D would emphasize restoration of nondesignated roads, primitive roads, and trails in PHMA, following completion of travel management plans.

Recreation—SRPs would be allowed only in PHMA if they are neutral or beneficial for GRSG habitat.

Lands and realty—PHMA would be designated as ROW avoidance areas (approximately 233,219 acres; wind energy authorizations would be avoided from PHMA and GHMA areas). GHMA would be open to non-wind ROW development and evaluated on a case-by-case basis. Similar to Alternative B, nonmineral withdrawal proposal in PHMA would need to be consistent with GRSG conservation measures.

Range management—Similar to Alternative B, grazing would be allowed on all lands identified as suitable (approximately 570,112 acres). Within PHMA, GRSG habitat objectives and management considerations would be incorporated into all BLM grazing allotments through watershed planning and permit renewal process. Similar to Alternative B, the BLM would prioritize completion of land health assessments in PHMA. Like Alternative B, Alternative D would focus forage treatments and restrictions on range improvements in PHMA.

In PHMA, land health evaluations and determinations would be conducted that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. State objectives would be used for fine-scale analysis, unless local objectives are developed at the field office level, in partnership with MFWP and USFWS. The objectives would be used during the land health evaluation and determination process and specifically linked to LFO Standard #5, the biodiversity standard (see **Appendix F**). Future management actions would be developed if land health determinations indicate that an allotment is not meeting

standards due to current livestock grazing, based on an evaluation that considers the GRSG habitat objectives.

Energy and mineral development—Existing leases in the planning area would be subject to conservation measures through implementation decisions and on completion of the environmental record of review. Operating constraints would also be applied to existing leases as COAs. All mitigation/conservation measures not already required as stipulations would be analyzed in a site-specific NEPA document, and be incorporated, as appropriate, into COAs of the permit, plan of development, and/or other use authorizations. Exploration would be allowed in PHMA, by helicopter only in accordance with applicable restrictions.

The planning area would be available for coal exploration, subject to environmental review and mitigation measures. On a case-by-case basis, unsuitability criteria for coal would be applied and a plan amendment would be prepared. Proposed locatable minerals actions would be analyzed in Plan of Operations and appropriate mitigation would be applied. Permits for nonenergy leasable minerals and salable minerals would be considered on a case-by-case basis, and appropriate mitigation measures would be required.

Fire and fuels management—In suitable GRSG habitat, the BLM would design and implement fuels treatment and suppression with an emphasis on protecting sagebrush ecosystems. Sagebrush canopy cover would not be reduced to less than 15 percent, unless a fuels management objective were to require additional reduction in sagebrush cover to meet strategic protection of PHMA and conserve habitat quality for the species. Similar to Alternative B, fuels management projects in PHMA would be designed to reduce wildfire threats in the greatest area.

Habitat restoration/vegetation management— The BLM would make meeting GRSG habitat restoration objectives in PHMA and GHMA a high priority, while also considering other species.

Special designations—GRSG habitat would not be designated as an ACEC. It would be protected and managed consistent with the identified management actions and constraints under this alternative.

2.9 SUMMARY COMPARISON OF PROPOSED PLAN AMENDMENT AND DRAFT ALTERNATIVES

This section summarizes and compares Alternatives A through D and the BLM Proposed Plan Amendment considered in the Final EIS. Combined with the appendices and maps, **Table 2-4** provides the differences among the alternatives relative to what they establish and where they occur. The table compares the differences with the most potential to affect resources among the alternatives.

Table 2-4
Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives

Resources/Resource Uses	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Planning Area–BLM Surface (no PHMA or GHMA delineation) (acres)	593,995	593,995	593,995	593,995	593,995
GRSG Habitat Areas (acres)					
PHMA–All ownerships	0	1,207,994	1,207,994	1,207,994	1,207,994
PHMA–BLM	0	233,219	233,219	233,219	233,219
PHMA–Private, State, or Other Surface/Federal Minerals	0	294,935	294,935	294,935	294,935
GHMA–All ownerships	0	1,015,035	1,015,035	1,015,035	1,015,035
GHMA–BLM	0	112,341	112,341	112,341	112,341
GHMA –Private, State, or Other Surface/Federal Minerals	0	195,668	195,668	195,668	195,668
Livestock Grazing					
Open for all classes of livestock grazing (acres)	570,112	570,112	232,947	570,112	570,112
Open for all classes of livestock grazing in PHMA	n/a	230,716	0	230,716	230,716
Open for all classes of livestock grazing in GHMA	n/a	106,449	0	106,449	106,449
Open for all classes of livestock grazing in non-habitat	n/a	232,947	232,947	232,947	232,947
Closed to livestock grazing (acres)	6,781	6,781	337,165	6,781	6,781
Closed for all classes of livestock grazing in PHMA	n/a	0	230,716	0	0
Closed for all classes of livestock grazing in GHMA	n/a	0	106,449	0	0
Available AUMs	103,806	103,806	34,398	103,806	103,806
Available AUMs in PHMA	n/a	49,948	0	49,948	49,948
Available AUMs in GHMA	n/a	19,460	0	19,460	19,460

Table 2-4
Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives

Resources/Resource Uses	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Available AUMs in non-habitat	103,806	34,398	34,398	34,398	34,398
Comprehensive Travel and Transportation Management					
Limited to existing routes for OHVs (acres)	593,955	593,955	593,955	593,955	593,955
Lands and Realty (acres)					
Right-of-way (ROW) exclusion areas	0	233,219	345,560	0	0
ROW exclusion areas in PHMA	n/a	233,219	233,219	0	0
ROW exclusion areas in GHMA	n/a	0	112,341	0	0
ROW avoidance areas	30,403	132,826	0	260,949	366,045
ROW avoidance areas in PHMA	n/a	0	0	233,219	233,219
ROW avoidance areas in GHMA	n/a	112,341	0	7,245	112,341
ROW avoidance in non-habitat	30,403	20,485	0	20,485	20,485
Wind and Solar ROW exclusion areas	n/a	0	0	0	233,219
ROW exclusion areas in PHMA	n/a	0	0	0	233,219
ROW exclusion areas in GHMA	n/a	0	0	0	0
Wind and Solar ROW avoidance areas GHMA	n/a	0	0	0	112,341
Coal[1]					
Unsuitable for surface mining (acres)	0	284,975	464,178	0	0
Unsuitable in PHMA	n/a	284,975	284,975	0	0
Unsuitable in GHMA	n/a	0	179,202	0	0

[1]Coal development is not addressed in the Judith Resource Area RMP/ROD (BLM 1994) because: there has been no federal coal mining in the last 70 years, there are no existing federal coal leases in the planning area, and no expression of interest for leasing or exchange have been identified; therefore, no acreage calculations will be created for the amendment.

Table 2-4
Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives

Resources/Resource Uses	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Fluid Mineral Leasing					
Existing fluid mineral leases (acres)					
BLM surface/federal minerals	55,880	55,880	55,880	55,880	24,424
Private, state, or other surface/federal minerals	37,926	37,926	37,926	37,926	18,993
Locatable Minerals, Salables and Non-Energy Solid Leasable Minerals					
BLM Surface/Federal Minerals (acres)					
Withdrawn from Locatable Mineral Entry	4,298	4,298	4,298	4,298	4,298
Withdrawn from locatable mineral entry in PHMA	n/a	101	101	101	101
Withdrawn from locatable mineral entry in GHMA	n/a	2,585	2,585	2,585	2,585
Recommend for withdrawal from locatable mineral entry	0	233,219	345,560	0	53,440
Recommend for withdrawal from locatable mineral entry in PHMA	0	233,219	233,219	0	53,440
Recommend for withdrawal from locatable mineral entry in GHMA	0	0	112,341	0	0
Closed to salable mineral disposal	2,858	235,897	345,790	2,858	235,897
Closed to salable mineral disposal in PHMA[2]	n/a	233,219	233,219	2,437	233,138
Closed to salable mineral disposal in GHMA	n/a	2,437	112,341	101	2,437

[2]All acres would remain open to free use permits and expansion of existing pits except the 2,858 acres closed under all alternatives.

Table 2-4
Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives

Resources/Resource Uses	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Closed to nonenergy leasable mineral exploration or development	2,858	235,897	345,790	2,858	235,897
Closed to nonenergy leasable mineral exploration or development in PHMA	n/a	233,219	233,219	98	233,219
Closed to nonenergy leasable mineral exploration or development in GHMA	n/a	2,437	112,341	2,437	2,437
Private, State, or Other Surface/Federal Minerals					
Withdrawn from Locatable Mineral Entry (acres)	92,804	92,804	92,804	92,804	92,804
Withdrawn from locatable mineral entry in PHMA	n/a	1,105	1,105	1,105	1,105
Withdrawn from locatable mineral entry in GHMA	n/a	2,179	2,179	2,179	2,179
Recommend for withdrawal from locatable mineral entry (acres)	0	48,762	112,306	0	331
Recommend for withdrawal from locatable mineral entry in PHMA	n/a	48,762	48,762	0	331
Recommend for withdrawal from locatable mineral entry in GHMA	n/a	0	63,544	0	0

Table 2-4
Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives

Resources/Resource Uses	Alternative A (No Action)	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Closed to salable mineral disposal	0	48,762	112,306	0	48,762
Closed to salable mineral disposal in PHMA[3]	n/a	48,762	48,762	0	48,762
Closed to salable mineral disposal in GHMA	n/a	0	63,544	0	0
Closed to nonenergy leasable mineral exploration or development (acres)	0	48,762	112,306	0	48,762
Closed to nonenergy leasable mineral exploration or development in PHMA	n/a	48,762	48,762	0	48,762
Closed to nonenergy leasable mineral exploration or development in GHMA	n/a	0	63,544	0	0
Areas of Critical Environmental Concern					
ACEC to protect GRSG (acres)	0	0	98,091	0	0
ACEC to protect GRSG in PHMA	n/a	0	98,091	0	0
ACEC to protect GRSG in GHMA	n/a	0	0	0	0

[3]All acres would remain open to free use permits and expansion of existing pits except the 2,538 acres closed under all alternatives.

2.10 DETAILED DESCRIPTION OF DRAFT ALTERNATIVES

2.10.1 How to Read Table 2-5

The following describes how **Table 2-5**, below, is written and formatted to show the land use plan decisions proposed for each alternative.

In accordance with Appendix C of the BLM's Land Use Planning Handbook (H-1601-1), land use plan and plan amendment decisions are broad-scale decisions that guide future land management actions and subsequent site-specific implementation decisions (BLM 2005a). Land use plan decisions fall into two categories, which establish the base structure for desired outcomes (goals and objectives), and allowable uses and actions to achieve outcomes.

- Goals are broad statements of desired outcomes that usually are not quantifiable.
- Objectives identify specific desired outcomes for resources. They may be quantifiable and measurable and may have established timeframes for achievement, as appropriate.
- Allowable uses identify allocations that are allowable, restricted, or prohibited on BLM-administered lands and mineral estate.
- Actions identify measures or criteria to achieve desired objectives, including actions to maintain, restore, or improve land health.

Stipulations are also applied to surface-disturbing activities to achieve desired outcomes (i.e., objectives).

In general, only those resources and resource uses that have been identified as planning issues have notable differences between the alternatives.

Actions that are applicable to all alternatives are shown in one cell across a row. These particular objectives and actions would be implemented regardless of which alternative is ultimately selected.

Actions that are applicable to more than one but not all alternatives are indicated by either combining cells for the same alternatives, or by denoting those objectives or actions as the "same as Alternative A," for example.

In some cells, "No Similar Action" is used to indicate that there is no similar goal, objective or action to the other alternatives, or that the similar goal, objective or action is reflected in another management action in the alternative.

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Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
GOAL: Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners.			
Objective: No similar objective.	Objective: • Protect PHMA from anthropogenic (human-caused) disturbances that would reduce distribution or abundance of GRSG – Manage or restore priority areas so that at least 70% of the land cover provides adequate sagebrush habitat to meet GRSG needs – Manage PHMA so that discrete anthropogenic disturbances cover less than 3% of the total GRSG habitat	Objective: • Protect PHMA and GHMA from anthropogenic disturbances that would reduce distribution or abundance of GRSG	Objective: • Protect PHMA from anthropogenic disturbances that would reduce distribution or abundance of GRSG.
Habitat Delineation: No similar delineation.	Habitat Delineation: Delineate PHMA to encompass the 75% breeding bird density map: 233,219 BLM surface acres (19% of total PHMA acres). See **Figure 1-1 (Appendix A).**		
Habitat Delineation: No similar delineation.	Habitat Delineation: Delineate GHMA to encompass the remainder of the habitat presented in the 100% breeding bird density map: 112,341 BLM surface acres (11% of total GHMA acres). See **Figure 1-1 (Appendix A).**		
ALTERNATIVES DIRECTION/MANAGEMENT ACTIONS			
Travel and Transportation Management			
Action: BLM-administered lands are designated limited yearlong for motorized wheeled vehicles (motorized wheeled cross-country travel is restricted to existing roads and trails) (BLM 2003b).	Action: In PHMA, limit motorized travel to existing roads, primitive roads, and trails, at a minimum, until such time as travel management planning is complete and routes are either designated or closed.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative A; in addition, implement a CTTM plan to designate roads and trails (when travel management plan is complete). Administrative off-road use for BLM personnel and BLM authorized activities would be allowed. BLM-implemented CTTM would not apply to private or other state or federal lands within the LFO.
Action: No similar action.		Action: Prohibit new road construction within 4 miles of active GRSG leks, and avoid new road construction in PHMA and GHMA.	Action: On completion of site-specific projects, roads used for commercial or administrative access on BLM-administered lands would be reclaimed, unless the route would provide specific benefits for public access, would minimize impacts on the resources, and would be considered on a case-by-case basis. Action: The BLM may close or restore unauthorized, user created roads and trails to prevent resource damage, including impacts on GRSG.
Action: The BLM would minimize or prevent road and trail development on crucial big game and upland bird habitat areas (BLM 1994). Action: BLM regulations (43 CFR, Parts 8341.2 and 8364.1) allow for area, road, or trail closures where off-road vehicles are causing or would cause considerable adverse effects on wildlife and its habitat (BLM 2003b).	Action: In PHMA, travel management should evaluate the need for permanent or seasonal road or area closures.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: During route designation and travel planning in PHMA, travel management would evaluate the need for permanent or seasonal road or area closures where vehicle use is causing or would cause considerable adverse effects on habitat.
Action: Through site-specific planning, the BLM would designate roads and trails for motorized use. Roads and trails would be inventoried, mapped, and analyzed to the degree necessary to evaluate and designate the roads and trails as open, seasonally open, or closed (BLM 2003b).	Action: In PHMA, complete activity level travel plans within 5 years of the ROD. During activity level planning, and where appropriate, designate routes in PHMA with current administrative/agency purpose or need for administrative access only.	Action: Same as Alternative B except applies to both PHMA and GHMA.	Action: Same as Alternative A. All CTTM planning should be completed within 5 years of the signing of the ROD. The CTTM planning would be conducted using an interdisciplinary team approach to address all resource uses, including administrative, recreation, commercial, and associated modes of travel (motorized, mechanized, and nonmotorized types; BLM – *Travel and Transportation Handbook* [H-8342]).

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Action: No similar action.	Action: In PHMA, limit route construction to realignments of existing designated routes if that realignment has a minimal impact on GRSG habitat, if it eliminates the need to construct a new road, or if it is necessary for motorist safety.	Action: In PHMA and GHMA, limit route construction to realignments of existing designated routes if that realignment would have a minimal impact on GRSG habitat, if it would eliminate the need to construct a new road, or if it is necessary for motorist safety. Mitigate any impacts with methods that have been demonstrated to be effective to offset the loss of GRSG habitat.	Action: In PHMA, during site-specific travel and transportation management planning, limit route construction to realignment of existing routes if that realignment has a minimal impact on GRSG habitat, if it eliminates the need to construct a new road, or if it is necessary for motorist safety.
Action: No similar action.	Action: In PHMA, use existing roads, or realignments, as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road to the absolute minimum standard necessary and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3% for that area, then evaluate and implement additional effective mitigation to offset the resulting loss of GRSG habitat (see Alternative B Objectives).	Action: Same as Alternative B, using a 4-mile buffer from leks to determine road route.	Action: In PHMA, during site-specific travel and transportation management planning, use existing roads or realignments, as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road to the absolute minimum standard necessary.
Action: No similar action.	Action: In PHMA, allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless the upgrading would have minimal impact on GRSG habitat, if it is necessary for motorist safety, or if it eliminates the need to construct a new road.	Action: In PHMA and GHMA, allow no upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity unless it is necessary for motorist safety, or eliminates the need to construct a new road. Any impacts shall be mitigated with methods that have been demonstrated to be effective to offset the loss of GRSG habitat.	Action: In PHMA, during site-specific travel and transportation management planning, the upgrading of existing routes that would change route category (road, primitive road, or trail) or capacity may be allowed when there are minimal impacts on GRSG and GRSG habitat, if it is necessary for motorist safety, or if it eliminates the need to construct a new road. All upgrades to existing routes would be evaluated on a case-by-case basis and would be subject to valid existing rights (e.g., existing ROWs or easements).
Action: No similar action.	Action: In PHMA, restore roads, primitive roads, and trails not designated in travel management plans. This also includes primitive routes/roads that were not designated in WSAs that have been selected for protection in previous RMPs.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B, when travel plans are complete (these will not be complete prior to this RMPA decision).
Action: No similar action.	Action: When reseeding roads, primitive roads, and trails in PHMA, use appropriate seed mixes and consider the use of transplanted sagebrush.	Action: When reseeding closed roads, primitive roads, and trails in PHMA and GHMA, use appropriate native seed mixes and require the use of transplanted sagebrush.	Action: Same as Alternative B.
Recreation			
Action: No similar action.	Action: Allow SRPs only in PHMA that have neutral or beneficial effects on PHMA.	Action: Same as Alternative A.	Action: SRPs in PHMA may be allowed if they are neutral or beneficial for GRSG habitat.
Lands and Realty			
Rights-of-Way			
Action: ROWs outside of avoidance areas and WSAs would be considered on a case-by-case basis, with appropriate stipulations from BLM Handbook H-2801-1 incorporated into the ROW grant (BLM 1994, page 27). Action: Public land within identified exclusion areas would not be available for utility and transportation corridor development (BLM 1984, page 15). Action: There are no ROW exclusion areas within the Judith Resource Area RMP for GRSG. There are two ROW avoidance areas in the decision area (30,193 acres) (Acid Shale Pine Forest ACEC and Judith River Canyon). See **Figure 2-9**, Rights-of-Way Avoidance Areas - Alternative A (**Appendix A**).	Action: Make PHMA exclusion areas for new ROWs (233,219 acres). Consider the following exceptions: • Within designated ROW corridors encumbered by existing ROW authorizations: new ROWs may be collocated only if the entire footprint of the proposed project (including construction and staging) can be completed within the existing disturbance associated with the authorized ROWs. • Subject to valid existing rights, where new ROWs associated with valid existing rights are required, collocate new ROWs within existing ROWs or where it best minimizes GRSG impacts. Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights	Action: PHMA and GHMA areas shall be exclusion areas for new ROW (345,560 acres). Consider the following exceptions: • Within designated ROW corridors encumbered by existing ROW authorizations, new ROWs may be collocated only if the entire footprint of the proposed project (including construction and staging) can be completed within the existing disturbance associated with the authorized ROWs. • Subject to valid existing rights, where new ROWs associated with valid existing rights are required, collocate new ROWs within existing ROWs or where it best minimizes GRSG impacts. Use existing roads, or realignments as described above, to access valid existing rights that are not yet developed. If valid existing rights	Action: PHMA would be managed as ROW avoidance areas (233,219 acres). • Where new ROWs are required, collocate new ROWs within existing ROWs or where it best minimizes impacts on GRSG and GRSG habitat. Action: PHMA and GHMA would be managed as a wind energy ROW avoidance area (345,560 acres). See **Figure 2-12**, Rights-of-Way Avoidance Areas - Alternative D (**Appendix A**).

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
	cannot be accessed via existing roads, then build any new road to the absolute minimum standard necessary and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3% for that area, then evaluate and implement additional effective mitigation on a case-by-case basis to offset the resulting loss of GRSG habitat. See **Figure 2-10**, Rights-of-Way Avoidance and Exclusion Areas - Alternative B (**Appendix A**).	cannot be accessed via existing roads, then build any new road to the absolute minimum standard necessary and add the surface disturbance to the total disturbance in the priority area. If that disturbance exceeds 3% for that area, then make additional mitigation that has been demonstrated to be effective to offset the resulting loss of GRSG habitat. See **Figure 2-11**, Rights-of-Way Exclusion Areas - Alternative C (**Appendix A**).	
Action: No similar action.	Action: Make GHMA avoidance areas for new ROWs (112,341 acres). See **Figure 2-10** (**Appendix A**).	Action: PHMA and GHMA areas would be exclusion areas for new ROW authorizations (345,560 acres). Consider the exceptions listed above. See **Figure 2-11** (**Appendix A**).	Action: ROWs would be allowed in GHMA, with appropriate mitigation and conservation measures identified within the terms of the authorization to minimize surface-disturbing and disruptive activities. Action: GHMA would be managed as a wind energy ROW avoidance area (112,341 acres). See **Figure 2-13**, Rights-of-Way Wind Energy Avoidance Areas - Alternative D (**Appendix A**).
Action: No similar action.	Action: In PHMA, evaluate and take advantage of opportunities to remove, bury, or modify existing power lines within PHMA.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: When addressing ROW authorizations in PHMA identify and evaluate opportunities to remove, bury, or modify power lines within PHMA. Financial and technical feasibility would be evaluated during the environmental analysis process.
Action: Current FLMPA ROWs have a stipulation that when the use has been discontinued or abandoned, the site must be reclaimed and restored by the grant holder (43 CFR, Part 2807.19).	Action: In PHMA, where existing leases or ROWs have had some level of development (such as roads, fences, or wells) and are no longer in use, reclaim the site by removing these features and restoring the habitat.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Current FLPMA ROWs have a stipulation that when the use has been discontinued or abandoned, the site must be reclaimed and restored by the grant holder (43 CFR, Part 2807.19). Action: Many pre-FLPMA grant authorizations are for water, or electricity, to large areas and most of these grants are perpetual or non-expiring. If an amendment is needed the grant would be renewed/reauthorized under current authority with additional stipulations and/or mitigation requirements. If the pre-FLPMA authorizations are no longer needed, grantees would be required to reclaim sites by removing features/fixtures and restoring habitat. Grant authorizations under the Mineral Leasing Act would be renewed if they are still being used for their original purposes.
Action: Currently have policy to collocate ROWs, when possible.	Action: Where new ROWs are necessary in GHMA, collocate new ROWs within existing ROWs, where possible.	Action: No similar action.	Action: Same as Alternative B.
Action: No similar action.		Action: ROWs would be amended to require features that enhance GRSG habitat security in PHMA and GHMA. Action: Existing corridors in ACECs may be accessed for maintenance.	Action: No similar action.
Action: Leases/permits (other than cabin site leasing) would be considered on a case-by-case basis (BLM 1994, page 30).	Action: No similar action.		Actions: Leases and permits (other than for cabin site leasing), which may be for agricultural, occupancy, and film production, would be considered on a case-by-case basis; however, PHMA would be ROW avoidance areas. Leases and permits would be allowed in GHMA with appropriate mitigation and conservation measures identified within the terms of the authorization to minimize surface-disturbing and disruptive activities.

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Action: The holder of a ROW shall be responsible for weed control on disturbed areas within the limits of the ROW. The holder shall be responsible for invasive weed control for the life of the ROW. ROW holder is responsible for weed control and monitoring for 3 years after reclamation has been completed. The holder would be responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods.	Action: No similar action.		Action: Same as Alternative A.
Action: No utility corridors have been designated within the planning area. If high voltage transmission and/or major pipeline or other major ROWs are applied for a separate plan amendment would be required.			
Land Tenure Adjustment			
Action: Land tenure adjustments in Judith Resource Area planning area would be subject to disposal/acquisition criteria identified (BLM 1994). Action: Land tenure adjustments in the Headwaters planning area would be subject to disposal/acquisition criteria identified (BLM 1984, page 20). Action: Retain important wildlife habitat (one of the three main criteria for land tenure adjustments outlined in the Judith Resource Area RMP) (BLM 1994). Action: Headwaters RMP land ownership adjustment criteria include nesting/breeding habitat for game animals (BLM 1984, page 20).	Action: Retain public ownership of PHMA. Consider exceptions where: • There is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within PHMA. • Under PHMA with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land. As a final preservation measure, consideration should be given to pursuing a permanent conservation easement.	Action: Same as Alternative B, without exceptions for disposal to consolidate ownership that would be beneficial to GRSG (and applies to PHMA and GHMA).	Action: PHMA would be retained in public ownership, except when opportunities for land exchange would provide a greater benefit to GRSG habitat.
Action: Land exchanges, sales or other methods of acquisition (BLM 1994). Action: There are no BLM-administered lands identified for disposal by sale within the planning area (BLM 1994, page 30). Action: Sale is the preferred method of disposal when exchange is not feasible (BLM 1984, page 21).	Action: Where suitable conservation actions cannot be achieved in PHMA, seek to acquire state and private lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance, or restore GRSG habitat.	Action: The BLM would strive to acquire important private lands in ACECs. Acquisition would be prioritized over easements.	Action: When offered, PHMA would be a priority in consideration of land acquisitions (refer to **Appendix H**. Consider GRSG for all land tenure actions.
Recommend Land Withdrawals			
Action: There are current withdrawals from minerals on BLM surface (4,298 acres in the planning area and 2,868 in decision area).	Action: Recommend lands within PHMA for mineral withdrawal (233,219 acres).	Action: Same as Alternative B, except applies to PHMA and GHMA (345,468 acres).	Action: Same as Alternative A.
Action: No similar action.	Action: In PHMA, do not recommend withdrawal proposals not associated with mineral activity unless the land management is consistent with GRSG conservation measures. (For example, in a proposed withdrawal for a military training range buffer area, manage the buffer area with GRSG conservation measures.)	Action: In PHMA and GHMA, do not approve withdrawal proposals not associated with mineral activity unless the land management is consistent with GRSG conservation measures. (For example, in a proposed withdrawal for a military training range buffer area, manage the buffer area with GRSG conservation measures that have been demonstrated to be effective.)	Action: Same as Alternative B.
Range Management			
Action: Livestock grazing would continue to be managed through development and monitoring of AMPs or similar grazing plans and supervision of grazing use. AMPs would be developed and maintained to achieve multiple-use objectives, in accordance with the Missouri Breaks Grazing EIS as	Action: Within PHMA, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through AMPs or permit renewals. See **Figure 2-15**, Areas Opened and Closed Grazing Allotments Alternatives B and D (**Appendix A**).	Action: Same as Alternative B, except applies to both PHMA and GHMA. See **Figure 2-16**, Areas Opened and Closed Grazing Allotments Alternative C (**Appendix A**).	Action: GRSG habitat objectives would be considered when evaluating an allotment's conformance with land health standards (**Appendix F**) prior to renewing a grazing authorization.

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
modified by the proposed Judith Resource Area RMP/Final EIS. Methods and guidelines from these EISs would be followed to maintain or improve ecological condition, to enhance vegetation production, to maintain and enhance wildlife habitat, to protect watersheds, to reduce bare ground to the target soil vegetation cover by soil subgroups, and to minimize livestock/recreation conflicts. AMPs would implement some form of grazing method (for example, rest rotation, deferred rotation, seasonal, or other methods). Livestock grazing management methods would be implemented prior to land treatments (BLM 1984 and 1994). See **Figure 2-14**, Grazing Allotments Alternative A (**Appendix A**).			Action: In PHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing based on an evaluation that considers the GRSG habitat objectives. **Appendix B** addresses mid-scale monitoring. State objectives would be used for fine scale analysis unless local objectives are developed at the field office level, in partnership with MFWP and USFWS. See **Figure 2-15** (**Appendix A**).
Action: Livestock grazing would be allowed on all areas not specifically closed to grazing (570,112 acres would be open to grazing and 103,806 AUMS available). See **Figure 2-14** (**Appendix A**).	Action: Livestock grazing would be allowed on all areas not specifically closed to grazing (570,112 acres would be open to grazing and 103,806 AUMS available). See **Figure 2-15** (**Appendix A**).	Action: Livestock grazing would be removed on all grazing allotments within PHMA and GHMA (337,165 acres and 69, 408 AUMs; 232,947 acres would remain open to grazing and there would be 34,398 AUMs available). See **Figure 2-16** (**Appendix A**).	Action: Same as Alternative B.
Action: No similar action. *NOTE: This is currently being done on an allotment-specific basis over watershed areas.*	Action: In PHMA, cooperate on integrated ranch planning within GRSG habitat so operations with deeded/BLM allotments can be planned as single units.	Action: No similar action.	Action: In PHMA, cooperate with ranchers and other agencies on integrated ranch planning so operations with intermingled land ownerships within BLM allotments can be planned as single units.
Action: Areas with Category I allotments are the highest priority for processing authorizations, managing uses, and monitoring achievement of land health standards (BLM IM 2009-018, Process for Setting Priorities for Issuing Grazing Permits and Leases).	Action: Prioritize completion of land health assessments and processing grazing permits within PHMA. Focus this process on allotments that have the best opportunities for conserving, enhancing or restoring habitat for GRSG. Utilize BLM ecological site descriptions to conduct land health assessments to determine if standards of range-land health are being met.	Action: No similar action.	Action: Land health assessments and grazing permit renewals would be completed as they expire within watershed areas. Watershed areas in PHMA that contain expired or expiring grazing authorizations would be prioritized for renewal. Action: Allotments that have the best opportunities for conserving, enhancing, or restoring habitat for GRSG would receive high priority for monitoring, evaluation, and management. ESDs, riparian PFC protocols, water quality data, and various types of appropriate vegetative, riparian, habitat, and any other applicable data would continue to be used as the basis in allotment evaluations to determine conformance to Standards for Land Health and Guidelines for Livestock Grazing Management (**Appendix F**).
Action: Site-specific ground cover objectives would be incorporated to supplement and support range condition objectives. Ground cover objectives would be consistent with the site potential by soil series or ecological site. Grazing management methods, water developments, land treatments and other practices would be designed to meet ground cover objectives. Monitoring and evaluation methods would be applied and management practices would be modified as needed to ensure these objectives are met (BLM 1994).	Action: In PHMA, conduct land health assessments that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives.	Action: No similar action.	Action: In PHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. **Appendix B** addresses mid-scale monitoring. State objectives would be used for fine scale analysis unless local objectives are developed at the field office level, in partnership with MFWP and USFWS.

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Implementing Management Actions after Land Health Evaluations			
Action: Allotments in predominantly fair ecological condition or with fair condition areas due to poor livestock distribution would have grazing methods applied to periodically defer grazing during critical growth periods (BLM 1994).	Action: No similar action.		Action: In PHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed if land health determinations indicate that an allotment is not meeting standards due to livestock grazing. **Appendix B** addresses mid-scale monitoring. State objectives would be used for fine scale analysis unless local objectives are developed at the field office level, in partnership with MFWP and USFWS.
Action: Grazing systems would be implemented. The type of system to be implemented would be based on consideration of the following factors (BLM 1984): • Allotment specific management objectives • Resource characteristics, including vegetation potential and water availability • Operator needs • Implementation costs	Action: In the NEPA document prepared for the permit renewal, develop specific objectives to conserve, enhance, or restore PHMA, based on ESDs and assessments (including within wetlands and riparian areas). If an effective grazing system that meets GRSG habitat requirements is not already in place, analyze at least one alternative that conserves, restores, or enhances GRSG habitat in the NEPA document prepared for the permit renewal.	Action: No similar action.	Action: Conserve, enhance, or restore PHMA based on ESDs (including wetlands and riparian areas). If an effective grazing system that meets GRSG habitat objectives is not already in place, analyze at least one allotment-specific alternative within the watershed planning/permit renewal process that conserves, restores, or enhances PHMA.
Action: Methods and guidelines from EISs would be followed to maintain or improve ecological condition, to enhance vegetation production, to maintain and enhance wildlife habitat, to protect watersheds, to reduce bare ground to the target soil vegetation cover by soil subgroups, and to minimize livestock/recreation conflicts (BLM 1984 and 1994).	Action: In PHMA, manage for vegetation composition and structure consistent with ecological site potential and within the reference state to achieve GRSG seasonal habitat objectives.	Action: In PHMA and GHMA, manage for vegetation composition and structure consistent with ecological site potential and within the reference state to achieve GRSG habitat objectives.	Action: In PHMA, manage for vegetation composition and structure consistent with ecological site potential within the reference state to achieve GRSG seasonal habitat objectives. Natural ecological processes that impede localized site potential and that create a mosaic of habitat successional patterns would continue to occur.
Action: Livestock use adjustments would be most often made by changing one or more of the following: the kind or class of livestock grazing on an allotment, the season of use, the stocking rate, or the pattern of grazing. Monitoring would be used to measure the changes brought about by new livestock management practices and to evaluate the effectiveness of management changes in meeting stated objectives. Primarily, this would occur on "I "category allotments, which would include priority GRSG habitat (BLM 1984). Action: Allotments in predominantly fair ecological condition or with fair condition areas due to poor livestock distribution would have grazing methods applied to periodically defer grazing during critical growth periods (BLM 1994).	Action: In PHMA, implement management actions (grazing decisions, AMP/conservation plan development, or other agreements) to modify grazing management to meet seasonal GRSG habitat requirements. Consider singly or in combination changes in the following: • Season or timing of use • Numbers of livestock (includes temporary non-use or livestock removal) • Distribution of livestock use • Intensity of use • Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats)	Action: No similar action.	Action: In PHMA, implement management actions within or outside of the watershed planning/permit renewal process to modify grazing management and to meet seasonal GRSG habitat objectives where allotment evaluations indicate land health assessments are not being met due to current livestock grazing management. Consider singly, or in combination, changes in: • Season or timing of use • Numbers of livestock (includes temporary non-use or livestock removal) • Distribution of livestock use • Intensity of use • Type of livestock
Action: Efforts to manage public rangeland under drought conditions would be directed first to allotments with resource concerns such as "I" category allotments. Specific allotments in the "M" and "C" categories could also be considered high priority when resource values or conditions so require. Regardless of the category assigned to an allotment, operators should be aware of the procedures and flexibilities available for dealing with drought condition (**Appendix I**).	Action: During droughts, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Since there is a lag in vegetation recovery following drought, ensure that post-drought management allows for vegetation recovery that meets GRSG needs in PHMA.	Action: No similar action.	Action: During drought periods, prioritize evaluating effects of the drought in PHMA, relative to their needs for food and cover. Drought management would continue to be in accordance with the Montana/Dakotas drought policy (**Appendix I**). Since there is a lag in vegetation recovery following drought, post-drought management would be implemented to allow for vegetation recovery that meets GRSG needs in PHMA. In accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, consultation, cooperation, and coordination with owners or lessees having lands or

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Alternative A (No Action)	Alternative B	Alternative C	Alternative D
			managing resources within the area, the affected cooperative state grazing district, and interested public would be completed prior to adjusting post-drought livestock management if the grazing permit is being modified to make these adjustments. Implementation of adjustments would be initiated through documented agreement or by decision of the authorized officer.
Riparian Areas and Wet Meadows			
Action: Riparian habitat condition would be improved from unsatisfactory to satisfactory on approximately 26 miles of stream bank (BLM 1994). Action: The first objective would be to improve or maintain riparian-wetland areas to PFC (BLM 1994). Action: Riparian and wetland areas are in PFC (Lewistown Standard #2, BLM 1997).	Action: Manage riparian areas and wet meadows for PFC within PHMA. In PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that edge to minimize elevated mortality during the late brood-rearing period.	Action: Manage riparian areas and wet meadows for PFC within PHMA and GHMA. In PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs, with diverse species richness and productivity relative to site potential (e.g., reference state), to facilitate brood rearing. At least 6 inches of stubble height must remain on all riparian/meadow area herbaceous species at all times. Also conserve or enhance these wet meadow complexes to maintain or increase the amount of edge and cover within that edge to minimize elevated deaths during the late brood-rearing period.	Action: Riparian-wetland areas would be managed for PFC within the LFO. In PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes.
Action: The second objective would be to achieve or maintain the desired plant community to provide wildlife habitat, to increase waterfowl habitat by 30%, to improve watershed conditions, and to comply with the nonpoint source water pollution section of the Clean Water Act (BLM 1994).	Action: In PHMA, where riparian areas and wet meadows meet PFC, strive to attain reference state vegetation relative to the ecological site description. For example, within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Use fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in the summer.	Action: Same as Alternative B, except applies to PHMA and GHMA.	Action: Riparian-wetland areas currently achieving PFC would be managed for desired future condition and the desired plant community, based on ecological site potential. Other values to be considered include important wildlife habitat, water quality impaired streams, fisheries, riparian woodland forest, and habitat for currently listed threatened, endangered, and sensitive species. Action: Riparian-wetland areas with altered potential (i.e., those riparian-wetland areas that are incapable of reaching potential because of causes that are outside of the control of the BLM) would be managed for their capability. Action: Human-made water developments, such as reservoirs and stock ponds, can develop riparian-wetland characteristics. Those that have the capability to support important wildlife values (such as GRSG habitats and fisheries) would be managed for such to the extent practical, with greater consideration given to the purpose of the development. When constructing or modifying water developments in PHMA, use RDFs (**Appendix D**) to mitigate potential impacts from West Nile virus.
Action: Riparian habitat needs would be taken into consideration in developing livestock grazing systems and pasture designs. Some of the techniques that can be used to lessen impacts are changing class of stock from cow/calf pairs to herded sheep or yearlings; either eliminating hot season grazing or scheduling hot season grazing for only one year out of every 3; locating salt away from riparian zones; laying out pasture fences so that each pasture has as much riparian habitat as possible; locating fences so that they do not confine or concentrate livestock near the riparian zone;	Action: No similar action.		Action: Within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Use fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in summer. Hot season use of riparian and wet meadow complexes may be authorized where consistent with overall GRSG habitat objectives and where use is currently resulting in vegetative conditions that are in conformance with land health standards.

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Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
developing alternative sources of water to lessen the grazing pressure on the riparian habitat; and as a last resort, excluding livestock completely from riparian habitat by protective fencing (BLM 1984). Action: Grazing methods to be implemented include 1) hot season grazing deferment, 2) creation of separate riparian pastures, 3) changes in kind and class of livestock, 4) time control grazing, and 5) other range management practices, such as development of off-site water, salting, development of shade sources, herding, insect control, or early use pastures. A) All spring developments would be fenced if needed to protect associated riparian vegetation; B) salt and mineral blocks and supplemental feeding would only be allowed at least 0.25 mile or farther from riparian-wetland areas, where possible; C) water developments would be built away from stream riparian-wetland areas where possible; D) study exclosures would be put in place on key areas and areas representative of common riparian-wetland types and types about which there are questions, to compare management progress, to demonstrate the values of proper management, and to confirm potential and recovery rates (BLM 1994).			
Action: No similar action.	Action: Authorize new water development for diversion from spring or seep source only when PHMA would benefit from the development. This includes developing new water sources for livestock as part of an AMP/conservation plan to improve GRSG habitat.	Action: Authorize no new water developments for diversion from spring or seep sources within PHMA and GHMA.	Action: In PHMA, management emphasis would be placed on riparian and wetland potential associated with springs and seeps. Water from other sources would be prioritized to develop grazing management infrastructure. New water development for diversion from spring or seeps would be authorized only when no other sources are available and where such considerations would be neutral or beneficial to GRSG. Action: Human-made water developments, such as reservoirs and stock ponds, can develop riparian-wetland characteristics. Those that have the capability to support important wildlife values (such as GRSG habitats and fisheries) would be managed for such to the extent practical, with greater consideration given to the purpose of the development. When constructing or modifying water developments in PHMA, use RDFs (**Appendix D**) to mitigate potential impacts from West Nile virus.
Action: No similar action.	Action: Analyze springs, seeps, and associated pipelines to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to GRSG.	Action: Analyze springs, seeps, and associated water developments to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA and GHMA. Make modifications where necessary, including dismantling water developments.	Action: Analyze springs, seeps, and associated pipelines during the allotment evaluation and watershed planning process to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA. Make modifications, where necessary, in accordance with Montana water law, considering impacts on other water uses, when such considerations are neutral or beneficial to GRSG.

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Treatments to Increase Forage for Livestock/Wild Ungulates (Hoofed Animals)			
Objective: No similar objective.		Objective: Develop and implement methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants.	Objective: Develop and implement (as budgets and workloads allow) methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants.
Action: No similar action.	Action: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an AMP/conservation plan or if they provide value in conserving or enhancing the rest of the PHMA, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments.	Action: Evaluate the role of existing seedings that are composed of primarily introduced perennial grasses in and adjacent to PHMA and GHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings provide value in conserving or enhancing GRSG habitats, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat during the land health assessments.	Action: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of a grazing management plan that is providing value in conserving or enhancing native rangelands in PHMA and other priority wildlife habitats, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health evaluation and determination process.
Action: Integrated vegetation management would be used to control, suppress, and eradicate, where possible, noxious and invasive species, in accordance with Chapter 6, sections II and III of BLM Handbook H-1740-2.			
Action: Noxious weed control on affected grazing allotments would be implemented through Weed Control Cooperative Range Improvement Project Agreements.	Action: No similar action.		Action: Noxious weed control on affected grazing allotments would be implemented through Weed Control Cooperative Range Improvement Project Agreements.
Structural Range Improvements and Livestock Management Tools			
Action: Range improvements generally would be designed to achieve both wildlife and range objectives. Existing fences may be modified and new fences would be built so as to allow wildlife passage (BLM 1984).	Action: In PHMA, design any new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG habitat objectives. Structural range improvements, in this context, include cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including movable tanks used in livestock water hauling); windmills, ponds/reservoirs, solar panels; and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.	Action: No similar action.	Action: In PHMA, site and design any new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore said habitat through an improved grazing management system relative to GRSG habitat objectives. Structural range improvements, in this context, include cattle guards, fences, exclosures, corrals, or other livestock handling structures; pipelines, troughs, storage tanks (including movable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels, and spring developments. Action: Potential for invasive species establishment or increase following construction would be considered in the project planning process and monitored and treated post-construction. Projects would be designed to the extent practical to reduce or eliminate the establishment of new two-track roads and trails that may be created during construction and maintenance.
Action: No similar action.	Action: When developing or modifying water developments in PHMA, use applicable RDFs (**Appendix C**) to mitigate potential impacts from West Nile virus.	Action: Same as Alternative B, except applies to both PHMA and GHMA (**Appendix C**).	Action: Same as Alternative B (**Appendix D**).
Action: No similar action.	Action: In PHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) to make sure they conserve, enhance, or restore GRSG habitat. • To reduce outright GRSG strikes and deaths, remove, modify, or mark fences in high risk areas within PHMA, based on proximity to lek, lek size, and topography. • In PHMA, monitor for and treat invasive species associated with existing range improvements.	Action: In PHMA and GHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) to make sure they conserve, enhance, or restore GRSG habitat. • Remove, modify, or mark fences in areas of moderate or high risk of GRSG strikes within GRSG habitat, based on proximity to lek, lek size, and topography (Christiansen 2009; Stevens 2011). • In PHMA, monitor for and treat invasive species associated with existing range improvements.	Action: During the allotment evaluation and watershed planning process (typically every 10 years), examine existing structural range improvements and location of supplements (salt or protein blocks) to ensure they conserve, enhance or restore PHMA. • Identify and mark fences in high risk areas within PHMA, based on proximity to lek, lek size, and topography. During the allotment evaluation and watershed planning process, examine existing structural range improvements to ensure they conserve, enhance, or restore PHMA.

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Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
			• In PHMA and GHMA, monitor for and treat invasive species associated with existing range improvements.
Action: A minimum rest period from livestock grazing of 2 growing seasons would be required after any major vegetative disturbance. More rest may be required, depending on the situation. Major disturbances are defined as mechanical manipulation of the range, such as chiseling and seeding. Requirements for rest following fire (wild or prescribed) would depend on a variety of factors including the type of fuel, time of burn, accessibility of the burned area to livestock, and climatic factors post-burn. Specific timing and the type of rest would be determined at the site specific environmental assessment phase (BLM 1994).	Action: No similar action.		Action: In PHMA and GHMA, site-specific requirements for resting or deferring areas from livestock grazing following fire would depend on a variety of factors, including resource objectives, the type of fuel, time and intensity of burn, accessibility of the burned area to livestock and post-burn climactic factors.
Retirement of Grazing Privileges			
Action: No similar action.	Action: Maintain retirement of permitted grazing uses as an option in PHMA when the current permittee is willing to retire grazing on all or part of an allotment. Analyze the adverse impacts of no livestock use on wildfire and invasive species threats (Crawford et al. 2004) in evaluating retirement proposals.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: In PHMA, when a current grazing permittee/lessee is willing to relinquish grazing preference on all or part of an allotment, the associated authorized use would become vacated from the base property. Where allotments are not meeting standards for rangeland health due to current livestock, reductions of authorized use, temporary closures of allotments and modifications of terms and conditions would be implemented as appropriate. If upon reevaluation of land health standards it is determined that they are still not met, consider making grazing preference unavailable through the land use planning process. Any unavailability of grazing preference, in full or in part would be documented through the land use planning process after consultation, cooperation and coordination with owners or lessees having lands or managing resources within the allotment area, the affected cooperative state grazing district and interested public. Analyze the adverse impacts of no livestock use on wildfire, invasive species threats and socio-economics in evaluating retirement proposals.
Fluid Minerals			
Leased Federal Fluid Mineral Estate			
Action: No similar action.	Action: Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA. Allow only geophysical operations by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and other restrictions that may apply.	Action: Allow geophysical exploration within PHMA and GHMA areas to obtain exploratory information for areas outside of and adjacent to GRSG habitat areas. Allow only geophysical operations by helicopter-portable drilling methods and in accordance with seasonal timing restrictions or other restrictions that may apply. Geophysical exploration would be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing, and winter habitats during GRSG season of use. Action: No new geophysical exploration permits would be issued.	Action: Same as Alternative B.
Action: No similar action in the RMP. Standard stipulations (see **Appendix J**) would apply existing leases.	Action: In PHMA, apply the following 9 conservation measures through RMP implementation decisions (e.g., approval of an APD and Sundry Notice) and on completion of the environmental	Action: In PHMA and GHMA, apply the following conservation measures as COAs at the project and well permitting stages, and through RMP implementation decisions and on completion	Action: During implementation level review and decisions, (e.g., approval of an APD or Sundry Notice) and on completion of the environmental record of review (43 CFR,

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Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Follow standards and guidelines found in *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (The Gold Book 2007). *NOTE: COA means a site-specific requirement included in an approved APD or Sundry Notice that may limit or amend the specific actions proposed by the operator. COAs minimize, mitigate, or prevent impacts on BLM-administered lands or other resources. BMPs may be incorporated as a COA (Source – Onshore Oil and Gas Order Number 1, II. Definitions).*	record of review (43 CFR, Part 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things: • Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights and • Whether the action is in conformance with the approved RMP Provide the following 9 conservation measures as terms and conditions of the approved RMP: 1) Do not allow new surface occupancy on federal leases within PHMA; this includes winter concentration areas during any time of the year. Consider an exception: • If the lease is entirely within PHMA, apply a 4-mile NSO stipulation around the lek and limit permitted disturbances to one per section, with no more than 3% surface disturbance in that section. • If the entire lease is within the 4-mile lek perimeter, limit permitted disturbances to one per section, with no more than 3% surface disturbances in that section. Require any development to be placed at the most distal part of the lease from the lek, or, depending on topography and other habitat aspects, in an area that is less demonstrably harmful to GRSG. 2) Apply a seasonal restriction on exploratory drilling that prohibits surface-disturbing activities during the nesting and early brood-rearing season in all PHMA during this period. 3) The BLM would closely examine the applicability of categorical exclusions in PHMA. If extraordinary circumstances review is applicable, the BLM should determine whether those circumstances exist. 4) Complete master development plans in lieu of application for APD-by-APD processing for all but wildcat wells. 5) When permitting APDs on existing leases that are not yet developed, the proposed surface disturbance cannot exceed 3% for that area. Consider an exception if: • Additional, effective mitigation is demonstrated to offset the resulting loss of GRSG (see Alternative B Objectives). a. When necessary, conduct additional effective mitigation in PHMA or, less preferably, in GHMA (depending on the area-specific ability to increase GRSG populations). b. Conduct additional effective mitigation first within the same population area where the impact is realized; if not possible, conduct mitigation within the same management zone as the impact, in accordance with 2006 WAFWA Strategy (page 2-17). 6) Require unitization when deemed necessary for proper	of the environmental record of review (43 CFR, Part 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things: • Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights and • Whether the action is in conformance with the approved RMP Provide the following 9 conservation measures as terms and conditions of the approved RMP: 1) Do not allow new surface occupancy on federal leases within PHMA and GHMA; this includes winter concentration areas during any time of the year. Consider an exception: • If the lease is entirely within PHMA, apply a 4-mile NSO around the lek and limit permitted disturbances to one per section, with no more than 3% surface disturbance in that section. • If the entire lease is within the 4-mile lek perimeter, limit permitted disturbances to one per section, with no more than 3% surface disturbances in that section. Require any development to be placed at the most distal part of the lease from the lek or, depending on topography and other habitat aspects, in an area that is less demonstrably harmful to GRSG. 2) Apply a seasonal restriction on exploratory drilling that prohibits surface-disturbing activities during the nesting and brood-rearing season in all PHMA during this period. This seasonal restriction shall also apply to related activities that are disruptive to GRSG, including vehicle traffic and other human presence. 3) The BLM should closely examine the applicability of categorical exclusions in PHMA. If extraordinary circumstances review is applicable, the BLM should determine whether those circumstances exist. 4) Complete master development plans in lieu of APD-by-APD processing for all but wildcat wells. 5) When permitting APDs on existing leases that are not yet developed, the proposed surface disturbance cannot exceed 3% per section for that area. Consider an exception if: • Additional, effective mitigation is demonstrated to offset the resulting loss of GRSG (see Alternative C Objectives). a. When necessary, conduct additional effective mitigation in PHMA or, less preferably, GHMA (depending on the area-specific ability to increase GRSG populations) b. Conduct additional effective mitigation first	Part 3162.5), include appropriate documentation of compliance with NEPA. In this process evaluate, among other things: • Whether the conservation measure is reasonable (43 CFR, Part 3101.1-2) with the valid existing rights and • Whether the action is in conformance with the approved RMP The following operating constraints would be applied to existing leases as COAs in PHMA and GHMA. Exceptions may be granted by the authorized officer if an environmental review demonstrates that effects could be mitigated to an acceptable level, if habitat for the species is not present in the area, or if portions of the area can be occupied without affecting GRSG. Exceptions may also be granted where the short-term effects on GRSG within PHMA and GHMA are mitigated by the long-term benefits. The BLM may add additional site-specific restrictions as deemed necessary by further environmental analysis and as developed through coordination with other federal, state, and local regulatory and resource agencies. 1) Surface-disturbing/disruptive activities would avoid or minimize disturbance to GRSG or their habitat. Except as identified above or during emergency situations, activities would not compromise the functionality of the habitat. 2) Continuous noise (related to long-term operations or activities) would be no greater than 32 decibels at the perimeter of the lek and important seasonal habitats. 3) Temporary noise (related to, for example, installation, maintenance, one-time use, and emergency operations) exceeding 32 decibels at the perimeter of a lek or surface disturbing/disruptive activities may be allowed, but only from 9 a.m. to 6 p.m., between March 15 and June 30. 4) Manage water developments to reduce the spread of West Nile virus within GRSG habitat areas. 5) Site or minimize linear ROW to reduce disturbance to sagebrush habitats. 6) Maximize placement of new utility developments (such as power lines and pipelines) and transportation routes in existing utility or transportation corridors. 7) Power lines would be buried, eliminated, designed, or sited in a manner that does not impact GRSG. 8) Placement of other high profile structures, exceeding 10 feet in height, would be eliminated, designed, or sited in a manner that does not impact GRSG. 9) Production facilities must be remotely monitored, and all permit applications must contain a plan to reduce the frequency of vehicle use. 10) Maximize the area of interim reclamation on long-term

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Alternative A (No Action)	Alternative B	Alternative C	Alternative D
	development and operation of an area (with strong oversight and monitoring) to minimize adverse impacts on GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6. 7) Identify areas where acquisitions (including subsurface mineral rights) or conservation easements would benefit GRSG habitat. 8) For future actions, require a full reclamation bond specific to the site, in accordance with 43 CFR, Parts 3104.2, 3104.3, and 3104.5. Ensure that bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to their condition prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM would perform the work. 9) Make applicable RDFs (**Appendix C**) mandatory as COAs within PHMA. RDFs provided in **Appendix C** would be site-specific restrictions applied to permits to drill as COAs after the completion of site-specific NEPA analysis. Standard stipulations (see **Appendix J**) would apply existing leases.	within the same population area where the impact is realized, and, if not possible, then conduct mitigation within the same management zone as the impact, in accordance with 2006 WAFWA Strategy, page 2-17. 6) Require unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring) to minimize adverse impacts on GRSG, according to the Federal Lease Form, 3100-11, Sections 4 and 6. 7) Identify areas where acquisitions (including subsurface mineral rights) or conservation easements would benefit GRSG habitat. 8) For future actions, require a full reclamation bond specific to the site, in accordance with 43 CFR, Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to their condition prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM would perform the work. 9) Make applicable RDFs (**Appendix C**) mandatory as COAs within PHMA and GHMA. RDFs provided in **Appendix C** would be site-specific restrictions applied to permits to drill as COAs after the completion of site-specific NEPA analysis. Standard stipulations (see **Appendix J**) would apply existing leases.	access roads and well pads, including reshaping, top-soiling, and revegetating cut and fill slopes. 11) Restore disturbed areas at final reclamation to pre-disturbance conditions or desired plant community. 12) Permanent (longer than two months) structures that create movement must be designed or sited to minimize impacts on GRSG. 13) Consider using off-site mitigation within the same PHMA (e.g., creating sagebrush habitat, improving brood rearing habitat, or purchasing conservation easements) with proponent dollars to offset habitat losses (Washington Office-IM 2008-204). 14) Consider creating a mitigation trust account when impacts cannot be avoided, minimized, or effectively mitigated through other means. If approved by the BLM, the proponent may contribute funding to maintain habitat function within the same PHMA based on the estimated cost of habitat treatments or other mitigation needed to maintain the functions of impacted habitats. Off-site mitigation should be considered only when no feasible options are available to adequately mitigate within and immediately adjacent to the impacted site, or when the off-site location would provide more effective mitigation of the impact than can be achieved on-site. 15) Make applicable RDFs (**Appendix D**) mandatory as COAs within PHMA and GHMA. RDFs provided in **Appendix D** would be site-specific restrictions applied to permits to drill as COAs after the completion of site-specific NEPA analysis. Standard stipulations (see **Appendix J**) would apply existing leases. Applied RDFs would have to be reasonable (43 CFR, Part 3101.1-2) with the valid existing rights and in conformance with the approved Judith and Headwaters RMPs.
Solid Minerals			
Coal - There is no coal potential in the planning area.			
Action: Surface occupancy generally would be prohibited within public road corridors, ROWs, floodplains, and key wildlife areas (BLM 1984). Action: The planning area would be available for coal exploration licenses. See **Figure 2-17**, Solid Leasable and Salable Minerals – Alternative A (**Appendix A**). Before exploration licenses and licenses to mine are approved, a project-specific environmental review document would be prepared to assess impacts and develop mitigation measures. Action: Prior to issuing coal leases, unsuitability criteria would apply and a plan amendment will be prepared (BLM 1994).	Action: *Surface mines:* In PHMA, find unsuitable all coal surface mining under the criteria set forth in 43 CFR, Part 3461.5 (284,975 acres). See **Figure 2-18**, Solid Leasable and Salable Minerals – Alternative B (**Appendix A**).	Action: *Surface mines:* In PHMA and GHMA, find unsuitable all coal surface mining under the criteria set forth in 43 CFR, Part 3461.5 (464,178 acres). See **Figure 2-19**, Solid Leasable and Salable Minerals – Alternative C (**Appendix A**).	Action: The planning area would be available for coal exploration licenses. See **Figure 2-20**, Solid Leasable and Salable Minerals – Alternative D (**Appendix A**). Before exploration licenses and licenses to mine are approved, a project-specific environmental impact statement would be prepared to assess impacts on all resources including GRSG and to develop mitigation measures through the RDFs set forth in **Appendix D** as the current RMPs do not contain allocation decisions concerning coal. Action: On a case-by-case basis, unsuitability criteria would be applied, in accordance with 43 CFR, Part 3461.5, and a plan amendment would be prepared.
Action: No similar action.	Action: *Subsurface mines*—Grant no new mining leases unless all surface disturbances (appurtenant facilities) are placed outside of the PHMA.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: No similar action.

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Action: No similar action. There are no existing coal leases.	Action: For coal mining operations on existing leases: *Subsurface mining*—In PHMA, place any new appurtenant facilities outside of PHMA. Where new appurtenant facilities associated with the existing lease cannot be located outside the PHMA, collocate new facilities within existing disturbed areas. If this is not possible, then build any new appurtenant facilities to the absolute minimum standard necessary.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: No similar action.
Action: No similar action.	Action: In GHMA, apply minimization of surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on important seasonal GRSG habitats. Apply these measures during activity level planning. Action: Use additional effective mitigation to offset impacts, as appropriate (determined by local options/needs).	Action: No similar action.	
Locatable Minerals			
Action: Analyze proposed action in Plan of Operations and apply mitigating measures needed to prevent unnecessary or undue degradation (BLM 1994)[1]. Action: Before the BLM approves a Plan of Operations on existing mining claims in areas withdrawn, it would conduct validity examinations. If the claims did not contain a discovery, within the meaning of the mining laws, the claims would be declared null and void and the Plan of Operations would be denied. The BLM would consider purchasing valid claims where activities threaten the resource values protected by the withdrawal (BLM 1994). Action: Analyze proposed action in Plan of Operations and apply mitigating measures needed to prevent unnecessary or undue degradation (BLM 1994). Action: Screen Notices for impacts that constitute unnecessary or undue degradation (BLM 1994). See **Figure 2-21**, Withdrawals and Recommend for Withdrawal – Alternative A (**Appendix A**).	Action: In PHMA, recommend withdrawal from mineral entry based on risk to the GRSG and its habitat from conflicting locatable mineral potential and development (281,900 acres). • Make any existing mining claims within the withdrawal area subject to validity exams or buy out. In Plan of Operations required prior to any proposed surface-disturbing activities, include the following: – Additional, effective mitigation in perpetuity for conservation (in accordance with existing policy, Washington Office IM 2008-204). Example: purchase private land and mineral rights or severed subsurface mineral rights within the priority area and deed to the US Government). – Consider seasonal restrictions if deemed effective. – RDFs would be applied to locatables to the extent consistent with applicable law (**Appendix C**). See **Figure 2-22**, Withdrawals and Recommend for Withdrawal – Alternative B (**Appendix A**).	Action: Same as Alternative B, except applies to both PHMA and GHMA (457,774 acres). RDFs would be applied to locatables to the extent consistent with applicable law (**Appendix C**). See **Figure 2-23**, Withdrawals and Recommend for Withdrawal – Alternative C (**Appendix A**).	Action: Same as Alternative A. See **Figure 2-24**, Withdrawals and Recommend for Withdrawal – Alternative D (**Appendix A**). Action: Locatable minerals exploration and development under the mining laws are not authorized under the discretion of the field manager but are reviewed (Notice and Plan of Operations) and approved (Plan of Operations) to prevent unnecessary or undue degradation. Proposed actions under Plan of Operations would be analyzed on a case-by-case basis in coordination with MTDEQ, and RDFs (**Appendix D**) would be applied to locatables to the extent consistent with applicable law. Action: At a minimum, annual compliance inspections would be conducted on each active Notice or Plan of Operations.
Nonenergy Leasable Minerals			
Action: No similar action. *NOTE: Application of current BMP.*	Action: Close PHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine (284,337 acres).	Action: Same as Alternative B, except applies to both PHMA and GHMA (457,774 acres).	Action: No similar action.

[1]Unnecessary or undue degradation means conditions, activities, or practices that (43 CFR, Part 3809.5): (1) Fail to comply with one or more of the following: the performance standards in Section 3809.420, the terms and conditions of an approved Plan of Operations, operations described in a complete notice, and other federal and state laws related to environmental protection and protection of cultural resources; (2) Are not "reasonably incident" to prospecting, mining, or processing operations as defined in Section 3715. 0-5 of this chapter; or (3) Fail to attain a stated level of protection or reclamation required by specific laws in areas such as the California Desert Conservation Area, Wild and Scenic Rivers, BLM-administered portions of the National Wilderness System, and BLM-administered National Monuments and National Conservation Areas.

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Action: Prospecting permits would be issued after appropriate environmental review to assess impacts and develop mitigating measures (BLM 1994).	Action: For existing nonenergy leasable mineral leases in PHMA, in addition to the solid minerals RDFs (**Appendix C**), follow the same RDFs applied to fluid minerals (**Appendix C**) when wells are used for solution mining.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: In PHMA, prospecting permits may be issued after appropriate environmental review to assess impacts and to develop RDFs set forth in **Appendix D**. Prospecting permits are considered on a case-by-case basis and are issued at the discretion of the Montana BLM State Office. If activity under the permit application cannot be mitigated to prevent unnecessary or undue degradation to GRSG habitat, the field manager would not recommend issuing the permit.
Salable Minerals			
Action: 2,437 acres within GH and 198 acres within PH are closed to salable minerals disposal. See **Figure 2-17** (**Appendix A**).	Action: Close PHMA to salable minerals disposal (284,337acres). See **Figure 2-18** (**Appendix A**).	Action: Close PHMA and GHMA to salable minerals disposal (457,774 acres). See **Figure 2-19** (**Appendix A**).	Action: Same as Alternative A. See **Figure 2-17** (**Appendix A**).
Action: The BLM would issue sales contracts for salable minerals where disposal is deemed to be in the public interest, while providing for reclamation of mined lands and preventing unnecessary or undue impact on nonmineral resources. Salable minerals permits are considered on a case-by-case basis and are issued at the discretion of the area manager (BLM 1994).	Action: No similar action.		Action: In PHMA, the BLM would issue permits for salable minerals where disposal is deemed to be in the public interest (**Figure 2-17**, **Appendix A**), while providing for reclamation of mined lands and preventing unnecessary or undue degradation (**Appendix D**). Salable mineral permits are considered on a case-by-case basis and are issued at the discretion of the field manager. If activity under the permit application cannot be mitigated to prevent unnecessary or undue degradation to GRSG habitat, the permit would not be issued.
Action: The BLM would issue sales contracts for salable minerals where disposal is deemed to be in the public interest, while providing for reclamation of mined lands and preventing unnecessary or undue impact on nonmineral resources (BLM 1994).	Action: In PHMA, restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Mineral Split Estate			
The BLM manages 700 million acres of subsurface mineral estate nationwide, including approximately 58 million acres where the surface is privately owned. In many cases, the surface rights and mineral rights were severed under the terms of the nation's homesteading laws. These and other federal laws, regulations, and BLM policy directives, some noted below, give managers the authority and direction for administering the development of federal oil and natural gas resources beneath privately owned surface. **Planning and Leasing** • Must involve the public when preparing land use plans and amendments • Must notify the public when oil and gas lease sales have been scheduled **Permitting** • Encourages the lessee/operator to contact the surface owner as early as possible when operations are contemplated • Requires the lessee/operator to certify that a good faith effort has been made to negotiate a surface use agreement with the surface owner	Action: Where the federal government owns the surface, and the mineral estate is not in federal ownership in PHMA, apply appropriate fluid mineral RDFs (**Appendix C**) to surface development.	Action: Same as Alternative B, except applies to both PHMA and GHMA (**Appendix C**).	Action: Where the federal government owns the surface, and the mineral estate is not in federal ownership in PHMA, apply appropriate fluid mineral RDFs (**Appendix D**) to surface development. Applied RDFs would have to be reasonable (43 CFR, Part 3101.1-2) with the valid existing rights and whether the action is in conformance with the approved RMP.

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Drilling and Production • Conducts compliance inspections, consults with surface owner as appropriate, and takes enforcement action when necessary to ensure permit compliance **Surface Reclamation** • Must carefully consider the surface owner's views on reclamation requirements and seek concurrence that final reclamation is satisfactory			
Action: No similar action.	Action: Where the federal government owns the mineral estate in PHMA, and the surface is not in federal ownership, apply the same conservation measures applied on BLM-administered lands.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Where the federal government owns the mineral estate in PHMA and the surface is not in federal ownership, apply the same conservation measures applied on BLM-administered lands when federal action (mineral exploration or development) occurs. See appropriate mineral section for more information. Applied RDFs would have to be reasonable (43 CFR, Part 3101.1-2) with the valid existing rights and whether the action is in conformance with the approved RMP.
Fire and Fuels Management			
Fuels Management			
Objective: Prescribed burning would continue to be used in support of resource management objectives (BLM 1984). Objective: Prescribed fire may be used to meet resource objectives, such as restoring fire-adapted grass and shrublands, or increasing variation of age classes in shrublands. Treatments would be designed to achieve mosaic patterns, which would also reduce the potential of entire stands being destroyed by wildland fire. Most sagebrush treatments would be on mountain big sagebrush or silver sagebrush (BLM 2003a).	Objective: Design fuel treatments to protect, restore, enhance, or maintain GRSG habitat, consistent with vegetation and wildlife habitat objectives.		
Action: Land treatments would be designed to maintain sagebrush levels within the desired canopy cover range 15 to 50% and to increase the amounts of succulent forbs. Controlled burning in conifer and sagebrush types would be done on an individual basis to improve wildlife habitat (BLM 1994). Action: Prescribed burning would be administered on an individual basis in grassland, sagebrush, and conifer types to improve wildlife habitat and vegetation production (BLM 1994). Action: Burning would be done on a limited basis to improve wildlife and livestock forage in dense pine-juniper stands throughout the Missouri Breaks and to improve vegetation productivity on other upland sites, including sagebrush (BLM 1994). Action: Mechanical treatments and prescribed fire would primarily be used to remove encroaching conifers or open	Action: In PHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. • Do not reduce sagebrush canopy cover to less than 15% unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of PHMA and conserve habitat quality for the species. Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in future NEPA documents. • Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in PHMA. • Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and would maintain winter range habitat quality. • Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species). However, if as a last resort and after all other treatment opportunities have been explored	Action: In PHMA and GHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. • Do not reduce sagebrush canopy cover to less than 15%, unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of PHMA and GHMA and conserve habitat quality for the species. • Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in the NEPA process. • Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present. • Allow no fuels treatments in known winter range, unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and would maintain winter range habitat quality. • Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species). However, if as a last	Action: In PHMA and GHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. • Do not reduce sagebrush canopy cover to less than 15%, unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of PHMA and conserve habitat quality for the species. Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in the NEPA process. 1) Sites should not be burned unless: a) Biological and physical limitations of the site and impact on GRSG are identified and determined to be neutral or beneficial to PHMA, including moisture regimes, soil texture, seed sources, and sagebrush recovery time, b) Management objectives for the site, including those for wildlife, are clearly defined, c) Potential for weed invasion and successional

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
the canopy on dense, stagnant, and even-aged stands of sagebrush that are at risk of destruction by wildland fire. In shrublands where mechanical treatments and prescribed fire are used against conifer encroachment, the density and canopy of shrub stands would be reduced in treated areas. The duration of the reduction would depend on whether the shrubs sprout after fire and post-fire management actions, such as reseeding (BLM 2003a). Action: Chemical weed treatments would be applied where other fuels treatments would create conditions favorable for noxious weeds or other undesirable invasive species to expand. For example, weeds are often present in areas of conifer encroachment. When the canopy is opened by mechanical treatments or prescribed burns, the conditions are favorable for the weeds or invasive species to expand. Nearly all of the weed treatments would be applied either before or after the area is treated with prescribed fire or mechanical methods (BLM 2003a). Action: A minimum rest period from livestock grazing of 2 growing seasons would be required after any major vegetative disturbance. More rest may be required, depending on the situation. Major disturbances are defined as mechanical manipulation of the range, such as chiseling and seeding. Requirements for rest following wild or prescribed fire would depend on a variety of factors, including the type of fuel, time of burn, accessibility of the burned area to livestock, and climatic factors post-burn. Specific timing and the type of rest would be determined at the site-specific environmental assessment phase (BLM 1994).	and site-specific variables allow, the use of prescribed fire for fuel breaks that would disrupt the fuel continuity across the landscape could be considered, in stands where cheatgrass is a very minor component in the understory. • Monitor and control invasive vegetation post-treatment. • Rest treated areas from grazing for two full growing seasons, unless vegetation recovery dictates otherwise. • Require use of native seeds for fuels management treatment, based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet GRSG habitat objectives. • Design post fuels management projects to ensure long-term persistence of seeded or pretreatment native plants. This may require temporary or long-term changes in livestock grazing management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project.	resort and after all other treatment opportunities have been explored and if site-specific variables allow, the use of prescribed fire for fuel breaks that would disrupt the fuel continuity across the landscape could be considered. This would be for stands where cheatgrass is a very minor component in the understory. • Design post fuels management projects to ensure long-term persistence of seeded or pretreatment native plants, including sagebrush. This may require temporary or long-term changes in livestock grazing management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project.	trends are well understood, and d) Capability exists to manage the post-burn site properly, including a funded monitoring schedule, to achieve a healthy sagebrush community. Manage grazing, weeds, reseeding, or other activities that potentially influence the outcome of rehabilitation or treatment in a manner that achieves the desired condition of the burned site. • Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in PHMA. • Allow no fuels treatments in known GRSG winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and would maintain winter range habitat quality. • Monitor and control invasive vegetation post-treatment. • Requirements for resting or deferring areas from livestock grazing following fire would depend on a variety of factors, including resource objectives, the type of fuel, time and intensity of burn, accessibility of the burned area to livestock, and post-burn climatic factors.
Action: No similar action.	Action: Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area. This may require fuels treatments implemented in a more linear versus block design.	Action: No similar action.	Action: Same as Alternative B.
Action: No similar action.	Action: During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels, and implement grazing management that would accomplish this objective. Consult with ecologists to minimize impacts on native perennial grasses.	Action: No similar action.	Action: During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels and implement grazing management that would accomplish this. Consult with an interdisciplinary team of resource specialists, as appropriate, to minimize impacts on native perennial grasses.
Action: No similar action.		Action: Any vegetation treatment plan must include pretreatment data on wildlife and habitat condition, must establish nongrazing exclosures, and must include long-term monitoring where treated areas are monitored for at least three years before grazing returns. Continue monitoring for five years after livestock are returned to the area and compare to treated ungrazed exclosures, as well as untreated areas.	Action: No similar action.
Action: No similar action.	Action: In PHMA, follow RDFs (**Appendix C**).	Action: Same as Alternative B, except applies to both PHMA and GHMA. Follow RDFs in **Appendix C**.	Action: Follow the most current RDFs for fire and fuels (**Appendix D**).

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Fire Operations			
Objective: No similar objective.	Objective: Manage wildfires to minimize loss of sage-brush and protect GRSG habitat.		
Action: Intensive suppression would be applied to areas with high resource values, structures, improvements, oil and gas developments, commercial forest values, sagebrush and juniper areas, fire sensitive woody riparian areas (soil subgroups 6 and 17) and cultural values that require aggressive suppression (BLM 2003a).	Action: In PHMA, prioritize suppression, after life and property, to conserve the habitat. See **Appendix K**, which would be completed to help further refine fire management actions once this plan is completed.	Action: Same as Alternative B, except applies to both PHMA and GHMA. See **Appendix K**, which would be completed to help further refine fire management actions once this plan is completed.	Action: Same as Alternative B. See **Appendix K**, which would be completed to help further refine fire management actions once this plan is completed.
Action: Intensive suppression would be applied to areas with high resource values, structures, improvements, oil and gas developments, commercial forest values, sagebrush and juniper areas, fire sensitive woody riparian areas (soil subgroups 6 and 17), and cultural values that require aggressive suppression (BLM 2003a).	Action: In GHMA, prioritize suppression where wildfires threaten PHMA.	Action: No similar action.	Action: Same as Alternative B.
Action: No similar action.	Action: In PHMA, follow RDFs (**Appendix C**).	Action: Same as Alternative B, except applies to both PHMA and GHMA. Follow RDFs in **Appendix C**.	Action: Follow the most current RDFs for fire and fuels (**Appendix D**).
Emergency Stabilization and Rehabilitation			
Action: No similar action.	Action: In PHMA, prioritize native seed allocation for use in GRSG habitat in years when preferred native seed is in short supply. This may require reallocating native seed from ES&R projects outside of PHMA to those inside it. Use of native plant seeds for ES&R seedings is required, based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, nonnative seeds may be used, as long as they meet GRSG habitat conservation objectives. Reestablishing appropriate sagebrush species/subspecies and important understory plants, relative to site potential, should be the highest priority for rehabilitation.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Action: No similar action.	Action: In PHMA, design post-ES&R management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing and travel management to achieve and maintain the desired condition of ES&R projects to benefit GRSG.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: In PHMA, design post ES&R management to ensure long term persistence of seeded or pre-burn native plants. This could include changes in current resource management to achieve and maintain the desired condition of the restoration effort that benefits GRSG. Modifications to livestock grazing would be made in accordance with BLM grazing regulation 43 CFR, Part 4130.3-3 and after consultation, cooperation and coordination with owners or lessees having lands or managing resources within the affected allotment(s), affected cooperative state grazing districts and the interested public. Temporary or long-term adjustments in post-restoration livestock use would be implemented by documented agreement or by the decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.
Action: No similar action.	Action: In PHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collection from the warmer component of the species' current range when selecting native seed.	Action: Same as Alternative B, except applies to PHMA and GHMA.	Action: Same as Alternative B. Action: Develop an appropriate seed mix for the location, based on current climatic data as well as soils/ESDs.
Action: No similar action.		Action: Post-fire recovery must include establishing adequately sized exclosures (free of livestock grazing) that can be used to assess recovery.	Action: Appropriate pre and post treatment monitoring would be established to document impacts and success of the treatments.

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
Action: No similar action.		Action: Livestock grazing should be excluded from burned areas until woody and herbaceous plants achieve GRSG habitat objectives.	Action: Requirements for resting or deferring areas from livestock grazing following fire would depend on a variety of factors including resource objectives, the type of fuel, time and intensity of burn, accessibility of the burned area to livestock, and post-burn climatic factors. Compliance with land health standards (**Appendix F**) would be considered when implementing post-fire grazing management.
Action: No similar action.		Action: Where burned GRSG habitat cannot be fenced from other unburned habitat, the entire area (e.g., allotment/pasture) should be closed to grazing until recovered.	Action: Requirements for resting or deferring areas from livestock grazing following fire would depend on a variety of factors, including resource objectives, the type of fuel, time, and intensity of burn, accessibility of the burned area to livestock, and post-burn climatic factors. Compliance with land health standards (**Appendix F**) would be considered when implementing post fire grazing management.
Habitat Restoration and Vegetation Management			
Objective: Grazing methods, land treatments, and other improvements would be designed and monitored to accomplish objectives. The BLM would continue to cooperate with MFWP to determine wildlife habitat needs.	Objective: Within the analysis area, vegetation treatments may continue to be used to meet or support resource management objectives, given special consideration for the protection and maintenance of sagebrush ecosystems is incorporated into the design and implementation of treatments. The BLM would continue to cooperate with the MFWP to determine wildlife habitat needs.		
Action: No similar action.	Action: In PHMA, prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. Action: Prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution or abundance.	Action: In PHMA and GHMA, prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. Action: Prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution and abundance and where factors causing degradation have already been addressed (e.g., changes in livestock management).	Action: In PHMA, prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. Action: In PHMA and GHMA, prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution or abundance. Action: In PHMA and GHMA, consideration for other threatened, endangered, or sensitive species would be evaluated in addition to GRSG when prioritizing restoration projects.
Action: No similar action.	Action: Include GRSG habitat parameters, as defined by Connelly et al. (2000) and Hagen et al. (2007) or, if available, state GRSG conservation plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within PHMA the highest restoration priority.	Action: Include GRSG habitat objectives in habitat restoration projects. Make meeting these objectives within PHMA and GHMA the highest restoration priority.	Action: Manage for suitable GRSG habitat for restoration projects within PHMA.
Action: Surface-disturbing activities greater than 0.25 acre would require the initiating party to rehabilitate the disturbance. Native species in the site's natural plant community would normally be seeded to revegetate all surface disturbances. Some reclamation may involve introduced species if these species are necessary to stabilize the site. Revegetation species would be determined during the site-specific environmental assessment phase (BLM 1994, page 11).	Action: In PHMA, require use of native seeds for restoration, based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, nonnative seeds may be used as long as they support GRSG habitat objectives.	Action: Same as Alternative B, except applies to PHMA and GHMA.	Action: In PHMA, require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Nonnative species would be considered when determined to be necessary for emergency stabilization and where required to facilitate natural succession of desired native vegetative communities.
Action: No similar action.	Action: In PHMA, design post restoration management to ensure long-term persistence. This could include changes in livestock grazing management and travel management to achieve and maintain the desired condition of the restoration that benefits GRSG.	Action: Same as Alternative B, except applies to PHMA and GHMA.	Action: In PHMA, design post restoration management to ensure long-term persistence. This could include changes in current resource management to achieve and maintain the desired condition of the restoration that benefits GRSG. Modifications to livestock grazing would be made in accordance with BLM grazing regulation 43 CFR, Part 4130.3-

Table 2-5
Description of Alternatives A, B, C, and D

Alternative A (No Action)	Alternative B	Alternative C	Alternative D
			3, and after consultation, cooperation, and coordination with owners or lessees having lands or managing resources within the affected allotment(s), affected cooperative state grazing districts and the interested public. Temporary or long-term adjustments in post-restoration livestock use would be implemented by documented agreement or by the decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.
Action: No similar action.	Action: In PHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collection from the warmer component of the species' current range when selecting native seed.	Action: Same as Alternative B, except applies to PHMA and GHMA.	Action: Same as Alternative B. Action: Choose appropriate seed mix for the location.
Action: The BLM would manage for succulent vegetation, including a variety of forbs, and would maintain big and silver sage on GRSG wintering and nesting areas with a canopy coverage (line intercept) of 15 to 50% and an effective height of 12 inches (BLM 1994).	Action: In PHMA, restore native or desirable plants and create landscape patterns that most benefit GRSG.	Action: In PHMA and GHMA, exotic seedings would be rehabilitated, interseeded, and restored to recover sagebrush in areas to expand occupied habitats.	Action: In PHMA, restore native (or desirable) plants and create landscape patterns that most benefit GRSG. Consideration for other threatened, endangered, or sensitive species would be evaluated, in addition to GRSG, when creating landscape habitat patterns.
Action: No similar action.	Action: Make reestablishment of sagebrush cover and desirable understory plants (relative to ecological site potential) the highest priority for restoration in PHMA.	Action: No similar action.	Action: Make reestablishment of suitable GRSG habitat a high priority for restoration. Other restoration efforts within the field office may take precedence over sagebrush habitat projects, based on future threatened and endangered species listing decisions, funding sources and requirements, access to sites, landowner, and other agency cooperation, potential project success, as well as others. Decisions regarding restoration of habitats within the field office would remain at the discretion of the authorized officer.
Action: No similar action.	Action: In PHMA, in fire prone areas where sagebrush seed is required for GRSG habitat restoration, consider establishing seed harvest areas that are managed for seed production and are a priority for protection from outside disturbances.	Action: Same as Alternative B, except applies to PHMA and GHMA.	Action: In PHMA of increased fire frequency, where sagebrush seed is required for GRSG habitat restoration, consider establishing seed harvest areas that are managed for seed production that receive a priority for protection from outside disturbances.
Areas of Critical Environmental Concern			
Action: No similar action.		Action: As described in **Appendix E**, PHMA areas for GRSG with at least 4,000 acres of contiguous BLM surface ownership would be designated as ACECs, totaling 98,091 acres. See **Figure 2-25**, Area of Critical Environmental Concern – Alternative C, in **Appendix A**).	Action: No similar action.
Action: BLM would continue to manage 2,674 acres as the Acid Shale-Pine Forest ACEC to protect its unique pine forest and shale landscape. Management actions are as follows: • Limit motorized travel to existing routes and trails • Manage as ROW avoidance area • Prohibit timber harvest • Close to fluid minerals leasing	Action: BLM would continue to manage 2,674 acres as the Acid Shale-Pine Forest ACEC to protect its unique pine forest and shale landscape. Action: In addition to those management actions listed in Alternative A, management actions would include conservation measures consistent with the identified management actions and constraints identified for PHMA under this alternative.	Action: Same as Alternative B.	

BLM 1984: *Headwaters Resource Management Plan/Environmental Impact Statement Record of Decision*
BLM 1994: *Judith Resource Area Resource Management Plan*
BLM 2003a: *Fire/Fuels Management Plan Environmental Assessment/Plan Amendment for Montana and the Dakotas*
BLM 2003b: *Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota*

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2.11 ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

The following alternatives were considered but were not carried forward for detailed analysis because (1) they would not fulfill requirements of FLPMA or other existing laws or regulations, (2) they did not meet the purpose and need, (3) they were already part of an existing plan, policy, or administrative function, or (4) they did not fall within the limits of the planning criteria. FLPMA requires the BLM to manage BLM-administered lands and resources in accordance with the principles of multiple use and sustained yield.

2.11.1 National Technical Team Conservation Measures Not Applicable to Lewistown Field Office

No management actions from *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011) concerning wild horse and burros were carried forward. This is because there are no wild horse or burro herds managed by the LFO.

2.11.2 Elimination of Livestock Grazing from BLM Lands

An alternative that proposes to make the entire planning area unavailable for livestock grazing would not meet the purpose and need of the Lewistown Field Office Greater Sage-Grouse RMPA/EIS. NEPA requires that agencies study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources. An alternative that would eliminate grazing from the public lands in the absence of an unresolved conflict is inconsistent with the policy objectives of the planning area. The BLM manages grazing on the public rangelands by statutory authority, i.e. the Taylor Grazing Act, FLPMA, and the Public Rangelands Improvement Act. Under theses statutes, the BLM is required to develop regulations to manage public land resources on a multiple-use and sustained yield basis. Management of grazing on BLM-administered land within the planning area would be in accordance with the grazing administration regulations found in 43 CFR Part, 4100. The purpose of the grazing regulations is to manage the livestock grazing program as an integral part of the overall multiple-use of the public lands.

No issues or conflicts have been identified during this land use planning effort that require the complete elimination of livestock grazing within the planning area for their resolution (BLM Washington Office IM 2012-169) (BLM 2012c). Livestock removal and use adjustment where appropriate have been incorporated in this planning effort. Because the BLM has considerable discretion through its grazing regulations to determine and adjust stocking levels, seasons-of-use, and grazing management activities, and to allocate forage to uses of the BLM-administered lands in RMPs, the analysis of an alternative to entirely eliminate grazing is not needed.

In accordance with the BLM's H-1601-1 Land Use Planning Handbook and BLM Washington Office IM No. 2012-169, the BLM considered a range of

alternatives with respect to both areas that were available or unavailable for livestock grazing and the amount of forage allocated to livestock on a planning area-wide basis. An alternative eliminating livestock grazing in all allotments in PHMA and GHMA was developed. On allotments outside of PHMA and GHMA, no multiple-use conflicts or issues were identified that would affect GRSG habitat conditions or management. The range of alternatives considered includes a meaningful reduction in livestock grazing, both through a reduction in areas available to livestock grazing and forage allocation.

The majority of the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area is located in the northwestern portion of the Great Plains Ecoregion (EPA 2010a) and the rangelands in the planning area are classified as mixed-grass prairie. The rangelands of the Great Plains have a long evolutionary history of grazing and grazing is accepted by grassland ecologists as a keystone process of the grassland ecosystem (Fuhlendorf and Engle 2001; Milchunas, et al. 1988; Knapp et al. 1999). There is also agreement among many scientists and natural resource managers that some level of grazing disturbance is necessary to assure the ecological integrity of the mixed-grass prairie ecosystem (Parks Canada 2002).

Current resource conditions on BLM-administered land, including range vegetation, watershed, and wildlife habitat, as reflected in land health assessments, do not warrant prohibition of livestock grazing throughout the entire planning area. Following initial surveyed forage allocations, land health evaluations, inventories, and monitoring data (vegetative and levels of use) have been the basis for increasing or decreasing permitted use. Through this process, the planning area has changed the grazing allocations on allotments to ensure that the healthy ecological systems are provided for future generations.

2.12 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Table 2-6 presents a comparison summary of impacts on GRSG from management actions proposed for the Alternatives A—D and the Proposed Plan Amendment. **Section 4.3**, Greater Sage-Grouse, in **Chapter 4** provides a more detailed impact analysis.

Table 2-6
Summary of Impacts on GRSG[1]

Resource/Resource Use	Alternatives A—D and Proposed Plan Amendment
Summary of Impacts on GRSG from Oil and Gas Development	Alternatives B, C, D, and the Proposed Plan Amendment would apply RDFs (**Appendix C** for Alternatives B and C, and **Appendix D** for Alternative D and the Proposed Plan Amendment) as COAs where appropriate and necessary to drilling permits for currently leased federal minerals. No new leases, or reissuing of expired leases, would be issued in PHMA and GHMA under any alternative, based on an existing RMP protest resolution, which requires deferring nominated lease parcels if a special stipulation is required to protect important wildlife values. Avoiding future leasing in PHMA or GHMA, along with the COAs required for current leases, would address the objective in the COT report [USFWS 2013]) to design energy development to ensure that it will not impinge on stable or increasing GRSG population trends. The Proposed Plan Amendment would provide additional protections for GRSG and habitat by implementing density and disturbance caps, adaptive management, lek buffers, and regional mitigation, which would further support the COT report objectives.
Summary of Impacts on GRSG from Infrastructure	Overall, Alternative A would have the least protections for GRSG and GRSG habitat from development of infrastructure. Alternative B would have more restrictions on route construction and upgrades, as well as ROWs, than Alternatives A and D, but fewer than Alternative C (some actions under Alternative D are the same as under Alternative B; see **Table 2-4**). The Proposed Plan Amendment would protect the largest amount of GRSG habitat from infrastructure impacts. Alternatives B and C exclude PHMA from new ROWs (the Proposed Plan Amendment excludes wind and solar). This responds directly to the need identified in the COT report (USFWS 2013) to stop population decline and habitat loss by eliminating activities known to negatively impact GRSG and their habitats. Beneficial impacts are from the reduction in the threat of habitat loss, degradation, and fragmentation on BLM-administered lands. Potential adverse indirect effects in GRSG habitat could increase if these activities were excluded from BLM-administered lands because they would still occur on private land without BLM

[1]For a full disclosure of impacts on GRSG, refer to **Section 4.3**.

Table 2-6
Summary of Impacts on GRSG[1]

Resource/Resource Use	Alternatives A—D and Proposed Plan Amendment
	RDFs guidance. Ownership patterns in LFO (highly fragmented, with public land comprising approximately 17% of the planning area) could substantially increase the length of infrastructure required to enclose BLM ROW exclusion areas. Alternative D and the Proposed Plan Amendment would designate PHMA and GHMA as ROW avoidance areas because most PHMA and GHMA within the planning area are on private lands. The potential to concentrate infrastructure development where appropriate, and to use RDFs, would increase direct beneficial effects from infrastructure on GRSG on BLM-administered lands; however, it could substantially reduce potential indirect adverse effects on a much greater area of adjacent land not administered by the BLM. The benefits of maintaining or improving habitat on most of the PHMA would exceed the costs on BLM-administered lands and would be more likely to perpetuate a viable GRSG population. Reducing impacts on more of the existing habitat within the planning area is a reason for the ROW avoidance areas rather than ROW exclusion areas in PHMA and GHMA under Alternative D and the Proposed Plan Amendment. All alternatives and the Proposed Plan Amendment would require collocating new ROWs with existing ROWs in GHMA. Alternative D and the Proposed Plan Amendment would require this of new ROWs in PHMA also because new ROWs are not excluded in PHMA. The action alternatives are in agreement with the following conservation objectives/options in the COT report for infrastructure: 1. Avoid developing infrastructure within PACs (objective). 2. Avoid constructing these features in GRSG habitat, both within and outside of PACs (option). 3. Remove transmission lines and roads that are duplicative or are not functional (option). 4. Construct transmission line towers to severely reduce or eliminate nesting and perching by avian predators, most notably ravens, thereby reducing human subsidies to those species (option). The Proposed Plan Amendment would provide additional protections to GRSG and habitat by implementing density and disturbance caps, adaptive management, lek buffers, and regional mitigation, which would further support the COT report objectives.
Summary of Impacts from Recreation	Recreational uses in GRSG habitat include dispersed (e.g., hiking and camping) and group activities. Recreation is a limited threat in the LFO populations. OHV use is the most potentially damaging recreational use of GRSG habitat, but OHVs are limited to existing roads, primitive roads, and trails on BLM-administered lands within the LFO. BLM regulations allow for area, road or trail closures where OHVs are causing, or would cause considerable adverse effects on wildlife and its habitat. Alternatives B and D would restrict

Table 2-6
Summary of Impacts on GRSG[1]

Resource/Resource Use	Alternatives A—D and Proposed Plan Amendment
	issuance of SRPs for group recreation to activities neutral or beneficial to GRSG habitat. The Proposed Plan Amendment would also reduce potential disturbances by not constructing recreation facilities in PHMA unless there would be a conservation gain to GRSG. All alternatives would respond to the COT objective that recreation activities should maintain healthy native sagebrush communities based on local ecological conditions and with consideration of drought conditions.
Summary of Impacts on GRSG from Agriculture/Urbanization	Although agriculture and urbanization have been identified as threats within the LFO planning area, including both the Yellowstone Watershed (agricultural conversion) and Belt Mountain (urbanization) populations, the BLM has no direct management authority over those types of activities on private lands. Under Alternatives B and D, and the Proposed Plan Amendment, the BLM would take advantage of opportunities to consolidate GRSG habitat through land exchange if the action would benefit GRSG. Alternative C would allow for no disposal of PHMA or GHMA, regardless of benefits to GRSG. The LFO may have limited indirect abilities to influence these threats through maintaining appropriate authorized uses (grazing, ROWs, recreation, energy development) of BLM-administered lands that allow for the maintenance of habitat objectives. One example is to maintain appropriate levels of livestock grazing, which could discourage the conversion of GRSG habitat on private land to nonnative pasture or cropland. As a result of removal of grazing from PHMA and GHMA in Alternative C, there is the potential for increased conflicts between grazing and other land uses on adjacent non-federal lands. For example, under this alternative, if permittees and lessees were to lose forage currently provided on BLM-administered lands, ranchers may try to increase forage production on their private and other leased lands, potentially accelerating loss of GRSG habitat on those lands. Regarding the following conservation objectives/options identified in the COT report specific to infrastructure: • Limit urban and exurban development in GRSG habitat and maintain intact native sagebrush plant communities (objective). • Acquire and manage GRSG habitat to maintain intact ecosystems (option). Alternative D and the Proposed Plan Amendment meet the objectives best because of their flexibility. Alternative B meets the objectives but its focus on ROW exclusion areas could lead to greater impacts on non-BLM-administered lands. Alternative C is in agreement with the first objective, but the consequences of

Table 2-6
Summary of Impacts on GRSG[1]

Resource/Resource Use	Alternatives A—D and Proposed Plan Amendment
	its limitations on grazing, including increased fencing and reduced weed control, would not maintain intact GRSG habitat.
Summary of Impacts from Conifer Encroachment	Alternatives A—D and the Proposed Plan Amendment would address conifer encroachment using vegetation management approaches to habitat restoration. Two conifer removal projects are currently underway in the Belt Mountains and Crooked Creek areas. Alternatives A—D and the Proposed Plan Amendment would prioritize restoration, including conifer removal, which is a limited threat in LFO. All alternatives and the Proposed Plan Amendment would meet the COT report objective to remove pine and juniper from areas of sagebrush most likely to support GRSG at a rate at least equal to the rate of incursion.
Summary of Impacts on GRSG from Grazing	GRSG habitat considerations within livestock grazing allotments would be similar across Alternatives B, C, D and the Proposed Plan Amendment. Range improvement restrictions are the same under Alternatives B and D and the Proposed Plan Amendment. Under Alternative C (no grazing), the need for increased fencing on private land in order to prevent livestock trespass would result in indirect impacts on GRSG, including increased fragmentation, increased potential for wildfire from fine fuel buildup, increased collision with fences, and increased raptor predation. An indirect impact from excluding livestock grazing from BLM-administered lands under Alternative C is the potential conversion of adjacent private grazing lands to agriculture or other land uses. This is especially a concern in areas with a mosaic of ownership boundaries, which would decrease available habitat for GRSG that inhabit rangeland outside of BLM-administered lands. In the long term, removing grazing permits on federal land could cause ranches to be converted to residential or agricultural use, leading to a loss of GRSG habitat on adjacent private lands. Additionally, under Alternative C the BLM would lose the current or potential treatment of existing or new infestations of noxious weeds because these weeds are currently treated through agreements with permittees to spray, under the terms and conditions of grazing permits or leases. Under Alternative A, grazing would be managed to achieve the standards of rangeland health, which would address GRSG habitat requirements under most scenarios. However, the potential for project infrastructure up to 0.25 mile of leks under Alternative A could cause fragmentation, raptor perches, and inappropriate fence locations and designs. Alternatives B and D would also manage grazing to achieve the standards of rangeland health. Under the Proposed Plan Amendment, grazing permits in SFA would be prioritized for review to benefit GRSG habitat. These alternatives also put specific focus on GRSG habitat requirements in PHMA to minimize adverse impacts from livestock and project infrastructure. (An example would be implementing a rest-rotation grazing system to increase residual grass heights, but additional fencing would be required to implement the rotation. Proper sighting and marking the fences reduces, but does not eliminate,

Table 2-6
Summary of Impacts on GRSG[1]

Resource/Resource Use	Alternatives A—D and Proposed Plan Amendment
	impacts on GRSG. The assumption is that GRSG would benefit more from taller grasses in a rest-rotation grazing system than they would from being harmed by additional fencing.) Because Alternative C closes PHMA and GHMA to grazing, fine fuels could increase and weed control would be reduced. In addition, potential actions taken on private land to compensate for loss of public grazing might affect GRSG habitat and could be substantial (for example, hundreds of miles of new fencing could be constructed to hold livestock on private lands). Alternatives B, C and D, and the Proposed Plan Amendment would respond to the COT report objectives of meeting ecological conditions to maintain or restore healthy sagebrush shrub and native perennial grass and forb communities, and to conserve the essential habitat components for GRSG, including nesting cover and shrub cover. Alternatives B and D, and the Proposed Plan Amendment would also respond to the COT objective of minimizing impacts on GRSG from fences and sagebrush conversion to agriculture. However Alternative C (no grazing) would require additional fencing to restrict no-grazing areas in GRSG habitat and thus would not meet this objective. As a result of removal of grazing from PHMA and GHMA in Alternative C, there is the potential for increased conflicts between grazing and other land uses on adjacent non-federal lands. For example, under this alternative, if permittees and lessees were to lose forage currently provided on BLM-administered lands, ranchers may try to increase forage production on their private or other leased lands, potentially accelerating loss of GRSG habitat on those lands.
Summary of Impacts on GRSG from Invasive Species	Due to climate conditions, annual grasses do not currently threaten the planning area, unlike the current situation in the Great Basin. Under all alternatives and the Proposed Plan Amendment, the spread of weeds would be managed using integrated vegetation management as resources allow. The action alternatives respond to the COT report objective of implementing actions to maintain and restore healthy sagebrush communities. Alternative C prioritizes restoration of infestations, but limits treatments for addressing weeds by eliminating grazing; currently the BLM treats noxious weeds through agreements with grazing permittees. Eliminating grazing in Alternative C would also increase fine fuels, which would increase the probability of wildfire and associated weeds.
Summary of Impacts on GRSG from Disease	See RDFs in **Appendix C** for Alternatives B and C, and in **Appendix D** for Alternative D and the Proposed Plan Amendment, for a description of RDFs to reduce the threat of West Nile virus.

Table 2-6
Summary of Impacts on GRSG[1]

Resource/Resource Use	Alternatives A—D and Proposed Plan Amendment
Summary of Impacts on GRSG from Wildfire and Fuels Treatment	Alternative A manages wildlfire effectively but Alternatives B, C and D, and the Proposed Plan Amendment would provide additional protection to sagebrush habitat during fire management. Under all alternatives, except Alternative C, and the Proposed Plan Amendment, anticipated threats from wildfire remain constant (estimated 2,000 acres burned over a decade). Alternative C would have slightly increased threats from wildfire relative to the other alternatives due to the increase in fine fuel loading resulting from reduced grazing. All alternatives and the Proposed Plan Amendment would respond to the COT report objective of retaining and restoring healthy native sagebrush plant communities by limiting prescribed fire and prioritizing wildlife suppression in GRSG habitat areas.
Summary of Impacts on GRSG from Solid Mineral Development	All the action alternatives respond to the COT report objective to maintain GRSG populations with no net loss of GRSG habitat in areas affected by mining. Alternatives B and C, and the Proposed Plan Amendment would be more protective of GRSG and habitat than Alternatives A and D, though Alternative D has reclamation actions in common with Alternative B. Effective mitigation for existing mining claims and salable mineral sites is similar across Alternatives B, C, D and the Proposed Plan Amendment. Alternative D and the Proposed Plan Amendment provide a greater number of RDFs to be considered as necessary and appropriate to mitigate impacts. The Proposed Plan Amendment would provide additional protections to GRSG and habitat by implementing density and disturbance caps, adaptive management, lek buffers, and regional mitigation, which would further support the COT report objectives.

2.13 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Table 2-7 presents a comparison summary of impacts from management actions proposed for Alternatives A – D and the Proposed Plan Amendment. **Chapter 4** provides a more detailed impact analysis.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
GREATER SAGE-GROUSE				
See **Table 2-6** for summary of impacts on GRSG.				
LANDS AND REALTY				
No impacts, decision area would remain open to ROWs.	233,219 acres (PHMA) managed as ROW exclusion area and 112,341 acres managed as ROW avoidance area would prohibit or restrict new ROW authorizations. Could extend processing time for renewals of existing ROW authorizations and make siting of new linear or block ROWs more difficult. Exclusion areas could potentially shift development onto private land.	345,560 acres (PHMA and GHMA) managed as ROW exclusion area. In addition, prohibiting new road construction within 4 miles of active leks would limit development to 21% of the decision area. Exclusion areas could potentially shift development onto private land.	233,219 acres (PHMA) managed as ROW avoidance area would result in increased application processing time and costs due to the potential need to relocate facilities or due to greater design, mitigation, and siting requirements.	345,560 acres (PHMA and GHMA) managed as ROW avoidance for major ROWs, combined with additional RDFs for certain types of ROWs, would result in increased application processing time and costs due to the potential need to relocate facilities or due to greater design, mitigation, and siting requirements. Minor ROWs would be less impacted since PHMA would be managed as avoidance

[1]For a full discussion of impacts for any of the resources, refer to the appropriate section in **Chapter 4**.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				areas and GHMA as open with the application of RDFs. Adaptive management, density ad disturbance caps, regional mitigation, and lek buffers could limit future authorizations in certain areas.
VEGETATION (INCLUDING NOXIOUS WEEDS; RIPARIAN AND WETLANDS)				
ROW development would continue to impact vegetation.	ROW exclusion areas in PHMA (233,219 acres) would preclude loss or alteration of vegetation, and spread of invasive weeds in these areas from development. ROW avoidance areas in GHMA (112,341 acres) would likely reduce these types of disturbances to vegetation in these areas. Potential indirect impacts on vegetation from developing on private lands.	ROW exclusion areas in PHMA and GHMA (345,560 acres) would preclude loss or alteration of vegetation, and spread of invasive weeds from development in these areas. Indirect impacts on vegetation on private lands similar to Alternative B.	ROW avoidance areas in PHMA (233,219 acres) would reduce, but not eliminate loss or alteration of vegetation, and spread of invasive weeds from development in these areas.	ROW avoidance areas in PHMA and GHMA (345,560 acres) would reduce future impacts from human disturbance and infrastructure from development in these areas. ROW exclusion areas in PHMA (233,219 acres) for wind and solar energy would preclude impacts from these types of developments. Adaptive management, density

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				and disturbance caps, regional mitigation, and lek buffers offer incidental protection for vegetation by maintaining or restoring habitat and by limiting habitat disturbance in certain areas.
Grazing practices may have negative, neutral, or positive effects on vegetation; land health assessments and other management evaluations would be intended to identify areas of concern to maintain or improve rangeland health, which would improve vegetation condition.	Incorporating GRSG habitat objectives and management considerations into livestock grazing management would reduce, but would not eliminate, impacts from grazing on vegetation communities.	Grazing would be eliminated in PHMA and GHMA (reducing available AUMs). Livestock use of riparian zones would be limited to maintain PFC and benefit wildlife habitat. The reduction in grazing AUMs could ultimately reduce rangeland health by facilitating spread of weeds and fuel buildup.	Grazing management would be similar to Alternative B, with increased collaboration with stakeholders, guidance for prioritization of efforts, and increased tools available to improve flexibility in management.	Impacts from livestock grazing management would be similar to Alternative D. Habitat quality would be improved and protected through addressing areas not meeting Land Health Standards and implementation of RDFs.
Development of existing fluid mineral leases would continue to cause impacts on vegetation, including removal or degradation of vegetation and potential spread of invasive species.	RDFs required as COAs on existing fluid mineral leases in PHMA would reduce the impacts on vegetation compared to Alternative A.	RDFs required as COAs on existing fluid mineral leases in PHMA and GHMA would reduce the impacts on vegetation compared to Alternative A.	Reduction of impacts from applying RDFs similar to Alternative B.	Impacts would be similar to those under Alternative D. Additional restrictions on geophysical exploration within

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				PHMA would have a beneficial incidental impact on vegetation in the planning area. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for vegetation by maintaining or restoring habitat and by limiting habitat disturbance in certain areas.
Noxious weeds on affected grazing allotments would be controlled through weed control cooperative range improvement project agreements. The holder of a ROW would be responsible for weed control on disturbed areas within the limits of the ROW. The holder would be responsible for controlling invasive weeds control for the life of the ROW plus 3	Impacts would be the same as those under Alternative A.	The BLM would control all noxious weeds on all affected grazing allotments. Impacts from weed control in ROWs would be the same as those under Alternative A.	Impacts would be the same as those under Alternative A.	Impacts would be the same as those under Alternative A.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
years. The holder is responsible for consultation with the authorized officer or local authorities for acceptable weed control methods.				
WILDLAND FIRE MANAGEMENT AND ECOLOGY				
Few restrictions on fire and fuels management would have the fewest impacts on fire. Due to the flexibility in management of prescribed and wildland fires, fire suppression costs are likely to be lower compared with all action alternatives.	Restrictions in PHMA (233,219 acres) could impact ability to efficiently manage fuels and could increase costs of vegetation management and fire suppression.	Impacts from seasonal closures and restrictions would be similar to Alternative B but would apply to both the GHMA and PHMA (345,560 acres). The limitations would be more restrictive under this alternative, resulting in the greatest impacts on the fire and fuels management program.	Impacts would be similar to those described in Alternative C, with restrictions on fuels treatment options in both the PHMA and GHMA (345,560 acres). Fire suppression actions and related impacts would be the same as described under Alternative C.	Burn plans and additional NEPA analysis for prescribed fire could impact the efficiency with which fuels are managed. Prescribed fire has played only a minor role in vegetation management in the past; therefore, impacts would be only slightly greater than Alternatives B, C, and D.
Lack of restrictions on resource uses such as mineral development, ROW development, and recreation could mean greater risk of human-induced ignition which could result in an	Limitations on resource uses such as recreation, mineral development, and ROW authorizations in PHMA would decrease the chance of human ignition and consequently decrease	Limitations on resource uses such as recreation, mineral development, and ROW authorizations would occur, but would include PHMA and GHMA; therefore, the risk of human caused ignition	Impacts from recreation, mineral development, and ROW authorizations would be similar to those under Alternative B.	Impacts would be similar to those described in Alternative D. Additional restriction on development including the density

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
increased need for fire management.	wildfire risk.	would be decreased in both of these areas.		and disturbance caps, additional ROW exclusion and avoidance areas, and restrictions on new recreation facilities would decrease the chance of human ignition and consequently decrease wildfire risk.
FLUID MINERALS				
Existing oil and gas leases would continue to be developed according to their lease terms. COAs could be applied on a case-by-case basis.	All existing leases on federal oil and gas estate in PHMA (233,219 acres) would be subject to RDFs and conservation measures applied as COAs. These COAs would place additional limits on siting, design, and operations of fluid mineral development.	Similar to Alternative B except that COAs would be applied to existing leases in PHMA and GHMA (345,560 acres).	Similar to Alternative C, COAs would be applied to existing leases in PHMA and GHMA (345,560 acres), except with greater flexibility for site-specific modifications.	Similar to Alternative D, COAs would be applied to existing leases in PHMA and GHMA (345,560 acres). Adaptive management, density and disturbance caps, regional mitigation, and lek buffers would also potentially restrict siting.
SOLID LEASABLE MINERALS				
Constraints and closures would cover the smallest area of any alternative; approximately 2,535 acres	All PHMA (284,337 acres, or 62% of the solid minerals decision area) would be closed to	Impacts would be similar to Alternative B except that more acres (457,774 acres, or 100% of the solid minerals	Management of solid leasable minerals would be similar to Alternative A, except that new	Impacts would be similar to Alternative B. Adaptive management, density

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
(less than 1%) of the federal solid mineral estate would remain closed to solid minerals, precluding future leasing in these areas.	nonenergy solid mineral leasing. RDFs on existing nonenergy solid mineral leases in PHMA would place limitations on road design, construction, and use; restrict operations to minimize surface disturbance; limit construction; maximize reclamation efforts to meet GRSG habitat needs; and place other standards and restrictions on solid mineral operations.	decision area) would be closed to nonenergy solid mineral leasing, and more acres with existing leases would be subject to the mandatory application of the solid mineral RDFs.	prospecting permits would be subject to the RDFs.	and disturbance caps, regional mitigation, and lek buffers would also potentially restrict siting.
SOLID MINERALS (LOCATABLE MINERALS)				
Approximately 5,971 acres (approximately 1% of the total federal solid mineral estate for locatable minerals in the decision area) would remain withdrawn to the location of mining claims.	BLM would recommend to withdrawal an additional 281,900 acres. However, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.	BLM would recommend to withdrawal an additional 457,774 acres. However, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.	Management would be similar to that under Alternative A except that RDFs and conservation measures could be applied to any Notice or Plan of Operations where possible. However, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.	The BLM would recommend for withdrawal an additional 53,440 acres. However, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
SOLID MINERALS (SALABLE MINERALS)				
Constraints and closures would cover the smallest area of any alternative (2,535 acres closed to the disposition of salable minerals and 0 acres managed as ROW exclusion area), resulting in the fewest restrictions on the disposition of salable minerals.	Construction of new roads in ROW exclusion and avoidance areas would likely decrease, thereby decreasing demand for salable minerals needed for construction and maintenance. Approximately 284,337 acres of federal mineral estate in PHMA (62% of the solid minerals decision area) would be closed to salable mineral disposal. Solid mineral RDFs would apply to existing salable mineral operations in PHMA and would place limitations on road design, construction, and use; restrict operations to minimize surface disturbance; limit construction; maximize reclamation efforts to meet GRSG habitat needs; and place other standards and restrictions on solid mineral operations.	Because all PHMA and GHMA would be closed to salable minerals disposal, the ROW exclusion areas would not impact the salable minerals program. Approximately 457,774 acres of federal mineral estate in PHMA and GHMA (100% of the solid minerals decision area) would be closed to salable mineral disposal, the most of any alternative. Similar to Alternative B, RDFs would be applied to salable mineral operations in PHMA and GHMA. Because more acres would be within PHMA and GHMA under Alternative C, the impacts of applying these RDFs would increase.	Construction of new roads in ROW areas would likely decrease, thereby decreasing demand for salable minerals needed for construction and maintenance. No additional lands would be closed to the disposition of salable minerals or managed as ROW exclusion area. Impacts from RDFs placed on solid minerals would be the same as Alternative B.	Construction of new roads in ROW areas would likely decrease, thereby decreasing demand for salable minerals needed for construction and maintenance. Approximately 284,337 acres of federal mineral estate in PHMA (62% of the solid minerals decision area) would be closed to salable mineral disposal. Impacts would be mitigated because new free use permits and expansion of existing pits would still be allowed in PHMA. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers could

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				impact salable mineral activities by preventing new surface development.
COMPREHENSIVE TRAVEL AND TRANSPORTATION MANAGEMENT				
Existing travel opportunities for motorized travel would be maintained and there would be no impact on travel management.	Impacts on travel would be slightly greater than Alternative A because future enhancements to the route network would be limited.	Prohibiting new road construction within 4 miles of active GRSG leks would result in the closure of 274,435 acres (79% of the decision area) to new road construction. This action, along with limitations on route enhancements in PHMA and GHMA, would result in site-specific loss of access and diminished route network quality.	Impacts on travel under Alternative D would be similar to Alternative B. During route designation and travel planning, management would minimize impacts on travel and transportation management.	Impacts would be similar to those under Alternative D. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers could limit travel route miles and the types of activities allowed on those routes.
RECREATION				
The planning area would be closed to cross-country motorized travel; therefore, limiting recreational OHV use to existing routes.	Impacts from CTTM would be slightly greater than Alternative A because future enhancements to the route network and impact motorized travel would be limited.	Limitations on new road construction within 4 miles of active leks, along with limitations on route enhancements in PHMA and GHMA, would limit opportunities for increased recreational access.	Impacts from CTTM would be similar to those under Alternative B.	Impacts from CTTM would be similar to those under Alternative B.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
BLM would continue to manage for dispersed recreation activities. The BLM would continue to issue SRPs on a case-by-case basis.	Impacts from recreation management would be similar to those under Alternative A, with the exception that in PHMA (233,219 acres) the BLM would only allow SRPs that have a neutral or beneficial effect on PHMA. This could result in a reduction in the number or type of recreation opportunities in PHMA permitted through SRPs.	There would be no impacts from recreation management.	Impacts would be similar to those under Alternative B.	Impacts would be similar to those under Alternative B, except that restricting new recreation facilities in PHMA that do not result in a net conservation gain could reduce long term the recreational opportunities and activities in these areas.
Potential impacts on recreation during construction and operation of facilities in ROWs.	A long-term reduction in the amount of acres dedicated to ROWs and above-ground linear features would improve recreation opportunities.	Managing areas as ROW exclusion in the PHMA and GHMA (345,560 acres), with the exception of 843 acres of unitized areas, would protect recreational opportunities in those areas and protect the desired settings in the Judith Valley Special Recreation Management Area (SRMA) and 11 Extensive Recreation Management Areas (ERMAs).	Designation of the PHMA (233,219 acres) as a ROW avoidance area would benefit recreation activities in undeveloped settings. Limitations on ROW development would also preserve the existing recreation settings in each of the 11 ERMAs in PHMA.	Impacts would be similar to those under Alternative D, except that there would be additional restrictions on major ROWs in GHMA. This would provide a greater benefit to recreation that take place in undeveloped settings by further limiting the type of development allowed in these areas.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				Adaptive management, density and disturbance caps, regional mitigation, and lek buffers could limit future placement of recreation facilities in certain areas. However, these same actions, along with management responses to adaptive management hard triggers, could limit other types of development that could conflict with recreation opportunities and activities.
Impacts on recreation users from mineral development would include activities and disturbance related to exploration, development, and operations.	Restriction such as timing limitations on fluid mineral development in PHMA (233,219 acres) and closure of all PHMA areas to salable mineral disposal, would decrease the potential for development conflicting with recreation users.	Impacts from mineral development would be similar to those under Alternative B, but would apply to both the PHMA and GHMA (345,560 acres).	Impacts from minerals development would be similar to those under Alternative B.	Impacts would be similar to those under Alternative D, except that PHMA would be closed to new mineral material sales. This would provide a greater level of protection for recreation

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				activities and opportunities by limiting surface disturbance in these areas. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers could limit future placement of recreation facilities in certain areas. However, these same actions, along with management responses to adaptive management hard triggers, could limit other types of development that could conflict with recreation opportunities and activities.
RANGE MANAGEMENT				
Lands would be maintained and restored to maintain healthy ecological conditions,	Additional conservation measures specific to GRSG habitat would be	All PHMA and GHMA would be closed to grazing, resulting in a total closure of	Impacts on grazing systems would be similar to those described in Alternative B.	Impacts on grazing systems would be similar to those

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
and efforts to manage BLM-administered rangeland would be directed first to allotments not meeting rangeland health standards due to current livestock grazing. In general, Alternative A also has the fewest surface use restrictions that would limit range improvements and livestock management. As a result, permittees/lessees would have the greatest flexibility for management. Adjustments to grazing system, class of livestock and other lease/permit conditions would be made upon renewal of the grazing authorization as required by site specific conditions; therefore, impacts would occur at this point.	incorporated consistent with management and constraints. Completion of land health assessments during renewal of grazing permits/leases would be prioritized within PHMA. As a result, impacts on range management would be most likely to occur in these areas. Structural range improvements would be allowed in PHMA but costs and time to construct these structures may be increased due to GRSG conservation measures; full utilization of permitted AUMs may be impacted.	337,165 acres and a reduction of 69,408 AUMs of forage available for grazing. Closure of the areas to grazing has the potential to result in economic impacts on lessees/permittees. Closures would also impact the effectiveness of current seasonal grazing rotations or other management strategies that utilize both BLM-administered and private lands.	Similar to Alternative B, the BLM would prioritize completion of land health assessments in PHMA.	described under Alternatives B and D. The BLM would prioritize completion of land health assessment and determination for allotments not meeting land health standards in PHMA, focusing on riparian areas. Adjustments to grazing management or authorized grazing use level would follow the priority schedule and would be tailored to achieve Land Health Standards and specific management thresholds based on GRSG habitat objectives. Impacts would occur on an allotment scale as management changes were implemented. The level and intensity of impacts

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				would vary on a site-specific basis. Adaptive management measures could modify grazing strategies outside of the permit renewal schedule if certain GRSG habitat triggers were met (per **Section 2.7.1**).
There is some potential for disturbance or conflicts with livestock grazing from other resource uses, including recreational activities, ROW development (limited disturbance in 9,708 acres of ROW avoidance area) and mineral development (45,012 acres open to grazing and fluid mineral development).	Potential for disturbance or conflicts with livestock grazing from other resource uses would be reduced in this alternative as compared to Alternative A, including recreational activities, fire, ROW development (limited disturbance in 106,508 acres of ROW avoidance areas and 230,501 of ROW exclusion areas) and mineral development (29,778 acres of existing fluid mineral development leases are open to livestock grazing in PHMA, 33% less than Alternative A).	Impacts on livestock grazing from various resources and resource uses would be limited due to the closure of PHMA and GHMA to grazing. Impacts on grazing in areas outside of PHMA and GHMA could be increased should grazing or development increase in intensity in these areas.	Potential for disturbance or conflicts with livestock grazing from other resource uses would be similar to Alternative B, including recreational activities, fire, ROW development (240,087 acres would be proposed as a ROW avoidance area within area open to livestock grazing in PHMA or GHMA) and the same as Alternative B for mineral development.	Potential for disturbance or conflicts with livestock grazing from other resource uses would be similar to those under Alternatives B and D. Additional limits would be imposed on ROW development in GHMA (106,495 acres ROW avoidance area within area open to livestock grazing). The addition of the density and

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				disturbance caps on human disturbance would further limit the potential for disturbing livestock grazing from mineral and ROW development.
Noxious weeds on affected grazing allotments would be controlled through cooperative range improvement project agreements.	Impacts would be the same as those under Alternative A.	The BLM would control all noxious weeds on grazing allotments.	Impacts would be the same as those under Alternative A.	Impacts would be the same as those under Alternative A.
AREAS OF CRITICAL ENVIRONMENTAL CONCERN				
Impacts on values of the existing Acid Shale-Pine Forest ACEC would continue from authorized land uses, including grazing, recreation, and motorized use. Managing the ACEC as ROW avoidance area would protect the relevant and important values.	Impacts would be the same as those under Alternative A.	Management for the Acid Shale-Pine Forest ACEC would continue to be tailored to protect the relevant and important values for which the ACEC was originally designated. Establishing a GRSG ACEC would provide restrictions on authorized land uses within the new ACEC.	Impacts would be the same as those under Alternative A.	Impacts would be the same as those under Alternative A.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
AIR QUALITY				
No changes to visibility and human health would occur.	Fires would be less likely to occur, resulting in fewer impacts on air resources, including visibility and human health, compared with Alternative A.	Impacts on air resources from fire and fuels management would be similar to those described under Alternative B, except restrictions would be applied to PHMA and GHMA. However, grazing may reduce fine fuel buildup, so removing it could increase the occurrence of large wildfires, given the potential impact on weed control.	Impacts would be similar to those described under Alternative B. Placing an emphasis on improving habitat may reduce the risk of significant wildfires, resulting in fewer impacts on air resources, including visibility and human health.	Impacts would be similar to those under Alternative B. Closing acres to nonenergy leasable mineral exploration and development and salable mineral disposal could decrease emissions from fuel combustion, construction equipment, and surface disturbance. Fire risk would be reduced, which would reduce impacts on human health, as compared to Alternative A.
No changes to criteria air pollutant or hazardous air pollutant emissions would occur.	Closing areas with 281,900 acres of solid mineral potential to development would have the potential to result in fewer impacts on air resources, including visibility and human health.	Closing 457,774 acres to salable material disposal and nonenergy solid mineral leasing would have the potential to result in fewer impacts on air resources, including visibility and human health.	Impacts from solid minerals would be the same as those under Alternative A.	Closing 281,900 acres to salable mineral disposal and nonenergy leasable mineral exploration and development could result in fewer impacts on air

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				resources, including visibility and human health.
CLIMATE				
No changes to greenhouse gas (GHG) emissions would occur.	Fires would be less likely to occur, resulting in fewer GHG emissions, because management actions would decrease the risk of human-caused ignitions and increase the level of fire suppression in the PHMA (233,219 acres).	Impacts from fire and fuels management would be similar to those described under Alternative B, except restrictions on both resource use and fuels treatment options would be applied to the PHMA and GHMA (345,560 acres). However, grazing may reduce fine fuel buildup, so removing it could increase the occurrence of large wildfires, given the potential impact on weed control.	Impacts would be similar to those described under Alternative B. Placing an emphasis on improving habitat may reduce the risk of significant wildfires, resulting in fewer GHG emissions.	Impacts would be the same as those described under Alternative D.
No changes to GHG emissions would occur.	Closing areas with 281,900 acres of solid mineral potential to development would have the potential to result in fewer releases of GHGs.	Closing 457,774 acres to salable material disposal and nonenergy solid mineral leasing would have the potential to result in fewer emissions of GHGs.	Impacts from solid minerals would be the same as those under Alternative A.	Closing 281,900 acres to salable mineral disposal and nonenergy leasable mineral exploration and development could result in fewer releases of GHGs.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
SOIL RESOURCES				
Motorized use of existing roads and trails would result in the potential for disturbance and compaction of soils.	Some reduction in routes and limitations on new routes, as well as upgrades to existing routes, could result in the potential for reduction of disturbance and compaction of soils in the PHMA (233,219 acres).	Impacts on soil resources would be similar to those under Alternative B, although impacts would be further reduced since protections would apply to both the PHMA and GHMA (345,560 acres) and the BLM would apply additional mitigation requirements.	Impacts on soil resources from travel would be similar to those described under Alternative B.	Impacts would be the same as those described under Alternative D.
Soil conditions could continue to be degraded where land use authorizations were approved.	Managing 233,219 acres as ROW exclusion areas and 122,341 acres as ROW avoidance areas would reduce impacts on soil resources from surface disturbing activities related to ROW development.	Managing 345,560 acres as ROW exclusion areas would reduce impacts on soil resources from surface disturbing activities related to ROW development.	Managing 233,219 acres as ROW avoidance areas would reduce impacts on soil resources from surface disturbing activities related to ROW development.	ROW avoidance in PHMA and GHMA (345,560 acres) for major ROWs, and in GHMA (112,341) for minor ROWs would reduce the impacts on soil resources from surface-disturbing activities related to ROW development. Additionally, the PHMA (233,219 acres) would be managed as ROW exclusion to wind and solar energy ROWs, reducing

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				disturbance and compaction impacts. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for soil resources by reducing the disturbance in certain areas.
Grazing would continue to alter vegetative and biological soil crust communities.	Impacts from grazing would be similar to those under Alternative A with the addition of GRSG habitat objectives and management considerations incorporated into all BLM AMPs within the PHMA (233,219 acres), and the option of voluntary retirement of permitted grazing uses in the PHMA, which could further reduce soil compaction, soil erosion, and vegetation loss.	Removal of grazing in the PHMA and GHMA (345,560 acres) would provide the potential for soil health to improve in areas where Rangeland Health Standards (**Appendix F**) are not met due to current livestock grazing.	Additional incorporation of GRSG habitat objectives into all AMPs, and the addition of GRSG management considerations into AMPs of allotments on the PHMA (233,219 acres), along with improving the GHMA (112,341 acres) habitats for GRSG could improve soil conditions in these areas.	Impacts would be the same as those described under Alternative D.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
Impacts on soils associated with development of existing fluid mineral leases would continue.	RDFs and conservation measures applied as COAs on existing leases in the PHMA (233, 219 acres) would include surface use restrictions on existing federal leases, which would protect portions of the decision area from the soil impacts associated with oil and gas exploration, development, and production.	RDFs and conservation measures applied as COAs on existing fluid mineral leases in the PHMA and GHMA (345,560 acres), which would protect more areas from the soil impacts.	RDFs and conservation measures applied as COAs on existing leases in the PHMA and GHMA (345,560 acres), which would protect more areas from the soil impacts.	Impacts would be similar to those under Alternative D. Additional restrictions on geophysical exploration within PHMA would have a beneficial incidental impact on soil resources in the planning area. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for soil resources by reducing disturbances in certain areas.
Impacts on soils associated with development of solid minerals would continue.	Impacts on soil resources from solid mineral development would be less than Alternative A with 281,900 acres closed to mineral entry. RDFs would place limitations on road design, construction, and	Impacts from solid minerals would be the least of all the alternatives with all GRSG habitat areas (457,774 acres) managed as closed to mineral entry. Salable mineral pits within the PHMA (233,219, acres)	Impacts on soil resources from solid mineral development would be less than under Alternative A with 453,969 acres closed to mineral entry. RDFs would place limitations on road design,	Impacts on soil resources from solid mineral development would be similar to those under Alternative A. RDFs would place limitations on road

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
	use; restrict operations to minimize surface disturbance.	would be restored, which would increase soil health more than Alternative A. RDFs would place limitations on road design, construction, and use; restrict operations to minimize surface disturbance.	construction, and use; restrict operations to minimize surface disturbance.	design, construction, and use; operations would be restricted to minimize surface disturbance. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for soil resources by reducing disturbance in certain areas.
WATER RESOURCES				
Impacts from human-made runoff of soils and chemicals into waterways would continue as a result of ROW development.	Impacts from human-made runoff of soils and chemicals into waterways would be less than Alternative A with 233,219 acres (PHMA) managed as ROW exclusion areas.	Impacts from human-made runoff of soils and chemicals into waterways from ROW development would be the least of all the alternatives with PHMA and GHMA (345,560 acres) managed as ROW exclusion area.	Impacts from ROW development would be similar to those under Alternative A.	ROW avoidance areas in the PHMA and GHMA (345,560 acres) and in the GHMA (122,341) for minor ROWs, would reduce runoff and contamination of water resources from surface-disturbing activities related to ROW development. Additionally, the PHMA (233,219

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
				acres) would be managed as ROW exclusion to wind and solar energy ROWs, reducing these same types of impacts. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for water resources by reducing runoff and contamination in certain areas.
The BLM would continue to maintain the PFC of riparian and wetland areas. Water sources would be developed where needed (as indicated by monitoring) to improve GRSG habitat. Waters used by GRSG that are adversely affected by uncontrolled livestock use would be fenced.	Incorporating GRSG habitat objectives and management considerations into livestock grazing management could reduce, but would not eliminate, impacts from grazing on water resources. Impacts would be similar to those under Alternative A.	Reduced grazing AUMs could increase the potential for cleaner surface flows into waterways and improve access to water sources.	Impacts would be similar to Alternative A but additional range improvements in PHMA could improve water resources.	Impacts would be the same as those described under Alternative D.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
Impacts from human-made runoff of soils and chemicals into waterways associated with development of existing fluid mineral leases would continue.	Impacts from fluid mineral development would be less than those under Alternative A. All existing leases on federal oil and gas estate in the PHMA (233,219 acres) would be subject to RDFs applied as COAs.	Impacts from fluid mineral development would be the least of all the alternatives. All existing leases on federal oil and gas estate in the PHMA and GHMA (345,560 acres) would be subject to RDFs applied as COAs.	Impacts from implementing RDFs as COAs in the PHMA and GHMA (345,560 acres) would be similar to those under Alternative C.	Impacts would be similar to those under Alternative D. Additional restrictions on geophysical exploration within PHMA would have a beneficial incidental impact on water resources in the planning area. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for water resources by reducing disturbance in certain areas.
Impacts on water resources associated with development of solid minerals would continue.	Impacts on water resources from solid mineral development would be less than Alternative A with 279,097 acres closed to mineral entry. RDFs would place limitations on road design, construction,	Impacts from solid minerals would be the least of all the alternatives with the PHMA and GHMA (345,560 acres) managed as closed to mineral entry. Salable mineral pits within the PHMA (233,219 acres)	Impacts on water resources from solid mineral development would be less than Alternative A with 453,969 acres closed to mineral entry. RDFs would place limitations on road design,	Impacts on water resources from solid mineral development would be less than Alternative A, with 281,854 acres closed to mineral entry. RDFs would place

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
	and use; restrict operations to minimize surface disturbance.	would be restored, which would increase soil health more than Alternative A. RDFs would place limitations on road design, construction, and use; restrict operations to minimize surface disturbance.	construction, and use; restrict operations to minimize surface disturbance.	limitations on road design, construction, and use; operations would be restricted to minimize surface disturbance. Adaptive management, density and disturbance caps, regional mitigation, and lek buffers offer incidental protection to water resources by reducing disturbance in certain areas.
SPECIAL STATUS SPECIES—OTHER SPECIES OF ISSUE				
Travel may result in human disturbance, degradation of habitat, or mortality of special status species.	Route construction in the PHMA (233,219 acres) would be limited to realignments of existing roads, or built or upgraded to minimum standards necessary, which would reduce impacts from disturbance, changes to habitat, and mortality on special status species in these areas.	Additional restrictions on new road construction in the PHMA and GHMA (345,560 acres) would reduce impacts from disturbance, changes to habitat, and mortality on special status species in these areas.	Impacts from travel would be similar to those under Alternative B, with increased management flexibility incorporated to improve management and target those areas that need most protection.	Impacts would be the same as those under Alternative D.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
9,708 acres of habitat would continue to be managed as ROW avoidance area which would protect special status species from human-related disturbance and habitat alteration.	ROW exclusion areas in the PHMA (233,219 acres) would preclude future impacts from human disturbance and infrastructure in these areas. Additionally, ROW avoidance areas (112,341 acres) in the GHMA would further reduce these impacts. However, due to the large aerial extent and variety of ownerships (non-BLM) within the PHMA (974,735 acres) and the GHMA (899,659 acres), impacts on special status species would still continue to occur. Potential indirect impacts on special status species from developing on private lands.	ROW exclusion areas in the PHMA and GHMA (345,560 acres) would preclude future impacts from human disturbance and infrastructure in these areas. Potential indirect impacts on special status species from developing on private lands.	ROW avoidance areas in the PHMA (233,219 acres) would reduce future impacts from human disturbance and infrastructure from development in these areas. Impacts from ROW development in the GHMA (112,341 acres) would be mitigated.	ROW avoidance areas (366,032 acres) would reduce future impacts from human disturbance and infrastructure from development in these areas. ROW exclusion areas in the PHMA (233,219 acres) for wind and solar energy would preclude impacts from these types of developments.
Livestock grazing practices could have negative, neutral or positive effects on special status species through development and monitoring of AMPs or similar grazing plans. Grazing systems would consider restricting livestock from riparian areas	Incorporating GRSG habitat objectives and management considerations into livestock grazing management would reduce, but would not eliminate, impacts from grazing on vegetation communities. These efforts would also	Grazing would be removed from 337,165 acres of grazing lands, which would include the removal of 69,408 AUMs. This action would likely reduce the impacts on special status species from grazing. However, removal of grazing	If an effective grazing system meeting GRSG habitat objectives is not in place, the permit renewal process would examine at least one alternative to restore this habitat. This could benefit special status species which occupy	Impacts from livestock grazing management would be similar to those under Alternative D. Habitat quality would be improved and protected through addressing areas not

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
which would decrease impacts on riparian vegetation health and therefore increase the availability of wildlife special status species.	promote the health of potential habitats, including sagebrush steppe, riparian areas, and wet meadows.	could allow for noxious weeds to spread and fuels to accumulate leading to an increase in wildfire risk. Also, these actions could further fragment the landscape with mixed land practices and water uses.	GRSG habitat.	meeting Land Health Standards and implementing RDFs.
Fluid mineral development of existing leases would continue to cause impacts on special status species related to surface disturbance and occupancy.	Applying RDFs as COAs to existing leases in the PHMA (233,219 acres) would reduce impacts on special status species and their habitats from activities related to surface disturbance and occupancy.	Impacts from fluid minerals would be similar to Alternative B except that COAs would be applied to existing leases in both the PHMA and GHMA (345,560 acres).	Impacts from fluid minerals would be the same as those under Alternative B.	Impacts from fluid minerals would be the same as those under Alternative B.
WILDLIFE				
Travel may result in human disturbance, degradation of habitat, or mortality of wildlife.	Route construction in the PHMA would be limited to realignments of existing roads, or built or upgraded to minimum standards necessary, which would reduce impacts from disturbance, changes to habitat, and mortality on wildlife in these areas.	Additional restrictions on new road construction in the PHMA and GHMA (345,560 acres) would reduce impacts from disturbance, changes to habitat, and mortality on wildlife in these areas.	Impacts from travel would be similar to those under Alternative B, with increased management flexibility incorporated to improve management and target those areas that need most protection.	Impacts from travel would be the same as those under Alternative D.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
9,708 acres of habitat would continue to be managed as ROW avoidance area which would protect wildlife from human-related disturbance and habitat alteration.	ROW exclusion areas in the PHMA (233,219 acres) would preclude future impacts from human disturbance and infrastructure in these areas. Additionally, ROW avoidance areas (112,341 acres) would be included for the GHMA, further reducing these impacts. However, due to the large aerial extent and variety of ownerships (non-BLM) within the PHMA (974,735 acres) and GHMA (899,659 acres), impacts on wildlife would still continue to occur. Potential indirect impacts on wildlife from developing on private lands.	ROW exclusion areas in the PHMA and GHMA (345,560 acres) would preclude future impacts from human disturbance and infrastructure in these areas. Potential indirect impacts on wildlife from developing on private lands.	ROW avoidance areas in the PHMA (233,219 acres) would reduce future impacts from human disturbance and infrastructure from development in these areas. Impacts from ROW development in GHMA (112,341 acres) would be mitigated.	ROW avoidance areas in the PHMA and GHMA (366,045 acres) would reduce future impacts from human disturbance and infrastructure from development in these areas. ROW exclusion areas in the PHMA for wind and solar energy would preclude impacts from these types of developments.
Livestock grazing practices could have negative, neutral or positive effects on wildlife through development and monitoring of AMPs or similar grazing plans. Grazing systems would consider restricting livestock from riparian areas which would decrease impacts on riparian	Incorporating GRSG habitat objectives and management considerations into livestock grazing management would reduce, but would not eliminate, impacts from grazing on vegetation communities. These efforts would also promote the health of	Grazing would be removed from 337,165 acres of grazing lands, which would include the removal of 69,408 AUMs. This action would likely reduce the impacts on wildlife from grazing. However, removal of grazing could allow for noxious weeds to spread and	If an effective grazing system meeting GRSG habitat objectives is not in place, the permit renewal process would examine at least one alternative to restore this habitat. This could benefit wildlife which occupy GRSG habitat.	Impacts from livestock grazing management would be similar to those under Alternative D. Habitat quality would be improved and protected through addressing areas not meeting Land Health

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
vegetation health and therefore increase the availability of wildlife habitat.	potential habitats, including sagebrush steppe, riparian areas, and wet meadows.	fuels to accumulate leading to an increase in wildfire risk. Also, these actions could further fragment the landscape with mixed land practices and water uses.		Standards and implementing of RDFs.
Fluid mineral development of existing leases would continue to cause impacts on wildlife related to surface disturbance and occupancy.	Applying RDFs as COAs to existing leases in the PHMA (233,219 acres) would reduce impacts on wildlife and their habitats from activities related to surface disturbance and occupancy.	Impacts from fluid minerals would be similar to those under Alternative B except that COAs would be applied to existing leases in both the PHMA and GHMA (345,560 acres).	Impacts from fluid minerals would be the same as those under Alternative B.	Impacts from fluid minerals would be the same as those under Alternative B.
RENEWABLE ENERGY				
Zero acres of lands with "Good" or better wind potential would be affected by ROW exclusion or avoidance areas. All lands with such potential would continue to be open for ROW applications on a case-by-case basis.	Seventy percent of lands with "Good" or better wind potential that are open for ROW applications under Alternative A would become ROW exclusion areas under Alternative B and would be closed. 5,595 fewer acres available for wind development without substantial restrictions. Nine percent of lands with "Good" or better wind potential available for ROW	Seventy-nine percent of lands with "Good" or better wind potential that are open for ROW applications under Alternative A would become ROW exclusion areas and would be closed.	Seventy-nine percent of lands with "Good" or better wind potential that are open for ROW applications under Alternative A would become ROW avoidance areas and would be subject to substantial restrictions compared to Alternative A.	Seventy percent of lands with "Good" or better wind potential that are open for ROW applications under Alternative A would become ROW exclusion areas under Alternative B and would be closed. Fifty-nine hundred fewer acres available for wind development without substantial

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
	applications within the decision area would be subject to substantial restrictions when compared with Alternative A.			restrictions. Nine percent of lands with "Good" or better wind potential available for ROW applications within the decision area would be subject to substantial restrictions, when compared with Alternative A.
SOCIAL AND ECONOMIC CONDITIONS				
Use of allocated forage on allotments in the planning area would generate an estimated 201 total jobs (direct, indirect, and induced) and $2.8 million in labor income (direct, indirect, and induced) in the five county economic impact areas, which includes Chouteau, Fergus, Judith, Meagher and Petroleum counties. This figure includes direct contributions of 128 jobs, which equates to about 29% of employment in the agricultural economic sector	It is anticipated that current economic contributions from allocated grazing on allotments covered under this RMPA would continue as described under Alternative A. Reductions in allotted grazing could, however, occur with voluntary retirement of allotments which would reduce economic contributions. This alternative may limit new ROWs or energy development within the planning area (233,219	As a result of the reductions in allocated forage, estimated employment decrease from 201 to 66 total jobs (direct, indirect, and induced) and labor income would decrease from $2.8 million to $931,000 (direct, indirect, and induced) on an average annual basis within the impact area economy. This estimate includes a direct employment decrease from 128 jobs to 42 jobs, which would correspond to a decrease from 29% to 10% of employment in this sector.	It is anticipated that current economic contributions from allocated grazing on allotments covered under this RMPA would continue as described under Alternative A. Impacts from new ROWs or energy development within the planning area would be as described in Alternative B. Impacts on recreation would be the same as discussed under	Impacts would be the same as those under Alternative D.

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
for the area. Land use authorizations would continue to support area communities and economies. Economic contributions from recreation would continue at current levels; approximately 8 jobs (direct, indirect, and induced) are associated with wildlife related recreation, and 12 jobs (direct, indirect, and induced) are associated with non-wildlife related recreation in the five-county impact area; approximately 1% of employment in sectors specifically attributable to tourism and recreation. Well-being and non-market values associated with GRSG habitat would continue at current levels, but are likely to be less than that of action alternatives.	acres or 39% of the decision area would be designated as exclusion areas for new ROW permits) and would consequently support communities and economies less than under Alternative A. If future SRP applications were denied (if not found to be neutral or beneficial to GRSG), there would be a less organized hunting opportunities on BLM-administered land in the decision area as compared with Alternative A. As a result economic contributions could be less than current contributions depicted under Alternative A. As a result of protective measures for GRSG habitat, well-being non-market values associated with GRSG habitat would be protected to a greater degree than Alternative A.	Decreases may not be as large predicted since actual use of allotments used in analysis of current conditions is below the permitted level of use. In addition, the decrease portrayed here could be less if alternative sources of forage is found for willing permittees. This alternative may limit new ROWs or energy development within the planning area (345,560 acres of the decision area would be designated as exclusion for new ROW permits) and would consequently provide less support to communities and economies than under Alternative A. If changes to recreation access occurred, there would be a reduction in recreation visitation on BLM-administered land in the decision area. As a result, economic contributions could be less than Alternative A.	Alternative B. Restoration projects associated with threatened and endangered species would be considered when prioritizing projects. As a result, well-being and non-market values associated with GRSG habitat would be less than Alternatives B and C. Due to uncertainty in how restoration projects are prioritized; a relative comparison to Alternative A cannot be made.	

Table 2-7
Summary of Environmental Consequences of Alternatives A—D and the Proposed Plan Amendment[1]

Alternative A *(No Action)*	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
		Policies would promote expansion of GRSG habitat. As a result, well-being and non-market values associated with GRSG habitat would be protected to a greater degree than the other alternatives.		
ENVIRONMENTAL JUSTICE				
While minority and low-income populations may exist in the area, none the alternatives are expected to have a disproportionately high and adverse human health or environmental effects on these communities. Impacts on local communities are expected to be negligible, and there is no reason to suspect that any impacts would disproportionately affect minority and low income populations.				

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Chapter 3
Affected Environment

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CHAPTER 3
AFFECTED ENVIRONMENT

3.1 CHANGES BETWEEN THE DRAFT EIS AND THE FINAL EIS

- A discussion of predators and predation was added in **Section 3.4.1**, Predation. Range-wide and Montana-specific average vitality rates for GRSG are provided in **Table 3-1**.
- **Section 3.6.1**, Conditions of the Planning Area, was revised as follows:
  - A discussion of forest communities was added.
  - The Montana Noxious Weed List was updated.
  - A discussion of cheatgrass within the planning area was added.
- **Section 3.6.3**, Trends, was revised as follows:
  - Recent conifer removal projects were added.
  - Discussion of climate change was added.
- Drilling and production statistics were updated in **Section 3.8.1**, Conditions of the Planning Area.
- Air Quality Data were updated in **Section 3.16.1**, Conditions of the Planning Area.
- Special status species listing data were updated in **Section 3.20.1**, Conditions of the Planning Area.

3.2 INTRODUCTION

This chapter documents the existing conditions and trends of resources in the planning area that may be affected by implementing any of the proposed alternatives described in **Chapter 2**. The affected environment provides the context for assessing potential impacts as described **in Chapter 4**.

The planning area for the Lewistown Field Office Greater Sage-Grouse RMPA/EIS is composed of BLM; Forest Service; USFWS; US Department of Defense; State of Montana; and private lands (refer to **Table 1-1**) in Chouteau, Fergus, Judith Basin, Meagher, and Petroleum Counties in central Montana. A map of the planning area is provided as **Figure 1-1** in **Appendix A**.

Though the planning area includes private lands, decisions are only made for BLM federal surface and federal minerals in this RMPA. Management direction and actions outlined in this EIS apply only to these BLM-administered lands in the planning area and to federal mineral estate under BLM jurisdiction that may lie beneath other surface ownership.

3.3 ORGANIZATION OF CHAPTER 3

This chapter contains sections describing the biological, physical, and human resources of the planning area affected by implementing the alternatives outlined in this EIS. The following critical elements of the human environment and resource programs are not present; do not have specific GRSG conservation goals, objectives, or management actions identified in the alternatives; or are not directly affected by the alternatives presented in this EIS:

- Visual Resources
- Cultural and Historic Resources
- Paleontological Resources
- Tribal Interests
- National Historic Trails
- Wild and Scenic Rivers

Implementation of any of the alternatives would result in general and unquantifiable indirect beneficial effects for the above resource programs in terms of greater protection through new restrictions on surface and resource use resulting in reduced opportunities for surface disturbance or habitat disruption where they exist. For further information on the affected environment of these resources and programs, please refer to the Affected Environment sections of the Judith Resource Area RMP and the Headwaters RMP being amended by this Lewistown Field Office Greater Sage-Grouse RMPA/EIS.

The following critical elements of the human environment and resources are specifically addressed in **Chapter 3** and **Chapter 4** of the Lewistown Field Office Greater Sage-Grouse RMPA/EIS.

- Greater Sage-Grouse
- Lands and Realty
- Vegetation (Including Noxious Weeds; Riparian and Wetlands)

- Wildland Fire Management and Ecology
- Fluid Minerals
- Solid Leasable Minerals
- Locatable Minerals
- Salable Minerals
- Comprehensive Travel and Transportation Management
- Recreation
- Range Management
- Areas of Critical Environmental Concern
- Air Resources
- Climate
- Soil Resources
- Water Resources
- Special Status Species – Other Species of Issue
- Fish and Wildlife
- Renewable Energy
- Social and Economic Conditions
- Environmental Justice

Each of the above resource sections in this chapter contains a discussion of existing conditions and trends:

- Existing conditions describe the location, extent, and current condition of the resource in the planning area in general and on BLM-administered lands. Conditions for a resource can vary, depending on the resource. For each resource, a general description of the existing conditions is provided for the planning area, regardless of land status. This is done to provide a regional context for the resource. Then, a more detailed description of the existing conditions is provided for the BLM-administered lands managed according to the Judith Resource Area Resource Management Plan and the Headwaters Resource Management Plan. This is done to provide an area-specific description of the existing conditions for the resource. When possible, greater emphasis is placed on describing the existing conditions of the resource as it pertains to GRSG and their habitat.
- Trends identify the degree and direction of resource change between the present and some point in the past. If there is change,

the degree and direction of resource change is characterized as moving toward or away from the current desired condition based on the indicators, and the reasons for the change are identified. Trends can also be described in quantitative or qualitative terms. Identifying the trends is done to provide an understanding of how BLM management influences the desired condition of the resource over time. It can be difficult to analyze trends for certain resources, because changes to the resource often occur due to factors beyond the control of the BLM.

The BLM reviewed the Judith Resource Area Resource Management Plan, the Headwaters Resource Management Plan, and other relevant information sources (such as maps and state GRSG conservation assessments) for existing conditions and trends for the resources listed above with respect to GRSG and their habitat. This affected environment information is summarized below and, where appropriate, noted when the information is incorporated by reference.

Data from geographic information systems (GIS) have been used in developing acreage calculations and for generating many of the figures. Calculations in this EIS are rounded and are dependent upon the quality and availability of data. Data were collected from a variety of sources, including the BLM, collaborative partners, stakeholders, and cooperating agencies. Given the scale of the analysis, the compatibility constraints between datasets, and the lack of data for some resources, all calculations are approximate and serve for comparison and analytic purposes only. Likewise, the figures are provided for illustrative purposes and subject to the limitations discussed above. The BLM may receive additional GIS data; therefore, the acreages may be recalculated and revised at a later date.

3.3.1 WAFWA Management Zone Data

To augment this planning document at a biologically meaningful scale for GRSG, a BER of GRSG was produced by USGS for the BLM (Manier et. al. 2013). The BER is a science support document that provides information to put planning units and issues into the context of the larger WAFWA Sage-Grouse management zones. The BER examines each threat identified in the USFWS's listing decision published on March 15, 2010. For each threat, the report summarizes the current scientific understanding of various impacts on GRSG populations and habitats. When available, patterns, thresholds, indicators, metrics, and measured responses that quantify the impacts of each specific threat are reported.

As described in **Chapter 1**, the planning area for the Lewistown Field Office Greater Sage-Grouse RMPA/EIS is located in WAFWA MZs I and IV (Stiver et al. 2006). Data from the BER are presented throughout this chapter to illuminate the location (e.g., PH and GH), magnitude, and extent of the threats within WAFWA MZs I and IV that comprises the planning area. Because the

BER focuses on threats to GRSG at the WAFWA management zone scale, it provides biologically meaningful data for larger scale analyses. The BER data provided in **Chapter 3** is considered in the WAFWA MZs I and IV cumulative effects analysis for GRSG in **Chapter 5,** Cumulative Impacts.

The data and information included from the BER was the most accurate available when the data was "frozen" in time for analysis purposes; however, these scenarios remain based in present knowledge. Spatial data informing the existing conditions were compiled to establish a consistent information base across the entire region (GRSG Management Area), but, in order to attain this consistently across state, ownership, and management boundaries, some local data have been omitted at the WAFWA MZ level. There may be inconsistencies between WAFWA-level and local planning-level data. As such, these data provide a regional baseline, suitable for guiding regional mid- to long-term analysis scenarios (Manier et al. 2013).

Chapter 3 also presents data that is available at a finer scale than used in the BER. These fine-scale, local data are incorporated into the affected environment discussion to complement the BER's biologically meaningful data, characterize the relative contributions of threats in the planning area as opposed to the WAFWA management zones, and to set the stage for the cumulative effects analysis for GRSG.

3.4 GREATER SAGE-GROUSE

Special status species are those species with populations that have declined to the point of substantial federal or state agency concern. These declines may result from habitat loss or modification, or from changes in competition, predation, disease, weather, or overharvest. Habitat loss and modification from human activities are the primary causes of declining GRSG populations. GRSG is a BLM sensitive species in Montana. BLM sensitive species and USFWS-listed threatened or endangered species are both considered special status species.

The BLM's policy for special status species is to: 1) conserve and/or recover threatened and endangered species and the ecosystems on which they depend so that ESA protections are no longer needed, and 2) to initiate proactive conservation measures that reduce or eliminate threats to BLM-sensitive species to minimize the likelihood of and need for listing of these species under the ESA. The BLM 6840 Manual, Special Status Species Management (BLM 2008c), sets policy for the management of candidate species and their habitat. Candidate species are considered BLM-sensitive species. The 6840 manual directs the BLM to conserve special status species and the ecosystems on which they depend on BLM-administered land, and reduce the likelihood and need for future listing under the ESA. The 6840 manual directs the BLM to undertake conservation actions for such species before listing is warranted and also to "work cooperatively with other agencies, organizations, governments, and

interested parties for the conservation of sensitive species and their habitats to meet agreed on species and habitat management goals."

Policy provided in the 6840 manual requires that when the BLM engages in the planning process, land use plans, and implementation plans, that strategies, restrictions, and management actions necessary to conserve and recover listed species, as well as provisions for the conservation of BLM-sensitive species, are identified. This policy also requires managers to determine to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species, and evaluate the significance of actions in conserving those species.

Historically, GRSG occurred in parts of 12 states within the western US and three Canadian provinces; populations have declined throughout much of their former range and have been extirpated from fringe areas. Across their range, GRSG currently occupy 56 percent, of their potential pre-settlement range, approximately 1,200,000 km^2 (Schroeder et al. 2004).

The COT, a USFWS team of federal and state wildlife officials was tasked with developing conservation objectives by defining the degree to which the threats need to be ameliorated to conserve the GRSG, so that it no longer is warranted for listing under the ESA. The Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report (COT Report; USFWS 2013) was developed by this team. The report discusses GRSG populations and sub-populations within each WAFWA management zone and describes the threats facing each population. The LFO is primarily located within WAFWA MZ I, in the northwest portion of the Yellowstone Watershed Population. MZ I (the Great Plains) also includes the Dakotas, northern Montana and the Powder River basin. A small amount of the LFO also occurs in the Belt Mountains Population in WAFWA MZ IV. The report was used to focus the analysis in **Chapter 4** on the threats most likely to impact GRSG in the planning area.

The majority of the GRSG population in the planning area is part of the Yellowstone Watershed Population, a large population covering an expansive area south of the Missouri River, making up the majority of GRSG habitats in southeast and south-central Montana. The known threats to the Yellowstone Watershed Population that are present and widespread include agriculture conversion, weeds and annual grasses, energy, infrastructure, and grazing. Threats that are present but localized in the Yellowstone Watershed Population include elimination of sagebrush, fire, conifers, and recreation (USFWS 2013, Table 2, p. 17). Garton et al. (2011) reported a minimum male count of over 2,900 males, and considered the population only potentially at risk. Land ownership in the LFO is predominantly private with scattered tracts and blocks of public land. Livestock grazing and small grain farming are common, with scattered oil and gas developments across portions of this area. Extensive private lands have the potential for conversion of additional sagebrush habitats

to farming, and cropland conversion continues to take place (USFWS 2013, p. 65).

The Belt Mountains Population inhabits 439 acres of BLM-administered lands in the planning area. The BLM-administered acreage is all GH, and no leks are present on BLM-administered land. This population is at high risk because it is isolated from other GRSG populations by 50 miles in all directions, and fewer than 100 males have been counted annually since 1984. The known threats to the Belt Mountains Population that are present and widespread include isolated/small size population, agriculture conversion, weeds/annual grasses, and grazing. Threats that are present but localized in the Belt Mountains Population include sagebrush elimination, fire, conifer expansions, energy, infrastructure, recreation, and urbanization (USFWS 2013, pp.77-78). The BLM and NRCS are presently undertaking a conifer removal project in the North Fork of the Belt Mountains to improve GRSG habitat conditions in this area.

In response to petitions, USFWS first evaluated GRSG for listing in 2005 and determined listing was not warranted. After a 2007 court order, the agency again considered the GRSG for listing and, in 2010, concluded that GRSG listing under the ESA was warranted range-wide but precluded by higher priority actions (USFWS 2010, p.1).

The BER was produced by USGS, in cooperation with the BLM, to summarize the science, activities, programs, and policies influencing conservation of GRSG across their range (Manier et al. 2013). It summarizes the available primary literature on each of the threats and their impact on GRSG and provides tables of the overlap of threats, such as oil and gas leases with GRSG primary and general habitat.

The GRSG National Technical Team (NTT) was established by the BLM to coordinate effective management actions based on best available science for GRSG conservation and restoration. The NTT Conservation Measures/Planning Strategy Report (December 2011) includes a discussion of threats and recommended BLM management actions for each.

3.4.1 Predation

Predation is one of five specific ESA listing criteria; however, the USFWS did not identify predation as a significant threat to GRSG populations in their 2010 decision to list the species as warranted for protection under the ESA. The USFWS acknowledged that increasing patterns of landscape fragmentation are likely contributing to increased predation on the species and identified two areas, neither in Montana (southwestern Wyoming and northeastern Nevada), where predators may be limiting GRSG populations because of intense habitat alteration and fragmentation. Despite the USFWS document stating that predation is not a significant threat to GRSG populations in Montana, the public remains concerned about the influence of predators on GRSG conservation.

Predators are part of the ecosystem, and they have always preyed upon GRSG. Predators that prey on GRSG tend to be generalists that take prey opportunistically but do not focus solely or preferentially on GRSG (Hagen 2011). Predators of juvenile and adult GRSG are commonly coyote, red fox, American badger, bobcat, golden eagles, and several other species of raptors (Schroeder and Baydack 2001; Hagen 2011). Younger birds can also be taken by common ravens, northern harriers, ground squirrels, and weasels. Nest predators include coyote, American badger, common raven, and black-billed magpie (Schroeder and Baydack 2001; Hagen 2011). Smaller predators of GRSG, such as red fox or skunks, can also serve as prey to larger predators such as coyotes.

Historically, predator control programs in North America were designed to protect domestic livestock, not wildlife (Hagen 2011). Predator control as a tool to manage GRSG populations was rarely recommended historically, even for threatened and endangered populations in altered or fragmented habitats (Patterson 1952; Schroeder and Baydack 2001). It is likely that the termination of widespread predator control in the early 1970s has influenced changes in predator abundance observed anecdotally by the public in recent years (Montana Sage Grouse Working Group 2005). Maintaining and enhancing intact ecosystems of sufficient size and quality to support a particular species is of greater ecological value and sustainability than an alternate approach that relies heavily on human intervention (e.g., artificial feeding, predator control, animal husbandry, zoos). The former approach works with the natural system that is adapted to working as an interconnected resilient network. The latter approach is costly, temporary, risks variable results, and is not likely to avert an ESA listing (United States Department of the Interior 2010).

Human-altered landscapes have contributed to significant increases over historical numbers in some predator abundances, particularly red fox and ravens (Coates and Delehanty 2010; Sauer et al. 2012). The influx of predators in altered sagebrush habitat can lead to decreased annual recruitment of GRSG (Schroeder and Baydack 2001; Coates 2007; Hagen 2011). GRSG in altered systems are also typically forced to nest in less suitable or marginal habitats where predators can more easily detect nesting birds (Connelly et al. 2004). In Strawberry Valley, Utah, low GRSG survival was attributed to an unusually high density of red fox that were attracted to the area by anthropogenic activity (Baxter et al. 2007). Holloran (2005) attributed increased nest depredation rates on GRSG to high corvid abundance in western Wyoming; the latter was influenced by anthropogenic structures associated with natural gas development. In the same area, Bui (2009) found ravens used road networks, fences, power lines, and other infrastructure associated with development. Bui et al. (2010) also detected a negative association between raven presence and GRSG nest and brood fate. Coates and Delehanty (2010) found increased raven density in northeastern Nevada was associated with decreased GRSG nest success, especially in areas with lower shrub density. Habitat fragmentation,

infrastructure, weather, urban development, and improper grazing can increase predation pressure on GRSG. GRSG populations demonstrate annual and cyclic fluctuations, which are influenced by weather patterns such as drought and the composition and abundance of predators (Montana Sage Grouse Working Group 2005). Montana populations appear to cycle over an approximately10-year period under existing habitat conditions and the current combination of weather and predation (Montana Sage Grouse Working Group 2005; Montana Fish, Wildlife and Parks, unpubl. data). Longer-term trends in GRSG population abundance and distribution can be a function of habitat loss or deterioration (Garton et al. 2011). The majority of Montana's GRSG populations are expected to persist over the next 100 years if habitat conditions remain consistent, which suggests Montana's populations are relatively stable (Garton et al. 2011). GRSG are part of the sagebrush grassland ecosystem that includes an interlinked web of plant and animal species, including herbivores and carnivores. As one of many prey species in sagebrush habitats, GRSG are adapted to predation and in unaltered systems will persist indefinitely with predation pressure (Hagen 2011). The influence of predation on GRSG population dynamics only becomes a problem when vital rates, especially nest, chick, and hen survival, are consistently reduced below naturally occurring levels (Taylor et al. 2012). Naturally occurring variability in vital rates is a function of annual variation in conditions (e.g., weather, vegetation cover quality, predator abundance) and is expected with a species that shows cyclic tendencies. Based on a number of research projects, reported vital rates for GRSG populations in Montana vary within range-wide estimates, suggesting predation rates are within the range of normal variability (**Table 3-1**). Good quality and quantity of habitat reduces predation pressure, and quality habitat is essential for GRSG population stability. Predator management can provide beneficial short-term relief to localized GRSG populations where predation has been identified as a limiting factor for population stability. Predator control is managed cooperatively by Animal and Plant Health Inspection Service (US Department of Agriculture) Wildlife Service, MFWP, and the USFWS. Federal laws, such as the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act, limit options for managing avian predators.

Recent predator control programs designed to benefit GRSG have had mixed results (United States Department of Interior 2010; Hagen 2011). In Strawberry Valley, Utah, fox removal appeared to increase adult survival and productivity, but inference is limited because a control area was not included to compare changes in demographic rates, which were coincidentally increasing across the region during the study period (Baxter et al. 2007). Coyote control, however, appeared to have no effect on nest success or chick survival in Wyoming (Slater 2003). In fact, removal of coyotes can lead to a release of otherwise suppressed medium-sized predators, such as red fox, which tend to be more effective predators of GRSG nests and individuals (Mezquida et al. 2006). Ongoing control efforts of mammalian and avian predators (except raptors) in

Table 3-1
Average Range of Vital Rates for GRSG, range-wide and in Montana

Vital Rate	Range-wide Rates[1]	Montana Rates	Years of MT Study	Location	Reference
Nest Success	15 – 86%	64%	1969 - 1972	Petroleum Co.	Wallestad and Pyrah 1974
		28 – 43%	2004 - 2005	Musselshell and Golden Valley Co.	Sika 2006
		35 – 61%	2001 - 2003	S. Phillips Co.	Moynahan et al. 2007
		53 – 61%	2007 - 2008	Milk River Basin	Tack 2009
		59%	2011 - 2012	Musselshell and Golden Valley Co.	Berkeley, unpubl. data[2]
Chick survival	12 – 50%	33 – 38%	2007 - 2008	Milk River Basin	Tack 2009
		12%	2011 - 2012	Musselshell and Golden Valley Co.	Berkeley, unpubl. data[2]
Hen survival	37 – 78%	25 – 96%[3]	2001 – 2003	S. Phillips Co, Montana	Moynahan et al. 2006
		94% (nesting season)	2004 - 2005	Musselshell and Golden Valley Co	Sika 2006
		84 – 93% (late summer)			
		55 – 91% (spring/summer)	2007 - 2008	Milk River Basin	Tack 2009
		84 – 92% (over winter)			
		59%	2011 - 2012	Musselshell and Golden Valley Co.	Berkeley, unpubl. data

[1]Range-wide estimates from Connelly et al. 2011a.
[2]Spring and early summer weather during 2011 and 2012 were subject to historic extremes of high precipitation in 2011 and severe drought in 2012, which likely affected nest and chick survival rates.
[3]25% annual survival in 2003 was attributed to a West Nile virus outbreak and severe winter conditions; annual survival in 2001-2002 averaged 96%.

southwestern Colorado designed to increase recruitment in a small population of Gunnison's sage-grouse may be showing some success, but sample sizes are extremely low (five chicks monitored/year; Colorado Parks and Wildlife, pers. comm.). There are 13 displaying males currently in this population, and cost of

monitoring and control has totaled $267,000 over five years (Colorado Parks and Wildlife, pers. comm.), bringing in to question the sustainability of this program. Raven removal in northeastern Nevada resulted in short-term reductions in raven populations; however, other individuals repopulated the vacated habitat within a year (Coates 2007). Badger predation may also have compensated somewhat for decreases in raven numbers (Coates 2007). Predation by ravens on GRSG in southwestern Wyoming was attributed primarily to territorial pairs, not groups of juveniles, sub-adults, and non-breeding birds (Bui et al. 2010). Thus, the removal of raven groups at foraging sites is unlikely to influence GRSG nest success, and the removal of territorial pairs will likely have only short-term effects until the habitat is re-occupied by a new pair.

Range-wide and Montana-specific average vitality rates for GRSG are provided in **Table 3-1.**

3.4.2 Conditions of the Planning Area

Availability of Sagebrush Habitat

The distribution of GRSG is closely aligned with the distribution of sagebrush-dominated landscapes (Schroeder et al. 2004). GRSG require large, intact, and connected expanses of sagebrush shrubland to exist (Aldridge et al. 2008; Wisdom et al. 2011). The planning area occurs in WAFWA MZs I and IV (Stiver et al. 2006).

IM No. 2012-044 (BLM 2011a) directs the BLM to collaborate with state wildlife agencies to identify and map two categories of GRSG habitat (BLM 2012, IM No. 2012-043):

- **PH:** Areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations. These areas would include breeding, late brood-rearing, winter concentration areas, and other seasonal habitat
- **GH:** Areas of occupied habitat outside of priority habitat

In Montana, the BLM developed its PH/GH map (**Figure 3-1** in **Appendix A**) based on MFWP's prior modeling of GRSG Core areas using lek-centric model based on male lek attendance and refined with seasonal habitat, telemetry, connectivity information, and field review. Documentation for the Montana Core area analysis is summarized at: http://www.mt.nrcs.usda.gov/technical/ecs/biology/sagegrouse/sagegrouse_strategy_attachments/appendix1.html. Montana GH was mapped based on the Schroeder (2004) GRSG distribution map.

GRSG core areas are habitat associated with Montana's highest breeding densities of GRSG (25 percent quartile), based on male counts, and GRSG lek complexes

and associated habitat important to GRSG distribution. Acres of PH and GH within the planning area are presented in **Table 3-2**.

Table 3-2
PH and GH Occurring on BLM-Administered Lands and Non-BLM Lands in the Planning Area

Lands	PH (acres)	GH (acres)	Outside GRSG Habitat (acres)
BLM-administered lands	233,219 (19%)	112,341 (11%)	248,435 (5%)
Non-BLM-administered lands	974,775 (81%)	902,694 (89%)	4,840,055 (95%)
Total Planning Area	**1,207,994**	**1,015,035**	**5,088,490**

Source: BLM 2012a

Table 3-3 and **Table 3-4** shows the Regional Gap Analysis Program (ReGAP) Tier III vegetation types for the LFO in PH and GH habitat. Sagebrush habitat in PH on BLM-administered land in PH covers 169,598 acres. Mixed-grass prairie, riparian and pine woodland are the next most common habitat types. In GH, sagebrush in BLM-administered land covers 44,698 acres. **Table 3-4** includes habitat in both MZ I and MZ IV (Belt Mountains). The Belt Mountain population area is only 439 acres, all of which is in GH; no PH is found in this area. Population areas are described in more detail below.

Leks are key spring activity areas for mating and are most often located in open areas surrounded by sagebrush cover. There are approximately 148 leks within the planning area, 77 of which were active in 2013. The greatest concentration of PH is in the eastern portion of the planning area in Fergus and Petroleum counties. Smaller patches of GH occur in the western portion of the planning area.

Connectivity of Habitat Patches

While the amount of habitat available to GRSG is very important, habitat pattern is just as critical to long-term survival of the species. Fragmentation of habitat into smaller patches can result in extirpation of local GRSG populations when functional connectivity among patches is lost. Leks separated by distances greater than 11 miles could be isolated due to decreased probability of dispersals from neighboring leks (Connelly et al. 2000). Isolation and reduced connectivity increases the probability of loss of genetic diversity and extirpation from random events (Knick and Hanser 2011).

There is little information available regarding minimum sagebrush patch sizes required to support populations of GRSG. This is due in part to the migratory nature of some but not all GRSG populations, the lack of juxtaposition of seasonal habitats, and differences in local, regional, and range-wide ecological

Table 3-3
Acres of PH within Each Vegetation Type on BLM-Administered Lands and Non-BLM-Administered Lands in the Lewistown Field Office

PH Vegetation Description	BLM	Private	State	Other	Total[1]
Cultivated Cropland	2,301	68,536	1,357	184	**72,378**
Developed, Low Intensity	114	1,743	109	6	**1,972**
Developed, Medium Intensity	0	3	0	0	**3**
Developed, Open Space	173	2,716	188	2	**3,079**
Inter-Mountain Basins Big Sagebrush Steppe	169,598	463,132	57,751	2,226	**692,707**
Inter-Mountain Basins Greasewood Flat	2,345	5,786	640	87	**8,858**
Introduced Upland Vegetation - Perennial Grassland and Forbland	4,807	114,626	4,571	112	**124,116**
North American Arid West Emergent Marsh	200	499	34	622	**1,355**
Northern Rocky Mountain Foothill Conifer Wooded Steppe	3,415	9,642	905	72	**14,034**
Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	0	23	0	0	**23**
Northern Rocky Mountain Lower Montane, Foothill and Valley Grassland	99	0	0	0	**99**
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	0	12,333	1,552	0	**13,885**
Northwestern Great Plains - Black Hills Ponderosa Pine Woodland and Savanna	6,551	0	0	118	**6,669**
Northwestern Great Plains Floodplain	16	76	0	0	**92**
Northwestern Great Plains Mixedgrass Prairie	30,839	134,166	15,930	723	**181,658**
Northwestern Great Plains Riparian	6,301	38,134	3,975	150	**48,560**
Northwestern Great Plains Shrubland	75	378	31	0	**484**
Open Water (Fresh)	203	1,085	77	4	**1,369**
Pasture/Hay	4	728	11	0	**743**
Rocky Mountain Cliff, Canyon and Massive Bedrock	5	0	0	0	**5**
Western Great Plains Badland	2,793	4,259	709	18	**7,779**
Western Great Plains Cliff and Outcrop	41	14	0	3	**58**
Western Great Plains Closed Depression Wetland	18	94	7	4	**123**
Western Great Plains Open Freshwater Depression Wetland	43	53	1	0	**97**
Western Great Plains Saline Depression Wetland	375	1,157	95	1,668	**3,295**
Western Great Plains Sand Prairie	2,548	17,125	2,480	0	**22,153**
Western Great Plains Wooded Draw and Ravine	355	1,847	164	17	**2,383**
Total	**233,219**	**878,155**	**90,587**	**6,016**	**1,207,977**

Source: BLM 2012a
[1]Totals do not match due to rounding.

Table 3-4
Acres of GH within Each Vegetation Type on BLM-Administered Lands and Non-BLM-administered Lands within the Lewistown Field Office

GH Vegetation Description	BLM	Private	State	Other	Total[1]
Cultivated Cropland	1,623	87,145	2,990	12	**91,770**
Developed, Low Intensity	29	1,591	82	0	**1,702**
Developed, Medium Intensity	2	18	0	0	**20**
Developed, Open Space	69	8,406	909	3	**9,387**
Harvested Forest - Grass/Forb Regeneration	0	37	0	2	**39**
Harvested Forest - Northwestern Conifer Regeneration	0	38	0	2	**40**
Harvested forest-Shrub Regeneration	0	79	0	5	**84**
Inter-Mountain Basins Aspen-Mixed Conifer Forest and Woodland	0	6	0	0	**6**
Inter-Mountain Basins Big Sagebrush Steppe	44,698	253,149	32,541	406	**330,794**
Inter-Mountain Basins Greasewood Flat	1,747	6,410	903	23	**9,083**
Inter-Mountain Basins Montane Sagebrush Steppe	135	48,875	5,178	219	**54,407**
Introduced Upland Vegetation - Perennial Grassland and Forbland	1,757	75,068	4,652	39	**81,516**
Middle Rocky Mountain Montane Douglas-fir Forest and Woodland	31	7,196	653	624	**8,504**
North American Arid West Emergent Marsh	4	246	3	8	**261**
Northern Rocky Mountain Dry-Mesic Montane Mixed Conifer Forest	26	0	0	0	**26**
Northern Rocky Mountain Foothill Conifer Wooded Steppe	9,423	19,891	1,435	0	**30,749**
Northern Rocky Mountain Lower Montane Riparian Woodland and Shrubland	0	904	121	0	**1,025**
Northern Rocky Mountain Lower Montane, Foothill and Valley Grassland	120	31,389	9,684	25	**41,218**
Northern Rocky Mountain Montane-Foothill Deciduous Shrubland	2	748	63	7	**820**
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	2	1,531	311	66	**1,910**
Northern Rocky Mountain Subalpine Deciduous Shrubland	0	3	2	0	**5**
Northern Rocky Mountain Subalpine-Upper Montane Grassland	0	181	5	10	**196**
Northwestern Great Plains - Black Hills Ponderosa Pine Woodland and Savanna	14,360	29,545	3,128	0	**47,033**
Northwestern Great Plains Floodplain	195	2,006	182	130	**2,513**
Northwestern Great Plains Mixedgrass Prairie	8,377	96,424	8,808	19	**113,628**
Northwestern Great Plains Riparian	1,811	26,699	1,662	0	**30,172**
Northwestern Great Plains Shrubland	1,529	4,894	361	0	**6,784**
Open Water (Fresh)	132	1,137	49	424	**1,742**
Pasture/Hay	8	25,112	579	3	**25,702**
Rocky Mountain Alpine-Montane Wet Meadow	1	1,039	112	1	**1,153**

Table 3-4
Acres of GH within Each Vegetation Type on BLM-Administered Lands and Non-BLM-administered Lands within the Lewistown Field Office

GH Vegetation Description	BLM	Private	State	Other	Total[1]
Rocky Mountain Aspen Forest and Woodland	0	427	41	18	**486**
Rocky Mountain Cliff, Canyon and Massive Bedrock	99	30	5	0	**134**
Rocky Mountain Foothill Limber Pine-Juniper Woodland	0	571	271	0	**842**
Rocky Mountain Lodgepole Pine Forest	4	845	108	105	**1,062**
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	4	5,737	350	38	**6,129**
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	1	54	5	3	**63**
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	0	75	1	1	**77**
Rocky Mountain Subalpine-Montane Mesic Meadow	21	23,670	1,393	93	**25,177**
Western Great Plains Badland	22,427	28,121	3,931	90	**54,569**
Western Great Plains Cliff and Outcrop	72	195	13	0	**280**
Western Great Plains Closed Depression Wetland	3	109	0	0	**112**
Western Great Plains Open Freshwater Depression Wetland	0	68	0	0	**68**
Western Great Plains Saline Depression Wetland	17	203	0	0	**220**
Western Great Plains Sand Prairie	2,992	24,084	2,696	0	**29,772**
Western Great Plains Wooded Draw and Ravine	606	2,628	182	2	**3,418**
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	0	64	24	0	**88**
Total	**112,327**	**816,648**	**83,433**	**2,378**	**1,014,786**

Source: BLM 2012a
[1]Totals do not match due to rounding.

conditions that influence the distribution of sagebrush and associated understories. Where home ranges have been reported, they are extremely variable (2.5 to 382 square miles; Connelly et al. 2011a).

GRSG populations may be nonmigratory or migratory, moving between or among seasonal use areas (Connelly et al. 2011a). Recent research has shown that GRSG near Glasgow, Montana, migrate up to 150 miles between seasonal habitats, making frequent stopovers in suitable sagebrush rangelands (Smith 2013). There is no indication or expectation that GRSG in the planning area may be similarly migratory (Wallestad 1975).

Landscape Matrix and Edge Effect

GRSG typically occupy sagebrush vegetation but may also use a variety of other habitats (e.g., riparian meadows, agricultural lands) intermixed in a sagebrush dominated landscape. Aldridge and Boyce (2007) found GRSG selected large expanses of sagebrush and avoided anthropogenic edge during the breeding season. Thus, the viability of fragmented habitat for GRSG is dependent upon the juxtaposition of these habitats in relation to sagebrush and the hazards to birds using these areas (Connelly et al. 2011b). In addition, studies have found a positive relationship between quality of nesting cover and nesting success (Montana Sage Grouse Work Group 2005).

In Montana, GRSG prefer breeding habitats with a sagebrush canopy over 20 percent, generally within the 6- to 12-inch height class. Most nesting is believed to occur within two miles of a lek in Montana, and GRSG exhibit high commitment to a nest-area. In the summer, GRSG broods in central Montana prefer relatively open stands of sagebrush, generally with a canopy ranging from one to 25 percent. More than half of all GRSG observations during August and September were in alfalfa fields, greasewood in bottomlands, and borrow pits where succulent forbs remained relatively abundant. Increased use of higher density sagebrush in late September or October coincided with transition to a winter diet of sagebrush (Montana Sage Grouse Work Group 2005).

Conifer invasion and invasive weed spread cause habitat fragmentation by encroaching on existing sagebrush shrublands and making habitat less suitable for GRSG. A decline of shrubs is the most documented shift in understory vegetation following conifer encroachment. Mountain big sagebrush sites show 20 to 25 percent declines in shrub cover in response to trees, reaching 50 percent of the maximum site potential (Miller et al. 2000). Tree growth also provides attractive perches for GRSG predators, which further induces GRSG to avoid these areas. In LFO, conifer encroachment is a localized threat which primarily occurs in the northeastern/eastern portion of PH.

Crested wheatgrass (*Agropyron cristatum*) is the most prevalent introduced perennial grass in the planning area. Annual bromes, including cheatgrass (*Bromus tectorum*) and Japanese brome (*B. japonicus*), occur throughout PH at low densities, but their spread is restricted by climatic conditions. They are

found in isolated non-contiguous patches (typically less than 10 acres) and do not currently pose a threat of invading vast areas of PH or GH. Short-term, surface-disturbing activities, overgrazing, and drought can increase annual grasses. Proper management and typical precipitation patterns in the planning area (wetter May and June, with nearly an inch of rain monthly through the fall) allows desirable native plants to remain or reestablish in the presence of annual grasses. For more information, see **Section 3.6**, Vegetation (Including Noxious Weeds; Riparian and Wetlands).

Wildfire is an additional source of impacts on GRSG habitat. Between 2000 and 2012, four wildfires burned 1,938 acres (0.83 percent) in PH. Over the same time period, eight wildfires burned 303 acres (0.27 percent) in BLM GH. Increased wildfires and cheatgrass proliferation have not occurred in the LFO, much different than the Great Basin. For more information, see **Section 3.7**, Wildland Fire Management and Ecology.

Landownership in the planning area is interspersed between federal and non-federal lands (**Table 3-5**). Important GRSG habitat areas cross both BLM-administered and private lands (also see **Table 3-3** and **Table 3-4**). BLM-administered lands constitute a minority of sagebrush habitat, which increases the risk of habitat fragmentation if federal actions are not coordinated with state and private actions.

Table 3-5
Surface Ownership in PH and GH

Surface Ownership	PH (acres)(%)[1]	GH (acres)(%)[1]
BLM-administered lands	233,219 (19)	112,341 (11)
Other federal lands	3,688 (0.3)	1,717 (0.2)
State lands	90,587 (8)	83,438 (8)
Private	878,171 (73)	816,869 (80)
Water	2,329 (0.2)	670 (<0.1))
Total	**1,207,994**	**1,015,035**

Source: BLM 2012a
[1]Percent total does not equal 100 due to rounding.

Anthropogenic Disturbances

Comparing environmental conditions and levels of human disturbance on areas of former range (extirpated range) with areas still occupied by GRSG (occupied range), Wisdom et al. (2011) identified five key factors most likely to lead to extirpation of local populations: sagebrush area, elevation, distance to transmission lines, distance to cellular towers, and land ownership. Land ownership was a surrogate for conversion of private lands to non-sagebrush land uses, most commonly agricultural cultivation, which have reduced habitat

availability and fragmented remaining sagebrush habitat nearby. Lek abandonment was most likely to occur in areas with over 25 percent cultivated cropland within 18 miles of the lek (Aldridge et al. 2008).

Transmission lines, in addition to reducing habitat suitability and increasing fragmentation, can cause GRSG mortality through bird collisions with lines and facilitate raptor predation of GRSG. There are currently 800 acres of transmission lines in GH and 2,600 acres in PH on BLM-administered land in the planning area. For more information on land ownership and rights-of-way (ROWs) in the planning area, see **Section 3.5**, Lands and Realty.

Oil and gas developments within two to four miles of leks or nesting areas had deleterious effect on populations, with the effects increasing with higher well density (Lyon and Anderson 2003; Walker et al. 2007; Johnson et al. 2011). There are 45,400 acres currently leased and undeveloped for oil and gas in PH and GH on BLM-administered land within the planning area. There are no new oil and gas leases in PH or GH, and there have been no new oil or gas wells on BLM-administered lands in the last decade.

Cat Creek oil field is located on 951 acres of PH in the southeastern corner of Yellowstone Watershed and had 38 producing wells in 2011. In operation since the 1920s, the field is largely played out, with most wells plugged and abandoned. Leroy field lies mostly north of the planning area within the Upper Missouri River Breaks National Monument. None of the Leroy field is within PH, and 3,133 acres are within GH. In 2011, six producing wells in this field were within the planning area. Gas resources in this field have been depleted, and approximately half of the wells in the area are plugged and abandoned. In addition to activity within these fields, some exploration activity has occurred within the Heath oil shale play in the southern portion of Petroleum County, within PH and GH. The Montana Board of Oil and Gas has issued 17 drilling permits for the Heath shale in Petroleum County. Five of these permits have been issued since March 2011 (Montana Board of Oil and Gas Conservation 2012). No permits have yet been issued for drilling on federal minerals in the Heath play.

There is potential for renewable energy (primarily wind), but, to date, all wind turbines in the planning area have occurred on private lands. The main LFO planning area has three sites with a total of 42 wind turbines (Diffendorfer et al. 2014); none are in GRSG GH or PH. Spion Kop in Chouteau County is near the south end of the Highwood Mountains and has 25 turbines. The closest turbine is over 25 miles from the nearest active GRSG lek. In the Belt Mountains, 17 turbines (11 in the north area and 6 in the south) are in two areas near Martinsdale in Meagher County. The closest turbine was over 5 miles from a lek that was last active in 2011. Two 40-acre BLM parcels within GH are 1 to 2 miles from that lek and 5.5 miles from the nearest turbine. The nearest active lek (2012-2014) is over 22 miles from the closest wind turbine. The wind facility

near Judith Gap is in Wheatland County outside of the planning area, over 40 miles from the nearest active lek in the planning area.

For more information on existing mineral leases in GRSG habitat, see **Section 3.8**, Fluid Minerals**, Section 3.9**, Solid Leasable Minerals**, Section 3.10**, Locatable Minerals**,** and **Section 3.11**, Salable Minerals.

There are still large high-viability habitat patches in the planning area. However, the degree of habitat fragmentation within the patch, in the form of roads, power lines, corridors, energy sites, livestock watering pipeline systems, OHV trails, mineral sites, canals, landfills, and other sources, affects habitat suitability of the patch for GRSG. In the LFO, roads (including paved, gravel dirt and two-track) occur throughout PH on both BLM (454 miles) and other lands (2,214 miles). Power line (62 miles BLM PH) and telephone (42 miles BLM PH) ROWs typically are adjacent to the main roadways and occur throughout the area. Fences are common and are primarily four strands of barbed wire. Motorized travel on all LFO BLM-administered lands is limited to existing roads and trails.

SRPs are currently issued to outfitters and guides for big game and upland game, including GRSG. Statewide GRSG harvest has decreased from approximately 30,000 annually historically to approximately 3,200 in 2011. Peak recreational use occurs during the fall hunting season and is primarily to access big game hunting.

Current livestock grazing was a significant causal factor for not achieving land health standards in 78 (54 allotments within GRSG habitat) of the 526 allotments within the planning area. For more information on grazing, see **Section 3.14**, Range Management.

The presence of anthropogenic features between patches also decreases linkages important to GRSG habitat viability. Continuing pressures for conversion of sagebrush to cropland and for energy development in LFO pose increasing risks of habitat fragmentation, particularly given the mixed pattern of land ownership.

3.4.3 Conditions on BLM-Administered Lands

Acres of PH and GH on BLM-administered lands within the planning area are presented in **Table 3-2**. The conditions on BLM-administered lands are similar to those discussed in **Section 3.4.2**, Conditions of the Planning Area.

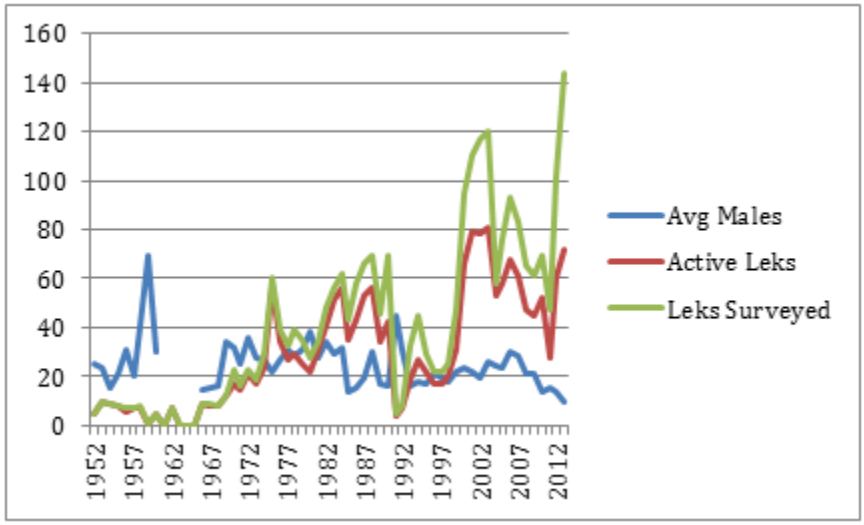
Yellowstone Watershed Population

The Yellowstone Watershed GRSG population is comprised of five PH areas within the Billings, Miles City, and Lewistown BLM field offices. PH within the LFO is made up of four areas: Yellow Water Triangle, War Horse, Crooked Creek and Winifred. Data on GRSG leks within one or more of these areas has been collected by MFWP and the BLM since 1952. Using the highest male counts from each lek annually the number of small (fewer than 10 males),

medium (10 or more, but fewer than 25 males), or large (more than 25 males) leks were determined. Large leks have a greater chance at persistence and remaining viable over the long term; small leks are most susceptible to extirpation. In PH, there were 60 and 72 active leks in 2012 and 2013, respectively. Combining data for 2012 and 2013 yielded 83 active leks. The data from these years were combined to establish a more complete picture than either year would allow individually. The differences between years were primarily survey efforts and weather factors (accessibility to leks) that influenced active lek data.

Diagram 3-1 shows the average number of males per active lek over the survey period from 1952 to 2013 in PH (Yellow Water, War Horse, Crooked Creek and Winifred), along with the number of leks surveyed and the number of active leks (leks in which male GRSG were observed). The gap in the lines indicates years in the 1960s in which no lek count data were available.

Diagram 3-1
GRSG Survey Effort, Active Leks and Average Male Counts per Active Lek Surveyed in PH
1952 – 2013



Lek count data collection efforts over the years have varied widely, and systematic efforts were not begun until the 1990s; thus, the data must be interpreted with caution. The graph shows a substantial increase in surveying effort in recent years, which has resulted in a larger number of active leks being observed. However, the number of males observed per lek is variable and has declined from approximately 30 males per lek in 2006 to approximately 10 males per lek. The 2013 average male count was at the lowest level since surveys began in 1952.

Diagram 3-2 shows the percentage of leks measured in the small, medium, and large categories from 1952 to 2013. The number of small leks has increased, while the number of large leks has declined.

Diagram 3-2
Percentage of PH Leks in each Size Class 1952 – 2013

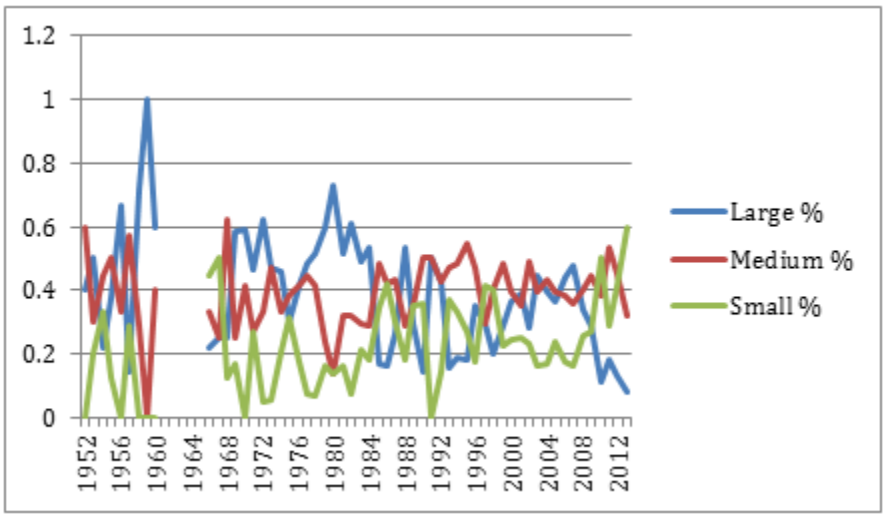


Table 3-6 shows the sizes of active leks in Yellowstone Watershed and Belt Mountains PH and GH in 2012/2013.

Table 3-6
2012/2013 Active Lek Sizes within Planning Area

Area	Large	Medium	Small	Total
LFO PH Yellowstone Watershed Population	11	26	46	83
LFO GH Yellowstone Watershed Population	0	1	1	2
LFO Belt Mountains Population	0	4	1	5

Table 3-7 shows the percentage of land under BLM and state jurisdiction in each subpopulation in Yellowstone Watershed. In all areas, the percentage of BLM-administered land is less than half, indicating the importance of both federal and private actions for GRSG conservation.

The Winifred area contains the smallest percentage (eight percent) of BLM-administered lands, with much more agriculture (11percent cropland) and less sagebrush (43 percent) than any other area in PH. Sagebrush remaining on private, state, and BLM-administered lands allows the 17 GRSG leks (two of which are large) to persist. The two large leks in the Winifred area were just over the 25 threshold.

Table 3-7
Land Ownership by Population Area in PH

PH	% BLM	% State	Acres
Winifred	8	8	162,760
Crooked Creek	19	6	294,202
War Horse	23	7	504,481
Yellow Water Triangle	31	5	137,645

The Crooked Creek area had 20 leks with males in 2012/2013. The only lek in the large category had over 50 males in 2012. The eastern part of the area contains a large portion of BLM-administered land, and the remainder of the area is mostly private. Agriculture occurs on three percent of the land, while sagebrush is on 63 percent. All fires reported in PH were located in the Crooked Creek area. Vehicle access for surveys is especially difficult in this area, and there are likely additional leks that have not been discovered to date.

The War Horse area is the largest and contains the greatest amount of BLM-administered lands throughout. There were 35 active leks (six of which are large) in 2012/2013. Cat Creek oil field, in operation since the 1920s, is located on 951 acres of PH in the southeastern corner of the area. There were 38 producing wells in 2011. The field is largely played out with most wells plugged and abandoned.

The Yellow Water Triangle area contains the largest percentage (31 percent) of BLM-administered lands. The area contains 11 active leks (two of which are large) in 2012 /2013.

Yellowstone Watershed GH Lek Information

There are no leks on BLM-administered lands in GH. There is much less sagebrush habitat in GH (38 percent), compared to PH (57 percent) for all ownerships), and fewer active leks (two) in these areas compared to PH. Patterns of land ownership within these areas are smaller sized contiguous blocks and a lower proportion of BLM-administration in the area (11 percent GH on BLM-administered lands compared to 19 percent PH on BLM-administered lands).

LFO Belt Mountains Population Lek Information

The Belt Mountains Population inhabits approximately 300,000 acres of GH in the planning area (all ownerships), of which BLM administers 439 acres (0.1 percent). BLM habitat includes 310 acres of sagebrush and 36 acres of forested areas. Conifer encroachment on BLM-administered lands is occurring and impacts sagebrush habitats on and adjacent to BLM-administered lands. There were five active leks in 2013, and the closest to BLM was approximately 2.5 miles away. The BLM and NRCS are presently undertaking a conifer removal

project in the North Fork of the Belt Mountains to improve GRSG habitat conditions in this area.

3.4.4 Trends

As show in **Diagram 3-1,** lek counts (average males) in the planning area in 2012/2013 were the lowest since counts began in the 1950s. Several land management factors could be contributing to the decline in GRSG population numbers in the planning area (USFWS 2013, p. 65). Intermingled private land in the traditional GRSG areas has been actively cultivated in recent years, causing a loss of habitat. Some parcels of BLM-administered land contain predominant or continuous stands of crested wheatgrass persisting from the Bankhead-Jones Land Utilization era. Many of these crested wheatgrass dominated lands exhibit little reinvasion of the native sagebrush community and comprise a monoculture with limited GRSG value. Oil and gas development in the LFO has been limited, so this development has minimally contributed to sagebrush habitat loss and fragmentation. Weather, in particular a harsh winter in 2010 followed by a cool, wet spring in 2011 and drought in 2012, was likely the cause for the lower male lek counts recently.

3.5 LANDS AND REALTY

Lands and realty actions can be divided between land use authorizations, land tenure adjustments, and withdrawals. Land use authorizations consist of ROWs, communication sites, and other leases or permits, while land tenure adjustments focus primarily on land exchange, acquisition (including purchase and easement acquisition), and disposal. Management and adjustment of withdrawals focuses on the establishment, management, modification, and revocation of withdrawals.

Land Use Authorizations

A ROW is the most common form of authorization to permit uses of BLM-administered lands by commercial, private, or governmental entities. A ROW grant is an authorization to use a specific piece of public land for projects such as roads, pipelines, transmission lines, and communication sites. The ROW grant authorizes rights and privileges for a specific period of time.

The BLM's objective is to grant ROWs to any qualified individual, business, or government entity and to direct and control the use of ROWs on BLM-administered lands in a manner that:

- protects the natural resources associated with BLM-administered lands and adjacent lands, whether private or administered by a government entity
- prevents unnecessary or undue degradation to BLM-administered lands
- promotes the use of ROWs in common, considering engineering and technological compatibility, national security, and area RMPs

- coordinates, to the fullest extent possible, all BLM actions with local, State, Native American Tribal, and other federal agencies; interested individuals; and appropriate quasi-public entities (43 CFR, Part 2801.2)

Some uses of BLM-administered lands are authorized through long-term land uses, while permits are used to authorize short-term uses. Private individuals and groups, as well as various businesses and government entities can hold these authorizations.

To the extent possible, linear ROWs (such as roads and pipelines) are routed where impacts would be least disturbing to environmental resources, taking into account point of origin, point of destination, and purpose and need of the project. The ROWs are issued with surface reclamation stipulations and other mitigation measures. Restrictions and mitigation measures may be modified on a case-by-case basis, depending upon impacts on resources. In general, the placement of major linear facilities depends upon meeting the following location criteria:

- concentrate linear facilities within, or contiguous to, existing corridors, where possible
- avoid locations that would take intensively managed forest land out of production
- avoid locations that would harass livestock or wildlife;
- avoid steep topography, poor soils, or other fragile areas (such as habitat for Threatened or Endangered species)
- avoid cultural sites that are listed on, or are eligible for listing on, the National Register of Historic Places

Land Tenure Adjustments

Land ownership (or land tenure) adjustment refers to those actions that result in the disposal, or the acquisition by the BLM of non-federal lands or interests in land. FLPMA requires that public land be retained in public ownership unless, as a result of land use planning, disposal of certain parcels is warranted and in the public interest. If tracts of land are designated in BLM land use plans as potentially available for disposal, BLM will evaluate and consider the full range of land disposal and acquisition tools available to accomplish important objectives of resource management, enhancement, development and protection to meet the needs of communities; promote multiple-use management; foster sustainable development and to fulfill other public needs.

Withdrawals

Withdrawals are used to preserve sensitive environmental values, protect major federal investments in facilities, support national security, and provide for public

health and safety. A withdrawal is a formal action that accomplishes one or more of the following actions:

- Transfers total or partial jurisdiction of federal land between federal agencies
- Segregates (closes) federal lands to appropriation under public land laws including mineral laws
- Dedicates public land for a specific public purpose

There are three major categories of formal withdrawals: (1) congressional withdrawals, (2) administrative withdrawals, and (3) Federal Power Act or Federal Energy Regulatory Commission withdrawals. Withdrawal segregates a portion of public lands and suspends certain operations of the public land laws, such as mining claims. Certain stock driveways are also withdrawn. Federal policy now restricts all withdrawals to the minimum time and acreage required to serve the public interest, maximizes the use of withdrawn lands consistent with their primary purpose, and eliminates all withdrawals that are no longer needed.

3.5.1 Conditions of the Planning Area

The planning area contains lands owned or administered by the BLM, other federal agencies (e.g., Forest Service, the Bureau of Reclamation), various state agencies, and private landowners. **Table 3-8** shows the acreage and overall percentage of GRSG habitat for each landowner in the planning area. Also see **Figure 3-1** in **Appendix A**.

Table 3-8
Surface Ownership within the Planning Area

Surface Ownership	Planning Area (acres)	PH (acres)	GH (acres)
BLM-administered lands	593,995	233,219 (19%)	112,341 (11%)
Other federal lands	1,010,816	3,688 (0.3%)	1,717 (0.2%)
State lands	526,504	90,587 (8%)	83,438 (8%)
Private	5,168,165	878,171 (73%)	816,869 (80%)
Water	12,039	2,329 (0.2%)	670 (<0.1%)
Total Planning Area	**7,311,519**	**1,207,994**	**1,015,035**

Source: BLM 2012a

WAFWA Management Zones I and 4

Table 3-9 through **Table 3-12** display data compiled in a BER produced by the USGS and BLM (Manier et al. 2013). In each table, acreages and mileages are presented by surface management agency and their occurrence within GH and PH in the planning area, and MZs I and IV.

Table 3-9
GRSG Habitat within City Limits

Surface Management Agency	Acres within GH			Acres within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	0	9,300	19,700	0	53	1,100
Forest Service	0	8	700	0	60	0
Tribal and Other Federal	0	200	100	0	0	0
Private	400	113,200	43,400	100	4,100	4,100
State	0	7,300	2,800	0	800	31
Other	0	0	38	0	6	0

Source: Manier et al. 2013, p. 32

Table 3-10
Transmission Lines within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	800	35,500	42,000	2,600	7,300	83,600
Forest Service	0	7,300	3,500	0	1,300	5,800
Tribal and Other Federal	0	56,300	4,700	0	700	10,700
Private	4,500	452,600	57,900	9,900	58,500	47,000
State	300	37,800	11,200	1,300	8,100	6,500
Other	0	600	900	0	20	2,800

Source: Manier et al. 2013, p. 41
[1]Includes transmission lines greater than 115 kilovolts.

Table 3-11
Number of Communication Towers within GRSG Habitat

Surface Management Agency	Number[1] within GH			Number[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	0	108	163	0	20	182
Forest Service	0	36	36	0	1	22
Tribal and Other Federal	1	167	51	0	0	11
Private	13	2,161	199	18	149	162

Table 3-11
Number of Communication Towers within GRSG Habitat

Surface Management Agency	Number[1] within GH			Number[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
State	0	108	23	0	14	17
Other	0	10	3	0	0	0

Source: Manier et al. 2013
[1]Displays the number of Federal Communication Commission communication towers.

Table 3-12
Vertical Obstructions within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	0	0	12	0	0	17
Forest Service	0	0	0	0	0	0
Tribal and Other Federal	56	7	20	0	0	2
Private	733	230	17	1,015	0	17
State	0	17	7	0	0	0
Other	0	15	0	0	0	0

Source: Manier et al. 2013, p. 45
[1]Derived from dataset containing Federal Communication Commission communication towers and Federal Aviation Administration vertical obstructions. Excludes wind towers. Assumes a buffer of 56.4 meters (2.47 acres) around each obstruction.

There are no utility corridors or utility-scale wind energy developments in the planning area (Manier et al. 2013), though some wind developments are on nearby private lands.

3.5.2 Conditions on BLM-Administered Lands

Land Use Authorizations

Diagram 3-3 provides the number of land use authorizations on BLM-administered lands in Chouteau, Fergus, Judith Basin, Meagher, and Petroleum Counties in the planning area between 2000 and 2013.

Within GRSG habitat, there are 643 acres of ROW authorizations in PH and 266 acres in GH. **Table 3-13** provides a breakdown of ROW types, miles, and acres in each habitat type.

Diagram 3-3
Land Use Authorizations

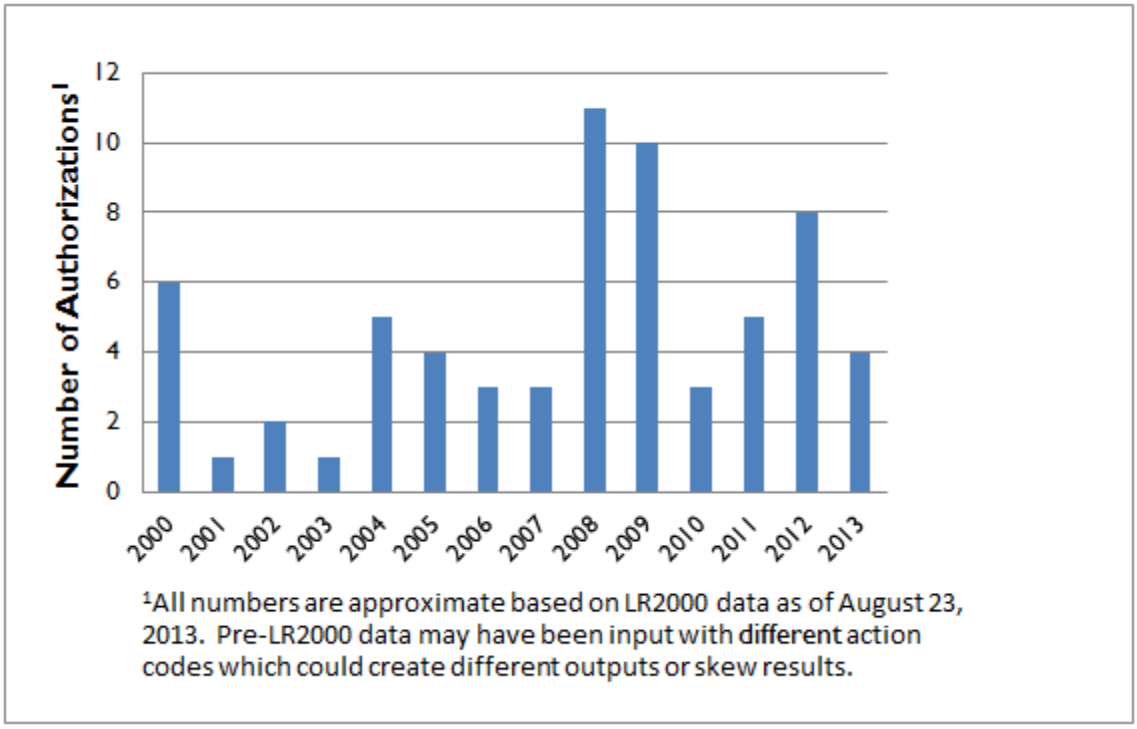


Table 3-13
Active ROW Authorizations within GRSG Habitat

ROW Type	PH (Miles)	GH (Miles)
Road/highway	20	10
Power/transmission line	42	15
Telephone	62	19
Water facilities	10	0
Pipeline or conduit	17	8
Railroad	0	1
Other	11	0
Total Miles	**162**	**53**
Total Acres	**643**	**266**

Source: BLM 2012a

ROW Avoidance and Exclusion Areas

ROWs are issued with surface reclamation stipulations and other mitigation measures. Areas closed to mineral leasing, having a NSO restriction, or otherwise identified as unsuitable for surface disturbance or occupancy are

generally identified as avoidance or exclusion areas for ROWs. Restrictions and mitigation measures could be modified on a case-by-case basis for avoidance areas, depending on impacts on resources, while exclusion areas are strictly prohibited from ROW development.

The Acid Shale Pine Forest ACEC (2,674 acres) is the only area identified as a ROW avoidance area in PH. Judith River Canyon (7,383 acres) is also identified as a ROW avoidance area; 98 percent (7,245 acres) are located within GH. There are no ROW exclusion areas in the planning area. See **Table 3-14**.

Table 3-14
ROW Avoidance Areas within the Planning Area

Avoidance Area	Total Acres	PH (acres)	GH (acres)
Acid Shale-Pine Forest ACEC	2,674	2,674 (100%)	0
Judith Mountains	19,179	0	0
Judith River Canyon	7,383	0	7,245 (98%)
South Moccasin Mountain	1,167	0	0
Total	**30,405**	**2,674 (8%)**	**7,245 (24%)**

Source: BLM 2012a

ROW Corridors and Communication Sites

There are no ROW corridors in the planning area. Communication sites contain equipment for various public and private tenants, including phone companies; local utilities; and local, state, and other federal agencies. Communication site applications are granted through a realty lease authorization under the ROW regulations.

BLM-administered lands would continue to be available for multiple- and single-use communication sites and road access ROWs on a case-by-case basis pursuant to Title V of FLPMA, and 43 CFR, Part 2800 regulations. All ROW applications are reviewed using the criteria of following existing corridors wherever practical and avoiding the proliferation of separate ROW.

There are two communication sites on BLM-administered lands within the planning area; however, neither is located within PH or GH (see **Table 3-15**).

Table 3-15
Communication Sites within the Planning Area

Site	Location
Judith Mountain	NE1/4 SW1/4 Sec 19 T 17 N R 20E MM
South Moccasin Mountain	NE1/4 SW1/4 Sec 2 T 16 N R 17E MM

Source: BLM 2012a

Renewable Energy

Wind and solar resource facilities are authorized with ROWs through the lands and realty program. Geothermal resources are considered fluid leasable minerals (see **Section 3.8**). As a result, management actions related to the lands and realty program and leasable minerals could affect renewable energy resources. Special management designation areas such as ACECs could also affect the use of renewable energy resources by limiting the location of these facilities. There are no active renewable energy ROW authorizations within the planning area. **Section 3.22**, Renewable Energy, provides a description of renewable energy resources.

Land Tenure Adjustments

Disposal

There are no pending land sales within the planning area; however, there is one pending land exchange within PH. Four hundred eighty (480) acres of surface lands are proposed to be exchanged: 240 acres would be moved from private ownership to BLM administration, and 240 acres would be moved from BLM to private ownership. The purpose of this exchange is to resolve a trespassing concern. The proposed exchange includes land containing a GRSG lek site that would be managed by the BLM after the exchange is completed. There are no pending land exchanges in GH.

Withdrawal

There are seven withdrawals within GRSG habitat, all of which are held by the US Government. Of these withdrawals, 101 acres are located within PH and 2,585 are located with GH (see **Table 3-16**).

Table 3-16
Withdrawal Lands within GRSG Habitat

Withdrawal	PH (Acres)	GH (Acres)
EO Power Site 33	0	1,419
PLO 2336	41	0
PLO 3633	20	0
Public Water Reserve	40	0
SO Power Site Class 301	0	282
SO Power Site Class 369	0	632
Total	**101**	**2,585**

Source: BLM 2012a
EO – Executive Order, PLO – Public Land Order, SO – Secretarial Order (all are held by the US Government)

Acquisitions

There are no proposed acquisitions in the planning area.

3.5.3 Trends

On average, there have been five land use authorizations per year between 2000 and 2013 (**Diagram 3-3**). Demand for land use authorizations in the planning area may increase due to possible oil and gas development in the area. There is some potential for land use authorizations for renewable energy projects (wind, solar, and geothermal), although no requests have been submitted recently. It is anticipated that ROW authorizations for communication sties and utilities will remain at current levels.

The BLM will process land exchanges, acquisitions, easements, and potential sales within the planning area on a case-by-case basis as staff and priority workload allow. As opportunities present themselves, each proposal will be reviewed and given careful consideration to management goals and public benefit. Currently, the land tenure program within the LFO receives very few land tenure adjustment requests per year; it is anticipated that this program will continue to experience low levels of activity.

3.6 VEGETATION (INCLUDING NOXIOUS WEEDS; RIPARIAN AND WETLANDS)

Vegetation serves multiple purposes on the landscape and provides many ecosystem services. Vegetation stabilizes soils, prevents erosion, uses carbon dioxide, releases oxygen, increases species diversity, and provides habitat and food for animals and products for human use. Many of the BLM's land management policies are directed toward maintenance of healthy vegetation communities. Vegetation can be characterized generally by ecological provinces and more specifically by plant communities. The ecological provinces and plant communities discussed below are those that provide the most important land cover across the planning area.

3.6.1 Conditions of the Planning Area

All Vegetation

The planning area lies within two Level III Ecoregions: Northwestern Great Plains and Middle Rockies (EPA 2011a). Most of the planning area is within the Northwestern Great Plains ecoregion, which is characterized by semiarid rolling plains of shale, siltstone, and sandstone punctuated by occasional buttes and badlands. Rangeland is common, but crop and hay production also occur; native grasslands persist in areas of steep or broken topography.

Rangeland vegetation consists of sagebrush grasslands, grasslands, and lightly vegetated badlands. Mixed shrub and deciduous tree communities are found in drainages throughout all of these vegetation types. Common grasses and grass-like species include bluebunch wheatgrass (*Pseudoroegneria spicata*), green needle-grass (*Nasella viridula*), needle and thread (*Hesperostipa eltoi*), western wheatgrass (*Pascopyrum smithii*), prairie junegrass (*Koeleria macrantha*), blue grama (*Bouteloua gracilis*), prairie sandreed (*Calamovilfa longifolia*), Sandberg bluegrass (*Poa secunda*),

and threadleaf sedge (*Carex filifolia*). Introduced grasses are found in some areas, either in pure stands or intermingled with native species.

Crested wheatgrass (*Agropyron cristatum*) is the most prevalent introduced perennial grass in the planning area, with stands occurring in localized areas in several allotments. Introduced annual grasses include cheatgrass (*Bromus tectorum*), and Japanese brome (*B. eltoids*). Although cheatgrass and several non-native brome species are present in the planning area, their spread is restricted by climatic conditions. They are found in isolated, non-contiguous patches and do not currently pose a threat of invading vast areas of PH or GH.

Common shrubs in the planning area include big sagebrush (*Artemisia eltoidse*), silver sagebrush (*A. cana*), shrubby cinquefoil (*Dasiphora fruticosa* ssp. *Floribunda*), wild rose (*Rosa eltoid*), saltbush (*Atriplex* spp.), greasewood (*Sarcobatus vermiculatus*), and rubber rabbitbrush (*Ericameria nauseosa*). Other common vegetation includes prickly pear cactus (*Opuntia* spp.), ponderosa pine (*Pinus ponderosa*), common juniper (*Juniperus communis*), western yarrow (*Achillea millefolium* var. *occidentalis*), wild onion (*Allium* spp.), pussytoes (*Antennaria* spp.), heartleaf arnica (*Arnica cordifolia*), cudweed sagewort (*Artemisia ludoviciana*), milkvetch (*Astragalus* spp.), arrowleaf balsamroot (*Balsamorhiza sagittata*), hairy goldenaster (*Heterotheca villosa*), purple prairie clover (*Dalea purpurea*), low larkspur (*Delphinium bicolor*), black Sampson (*Echineacea angustifolia*), sticky geranium (*Geranium viscosissium*), curlycup gumweed (*Grindelia squarrosa* var. *quasiperennis*), Rocky Mountain iris (*Iris missouriensis*), lupine (*Lupinus* spp.), yellow sweetclover (*Melilotus officinalis*), woolly Indian wheat (*Plantago patagonica*), Hood's phlox (*Phlox eltoi*), dense clubmoss (*Selaginella densa*), scarlet globemallow (*Sphaeralcea coccinea* ssp. *Coccinea*), and salsify (*Tragopogon dubius*) among others.

Overall, forest communities within the planning are healthy with ponderosa pine and Rocky Mountain juniper (*Juniperus scopuloru*) being the most common conifer species. Stocking levels, typically measured in trees per acre, vary considerably and are highly dependent on moisture availability; therefore, conifers are found in abundance in draws and on north aspects. In addition, as a result of reduced fine-fuel loadings from livestock grazing and successful fire suppression, ponderosa pine seedling encroachment onto ridges and areas historically void of conifer regeneration has become common (Arno et al. 1995). These clumps of ponderosa pine regeneration typically average between 1,000 and 3,000 trees per acre, while draws and north aspects average approximately 40 to 60 trees per acre throughout the planning area.

Old-growth

Ponderosa pine old-growth found throughout the planning area. These trees or groups of trees tend to have broken or deformed tops, bole defects such as catfaces (surface defects that are partly healed over), and large-diameter upper branches. These trees can typically be found on northerly slopes and draw

bottoms with a dense understory of regeneration and co-dominant trees also present. While there are no known stands of old-growth, individual trees or small groups of trees can be found within the uneven-aged stands characteristic of the planning area.

Riparian and Wetland

Riparian areas are defined as the green zones associated with lakes, reservoirs, estuaries, potholes, springs, bogs, wet meadows, and streams (ephemeral, intermittent, or perennial). Greasewood and silver sagebrush are common in alluvial flats in or near riparian areas. Woody riparian species found in the planning area include sandbar willow (*Salix exigua*), peachleaf willow (*S. amygdaloides*), yellow willow (*S. lutea*), and plains cottonwood (*Populus eltoids*), Snowberry (*Symphoricarpos albus*), chokecherry (*Prunus virginiana*), hawthorn (*Crataegus* spp.), wild rose, buffaloberry (*Shepherdia* spp.), and gooseberry (*Ribes* spp.) are shrubs commonly found in coulees and woody draws. The riparian zone occurs between the upland zone and the aquatic zone. Riparian areas are characterized by water tables at or near the soil surface, and by vegetation requiring high water tables. See **Figure 3-2** in **Appendix A**.

The functioning condition of riparian and wetland areas is a result of the interaction of geology, soil, water, and vegetation (BLM 1998).

Lotic Waters

Lotic waters are running water systems, such as rivers, streams, and springs. Riparian/wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to:

- Dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality
- Filter sediment, capture bedload, and aid floodplain development
- Improve floodwater retention and groundwater recharge
- Develop root masses that stabilize streambanks against cutting action
- Develop diverse ponding and channel characteristics to provide the habitat, water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses
- Support greater biodiversity

Lentic waters

Lentic waters are standing water systems, such as lakes, ponds, seeps, bogs, and wet meadows. Woody sedge (*Carex rosea*) and three-square bulrush (*Schoenoplectus americanus*) are common obligate riparian-wetland plants found in central and eastern Montana. Lentic riparian/wetland areas are functioning properly when adequate vegetation, landform, or debris is present to:

- Dissipate energies associated with wind action, wave action, and overland flow from adjacent sites, thereby reducing erosion and improving water quality
- Filter sediment and aid floodplain development
- Improve flood water retention and groundwater recharge
- Develop root masses that stabilize islands and shoreline features against cutting action
- Restrict water percolation
- Develop diverse ponding characteristics to provide the habitat and water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses
- Support greater biodiversity

Riparian/wetland areas are classified as functional-at-risk when they are in functional condition but an existing soil, water, or vegetation attribute makes them susceptible to degradation. These areas are further distinguished based on whether or not they demonstrate an upward, static, or downward trend.

Riparian/wetland areas are classified as nonfunctional when they clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, or providing other functions, as listed above.

Riparian/wetland areas are classified as being in unknown condition when the BLM lacks sufficient information to make a determination. PFC assessments completed on BLM-administered lands are described below in **Section 3.6.2**, Conditions on BLM-Administered Lands.

Noxious Weeds and Invasive Species

A noxious weed is defined by Montana Law (MCA 7-22-2101) as, "any exotic plant species established or that may be introduced in the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities." A noxious weed is any unwanted non-native plant with potential impact serious to the extent that it has been declared by the state of Montana that landowners must enter into an approved management program to keep it from spreading. (Montana Department of Agriculture 2013).

Noxious and invasive weeds compete with native vegetation for water, space, and nutrients and have the potential to displace desirable native vegetation to the point of altering the vegetative composition and structure present onsite. Montana's noxious weeds are placed into priorities based on how abundant and widespread the species is across the state. See **Table 3-17** for a listing of noxious weeds by priority.

Table 3-17
Montana Noxious Weed List

Priority 1A	These weeds are not present or have a very limited presence in Montana. Management criteria will require eradication if detected; education; and prevention. • Yellow starthistle (*Centaurea solstitialis*) • Dyers woad (*Isatis tinctoria*)
Priority 1B	These weeds have limited presence in Montana. Management criteria will require eradication or containment and education. • Knotweed complex (*Polygonum cuspidatum, P. sachalinense, P. × bohemicum, Fallopia japonica, F. sachalinensis, F. × bohemica, Reynoutria japonica, R. sachalinensis, and R.× bohemica*) • Purple loosestrife (*Lythrum* spp.) • Rush skeletonweed (*Chondrilla juncea*) • Scotch broom (*Cytisus scoparius*)
Priority 2A	These weeds are common in isolated areas of Montana. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts. • Tansy ragwort (*Senecio jacobaea, Jacobaea vulgaris*) • Meadow hawkweed complex (*Hieracium caespitosum, H. praealturm, H. floridundum, and Pilosella caespitosa*) • Orange hawkweed (*Hieracium aurantiacum, Pilosella aurantiaca*) • Tall buttercup (*Ranunculus acris*) • Perennial pepperweed (*Lepidium latifolium*) • Yellowflag iris (*Iris pseudacorus*) • Blueweed (*Echium vulgare*) • Hoary alyssum (*Berteroa incana*)
Priority 2B	These weeds are abundant in Montana and widespread in many counties. Management criteria will require eradication or containment where less abundant. Management shall be prioritized by local weed districts. • Canada thistle (*Cirsium arvense*) • Field bindweed (*Convolvulus arvensis*) • Leafy spurge (*Euphorbia esula*) • Whitetop (*Cardaria draba, Lepidium draba*) • Russian knapweed (*Acroptilon repens, Rhaponticum repens*) • Spotted knapweed (*Centaurea stoebe, C. maculosa*) • Diffuse knapweed (*Centaurea diffusa*) • Dalmatian toadflax (*Linaria dalmatica*) • St. Johnswort (*Hypericum perforatum*) • Sulfur cinquefoil (*Potentilla recta*) • Common tansy (*Tanacetum vulgare*) • Oxeye daisy (*Leucanthemum vulgare*) • Houndstongue (*Cynoglossum officinale*) • Yellow toadflax (*Linaria vulgaris*) • Saltcedar (*Tamarix spp.*) • Flowering rush (*Butomus umbellatus*)

Table 3-17
Montana Noxious Weed List

	• Eurasian watermilfoil (*Myriophyllum spicatum*) • Curlyleaf pondweed (*Potamogeton crispus*)
Priority 3	Regulated Plants: (NOT MONTANA LISTED NOXIOUS WEEDS) These regulated plants have the potential to have significant negative impacts. The plant may not be intentionally spread or sold other than as a contaminant in agricultural products. The state recommends research, education and prevention to minimize the spread of the regulated plant. • Cheatgrass (*Bromus tectorum*) • Hydrilla (*Hydrilla verticillata*) • Russian olive (*Elaeagnus angustifolia*)

Source: Montana Department of Agriculture 2013

Invasive plants also occur within the planning area. These include not only noxious weeds, but also other plants that are not native to the US. The BLM considers plants invasive if they have been introduced into an environment where they did not evolve. As a result, they usually have no natural enemies to limit their reproduction and spread (Westbrooks 1998). Some invasive plants can produce significant changes to vegetation, composition, structure, or ecosystem function (Cronk and Fuller 1995).

Bromus tectorum (cheatgrass) is more dominant in areas with minimal summer precipitation (USFWS 2010, p.14). Cheatgrass occurrence in the region is shown in **Diagram 3-4**.

WAFWA Management Zones I and 4

Table 3-18 and **Table 3-19** display data compiled in a BER produced by the USGS and BLM (Manier et. al. 2013). In these tables, acres with cheatgrass potential and croplands are presented by surface management agency and their occurrence within GH and PH in the planning area and in MZs I and IV.

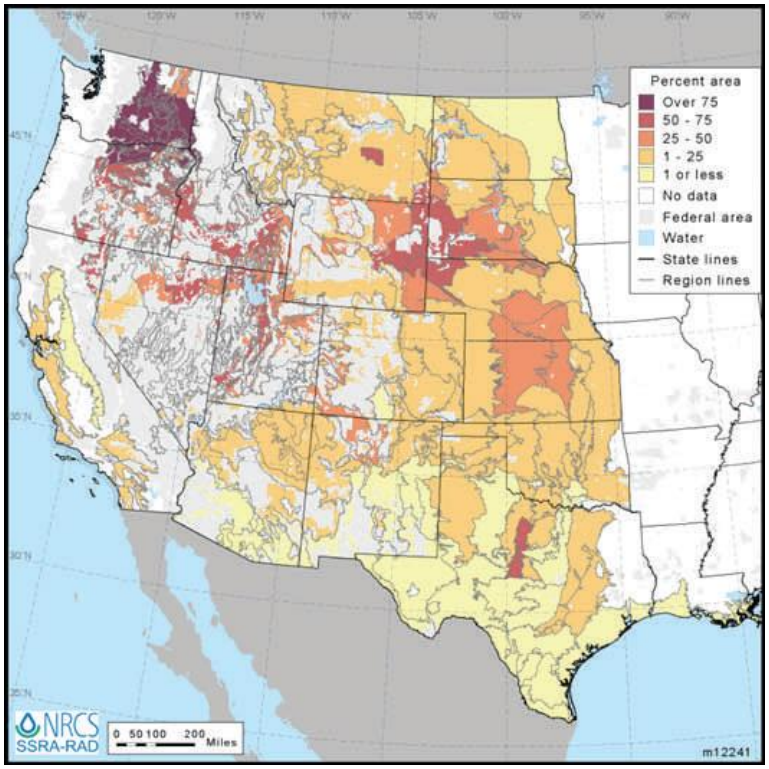
In **Table 3-18**, cheatgrass potential was not mapped for MZ I. Although the distribution of cheatgrass has been documented in Montana, the currently available model was only parameterized for the Great Basin (MZs III, IV, and V).

3.6.2 Conditions on BLM-Administered Lands

All Vegetation

Acres of vegetation types within GRSG habitat on BLM-administered lands within the planning area are presented in **Table 3-20**. Sagebrush acreage is included under shrubland, steppe, and savanna systems.

Diagram 3-4
Cheatgrass on Non-Federal Rangeland



Source: USDA-NRCS National Inventory Rangeland Sample Area (2003-06)

Table 3-18
Cheatgrass Potential within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area[2]	MZ I[2]	MZ IV	Planning Area[2]	MZ I[2]	MZ IV
BLM	n/a	n/a	6,234,900	n/a	n/a	13,995,500
Forest Service	n/a	n/a	1,086,900	n/a	n/a	1,521,600
Tribal and Other Federal	n/a	n/a	740,200	n/a	n/a	974,100
Private	n/a	n/a	4,257,400	n/a	n/a	5,643,800
State	n/a	n/a	945,500	n/a	n/a	1,022,900
Other	n/a	n/a	54,900	n/a	n/a	93,800

Source: Manier et al. 2013
[1]Acreage comprised of areas with a high potential for cheatgrass occurrence.
[2]Cheatgrass occurrence was mapped for MZs III, IV and V (i.e., the Great Basin region), but not for MZs I, II or VII, including the planning area. Data for cheatgrass occurrence in MZ IV at the planning area-level was not available.

Table 3-19
Cropland within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	800	17,700	14,500	1,200	6,600	14,800
Forest Service	0	1,000	1,800	0	600	900
Tribal and Other Federal	100	534,900	1,800	0	1,300	500
Private	91,000	2,436,900	233,600	98,200	247,400	55,200
State	2,900	93,300	4,400	1,500	5,400	800
Other	0	300	1,300	0	0	200

Source: Manier et al. 2013
[1]Based on data provided by the National Agricultural Statistics Service.

Table 3-20
Vegetation Communities within GRSG Habitat on BLM-Administered Lands

Vegetation Community	PH (acres)	GH (acres)	Outside GRSG Habitat (acres)
Human land use	2,592	1,732	582
Aquatic	203	132	75
Sparse and barren systems	2,838	22,597	40,515
Forest and woodland systems	6,906	15,031	91,458
Shrubland, steppe, and savanna systems	173,088	55,787	87,757
Grassland systems	33,485	11,510	20,804
Recently disturbed or modified	4,807	1,757	2,216
Riparian and wetland systems	9,298	3,783	5,042

Source: USGS 2010

The BLM assesses rangeland health on a regular basis. Rangeland health is defined as the degree to which the integrity of the soil, vegetation, water, and air as well as the ecological process of the rangeland system is balanced and maintained (BLM Technical Reference 1734-6, BLM 2005c). Of the 526 allotments on BLM-administered lands within the planning area, 316 are meeting land health standards.

Riparian and Wetland Vegetation

Wetland vegetation and associated freshwater habitat within the planning area are presented in **Table 3-21**.

PFC assessments completed on BLM-administered lands within the planning area are presented in **Table 3-22**.

Table 3-21
Wetland Vegetation and Aquatic Habitat within GRSG Habitat on BLM-Administered Lands

Vegetation/Habitat	PH (acres)	GH (acres)	Outside GRSG Habitat (acres)
Wetland	1,002	77	160
Freshwater pond and lacustrine	974	60	210

Source: USGS 2010

Table 3-22
PFC Assessments within GRSG Habitat on BLM-Administered Lands

PFC Rating [1,2]	PH (miles)	GH (miles)	Outside GRSG Habitat (miles)
PFC	43.6	41.6	70.5
FARD	3.9	0.2	2.8
FARN	18.3	16.4	16.6
FARU	10.0	3.4	3.3
NF	12.0	3.3	7.0

Source: BLM 2012a
[1]Dataset is provisional and some stream ratings are not current as of 2012 season
[2]PFC – proper functioning condition; FARD – functional at risk with downward trend; FARN – functional at risk with no trend; FARU – functional at risk with upward trend; NF – non-functional

Noxious Weeds and Invasive Species

Infestations of noxious weeds are present on BLM-administered lands, with higher concentrations along the major drainages and their tributaries. Several weed species have been identified within the planning area; the largest areas of infestation are occupied by:

- Leafy spurge
- Canada thistle
- Spotted knapweed
- Russian knapweed

- Field bindweed
- Dalmatian toadflax
- Whitetop (hoary cress)
- Houndstongue
- Salt cedar
- Black Henbane
- Sulfur cinquefoil

Introduced annual brome species, such as downy and Japanese brome, also occur within the planning area. While these species have impacted rangelands within the area, the scale of these impacts has been limited compared with the impacts from these species in the Great Basin and southwest, due to climactic conditions and vegetation types within the planning area. The BLM has been actively involved in an integrated weed control program within the planning area for several years and continues to monitor for new infestations of other noxious weeds.

3.6.3 Trends

All Vegetation

Continuing conversion of rangeland to cropland has caused the loss of shrub-steppe vegetation, including sagebrush. Development pressure on private lands for farmland and oil and gas developments will continue to cause decline of sagebrush ecosystems.

Conifer densities have been increasing in many areas. Pine seedlings and saplings are expanding into rangeland areas on forest margins. Heavy stand densities cause competition among conifers, with associated declines in forest health and decreased productivity of understory vegetation such as grasses, forbs, and shrubs. Drought has exacerbated the condition. Understory conifers contribute to fuel loadings that create a continuous fuel bed from the ground to the canopy. Wildland fire can be severe in these areas. The encroachment of ponderosa pine into open parks reduces biodiversity, crowds out sagebrush/grassland habitat and creates an increase threat of severe fires due to an increase in the continuity of fuels.

Several site-specific conifer removal projects are proposed or approved within the planning area. The Crooked Creek project was approved in May 2014 and identified areas in PH in the Yellowstone Watershed GRSG Population, approximately 30 miles north of Winnett, for potential conifer removal. Hand crews with chainsaws would remove approximately 1,000 acres of conifers (mostly juniper), with additional acres planned for removal annually. In addition, the North Fork project is proposed in Meagher County on Forest Service lands approximately 20 miles northeast of White Sulphur Springs. If approved,

approximately 300 acres of GH in the Belt Mountains GRSG population would have mechanical removal of conifers, mostly Douglas-fir, from sagebrush habitats.

Riparian and Wetland

Riparian and wetland condition in many areas of the planning area are likely to be improved through adjustment and implementation of grazing systems. Based on land health assessments, the trend for many riparian and wetland areas is improving. Riparian-wetland areas in PFC are in an improving trend. As projects intended to meet Standards for Rangeland Health are implemented, conditions are expected to continue to improve.

Noxious Weeds and Invasive Species

Weed infestations have grown appreciably during the past two decades. As a result of this expansion of weed infestations, control of noxious weeds within the planning area has become mostly permittee/lessee-based. Permittees and lessees are required to enter into a Cooperative Weed Control Range Improvement Agreement with the BLM for noxious weeds found on their grazing allotments as per terms and conditions on their permits and leases. Under the terms of the cooperative agreements, the BLM provides the chemical for control of the weed species and the permittee/lessee provides the labor for application. Application records and a map of the application are required by the BLM after spraying has been completed.

Biological control agents are also approved for use under the cooperative agreements. Biological control agents have shown promise controlling leafy spurge and spotted knapweed infestations, which have proven difficult to control on their own because of terrain. Established insect populations are monitored, collected, and dispersed by BLM personnel and permittees. Control agents for dalmatian toadflax and Canada thistle have been released within the planning area with limited success. New biological control agents are released within the planning area as they become available and their success monitored.

Hotter, drier, conditions as a result of potential climate change would be expected to exacerbate the spread of cheatgrass by increasing the risk of wildland fire, as well as reducing the ability of native species to compete with non-native species. Invasion by non-native grasses can result in increased fire frequency, which typically results in removal of sagebrush canopy in affected areas with replacement by annual species that provide little, to no, habitat value (Baker 2011).

3.7 WILDLAND FIRE MANAGEMENT AND ECOLOGY

Wildland fire is a general term describing any non-structure fire that occurs in the vegetation and/or natural fuels. Wildland fires are categorized by two types; wildfires, which are unplanned ignitions or planned ignitions that have been declared wildfires, and prescribed fires, which are planned ignitions (Wildland

Fire Leadership Council 2009). Wildfire occurs in the planning area, particularly during times of drought.

National BLM fire policy requires that current and desired resource conditions related to fire management be described in terms of fire regime condition class (FRCC). The current condition of a vegetative community is a function of the degree of departure from historical fire regimes, resulting in alterations of key ecosystem components, such as species composition, structural stage, stand age, and canopy closure. This departure may have resulted from a number of factors, including fire exclusion or suppression, vegetation resources, grazing, introduction and establishment of exotic plant species, insects or disease (introduced or native), or other past management activities (Hann and Bunnell 2001).

The *Federal Wildland Fire Management Policy* was developed by the secretaries of the departments of Interior and Agriculture in 1995 in response to dramatic increases in the frequency, size, and catastrophic nature of wildland fires in the US. The 2001 review and update of the 1995 *Federal Wildland Fire Management Policy* (DOI et al. 2001) consists of findings, guiding principles, policy statements, and implementation actions, and replaces the 1995 *Federal Wildland Fire Management Policy* as the primary interagency wildland fire policy document. This document directs federal agencies to achieve a balance between fire suppression to protect life, property, and resources, and fire use to regulate fuels and maintain healthy ecosystems. Multiple updates have been provided in memorandum and current implementation direction has been provided in the February 2009 *Guidance for Implementation of Federal Wildland Fire Management Policy* (USDA and DOI 2009). The BLM's policies follow this plan and implementation guidelines.

Wildland fire has been a primary concern associated with GRSG habitat and population declines in the western portion of their range (Great Basin) due to an increase in fire frequency. Climate change may shift the range of invasive plants, potentially expanding the importance of this threat into other areas of the species' range (USFWS 2013). The BLM has developed recommendations to guide fire operations and fuels management in GRSG habitat (IM-2013-128).

Spread of invasive weed species is another concern in fire management. Spread of invasive species can displace native species and decrease habitat quality for the GRSG.

3.7.1 Conditions of the Planning Area

GRSG largely inhabit the eastern part of the planning region, primarily in Petroleum County and Fergus County. Fires are frequent in the planning area, particularly near the Missouri and Musselshell River Breaks areas. Intense lightning storms occur in the planning region between July and September, often resulting in wildfires (BLM 1992). While cheatgrass is present in the planning area, its spread is restricted by climatic conditions. No large scale fire areas have been

invaded by annual grasses; they are found in isolated, non-contiguous patches and do not currently pose a threat of invading vast areas of PH or GH.

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Table 3-23 and **Table 3-24** display data compiled in a BER produced by the USGS and BLM (Manier et al. 2013). In each table, acres are presented by surface management agency and their occurrence within GH and PH in the planning area, and MZs I and IV.

Table 3-23 displays the total acres of land burned in wildland fire in the planning area and MZs I and IV between 2000 and 2012. The majority of fire occurred on tribal and other federal lands.

Table 3-23
Wildland Fire within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	6,700	74,300	965,900	500	22,000	1,809,400
Forest Service	0	6,400	161,500	0	1,800	33,900
Tribal and Other Federal	15,900	18,300	82,400	0	0	58,100
Private	2,200	446,600	190,300	600	81,000	417,400
State	1,900	35,600	30,900	0	10,600	53,100
Other	0	0	80	0	0	700

Source: Manier et al. 2013
[1]Acres calculated from wildland fires occurring between 2000 and 2012.

Table 3-24 displays acres with high probability for wildland fire based on the Forest Service's FSim data, a large fire simulator which develops fire probability data based on historical weather data and current land cover data.

Table 3-24
High Probability for Wildland Fire within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	134,600	718,800	4,438,100	24,100	299,200	11,904,200
Forest Service	0	208,800	621,400	0	124,900	1,163,200
Tribal and Other Federal	22,800	67,800	301,900	0	39,600	487,200
Private	68,400	4,621,600	2,268,400	47,200	1,271,600	4,068,100

Table 3-24
High Probability for Wildland Fire within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
State	14,400	523,700	649,700	3,100	185,800	738,700
Other	0	0	26,300	0	0	62,000

Source: Manier et al. 2013
[1]Derived from Forest Service FSim Burn data

3.7.2 Conditions on BLM-Administered Lands

In 2004, the BLM developed the Lewistown Field Office Fire Management Plan for central Montana. The plan is currently under revision, with the final revised plan scheduled for release in the summer of 2013. The Fire Management Plan established five Fire Management Units (FMUs) for the LFO: The Big Open FMU, Breaks FMU, Prairie Forest FMU, Island Ranges FMU and the Front FMU. Much of the BLM-administered land that is designated as PH or GH is included in the Breaks FMU and the Prairie Forest FMU.

The FRCC is an indicator of ecological departure from historical conditions such as that observed prior to Euro-American settlement. Departure is described as changes to one or more of the following ecological components: vegetation characteristics, fuel composition, fire frequency, in combination with changes to fire severity and pattern other associated disturbances (insects, disease, grazing, and drought).

The LANDFIRE project includes both a fire regime data layer and a vegetation departure data layer, which were used to estimate the degree of ecological departure for the different GRSG habitat types in the planning area. Class I represents a low degree of departure, and Class III a high degree of departure. Extreme departure from the historical conditions results in changes to one or more of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated disturbances (e.g., insect and disease mortality, grazing, and drought). See **Figure 3-3** in **Appendix A**, for the FRCC and LANDFIRE distribution in the planning area.

National vegetation condition class data is displayed below in **Table 3-25** the data provides an indication of the departure in PH and GH on BLM-administered lands in comparison to areas with non-habitat.

There is an average of only two human-caused fires every 10 years on BLM-administered land (BLM 2012a). Human-caused fires often occur as a result of debris burning or agricultural operations (BLM 2004a). Other fires on BLM-

Table 3-25
National Vegetation Condition Class on BLM-Administered Lands

BLM-Administered Land Area	Habitat Type	Vegetation Condition Class	Acreage
Judith Resource Area	Non Habitat	Class I	19,871
		Class II	54,128
		Class III	165,959
	GH	Class I	35,270
		Class II	27,286
		Class III	48,677
	PH	Class I	7,502
		Class II	96,242
		Class III	127,882
Headwaters	Non Habitat	Class I	935
		Class II	4,974
		Class III	1,521
	GH	Class I	47
		Class II	216
		Class III	170
	PH	Class I	N/A
		Class II	N/A
		Class III	N/A

Source: BLM 2012a
N/A = not applicable

administered lands have been ignited during intense lightning storms that are common in the area. While the total acreage burned on BLM-administered lands over the past 10 years is relatively small, fires still result in impacts on GRSG and their habitat.

No fire history data exists for the Headwaters Resource Management Plan area. In the Judith Resource Area Resource Management Plan area, there have been 12 fires over the past 10 years, burning approximately 33,440 acres total. Of this amount, approximately 31,200 acres burned were non-habitat lands, 290 acres of GH were burned, as were 1,950 acres of PH. This data does not include all fire within the planning area. **Table 3-26** displays information about fires on BLM-administered lands in the planning area.

Table 3-26
Fires on BLM-Administered Lands within the Judith Resource Area RMP Area (1992-2012)

Year	Fire Name	Fire Source	No Habitat Acreage	GH Acreage	PH Acreage
1995	Lower Dunn	Lightning	186.2		
1996	Alkali	Lightning	1,546.1		
1999	377	Lightning	125		

Table 3-26
Fires on BLM-Administered Lands within the Judith Resource Area RMP Area (1992-2012)

Year	Fire Name	Fire Source	No Habitat Acreage	GH Acreage	PH Acreage
2000	Blood	Lightning	539.0		
2002	Browning	Lightning	15.1		
2003	Armells	Lightning	4.8		
	Barrel Springs 3	Lightning	16.1		
	Tin Can	Lightning	92.6		
2005	McArthur	Lightning	416.9		
2006	Dovetail	Lightning	2597.3		
	Drag	Lightning	741.8		
	Soda Creek	Lightning	6,163.3		
2007	Chouteau Co Assist	Lightning	29.5		
	Fargo Coulee	Lightning	0.0		
	Last Day	Lightning	250.5		
	South Moccasin	Human	48.9		
	Salt Creek	Lightning	0	47.9	
	South McGinnis	Lightning			23.2
2008	79 Trail	Lightning	156.3		
	Blood Creek	Lightning	14.3		
	Pickett	Lightning	25.1		
2009	Meissner	Human	184.3	3.2	
2010	Raven Rat Patch	Lightning	6,653.7		477.4
2011	Blue Dunn	Lightning	16.2		
2012	15 Mile	Lightning	860.7		193.6
	Arrow 2	Lightning		9.9	
	Arrow	Lightning		18.5	
	Boyce	Lightning	5.1	201.3	
	Carol	Lightning		2.1	
	Chain Buttes	Lightning	3,000.2		
	First Time	Lightning		12.7	
	Kingsbury	Lightning		6.8	
	South Chain	Lightning	737.9		
	Wolf Creek	Lightning	6,880.7		1,244.4

Source: BLM 2012a

Fires that occur within PH and GH would pose the greatest threat to GRSG. Fires within PH would be particularly damaging because these areas have been identified as having the highest conservation value to maintaining sustainable GRSG populations.

Wildland fire use will not be part of the LFO fire management strategy due to high winds, difficulties in maintaining pre-determined fire sizes, and the large amount of damage fire could do to grazing allotments (BLM 2004a). This could serve to prevent the spread of fire and protect GRSG habitat.

Of the five FMUs in the LFO, all are explicitly managed to protect sagebrush habitat or GRSG. This could also result in management actions that would protect GRSG habitat from impacts due to wildland fire.

3.7.3 Trends

Over the past 10 years, two human-caused fires have been reported as occurring on BLM-administered lands in the planning area. Wildland fire, typically caused by lightning, has historically occurred within the planning area and tends to occur between July and September (BLM 1992). Fires will likely increase in the future as climate change causes irregular weather patterns, increases the likelihood of storms, and contributes to droughts that can increase the frequency of natural, unplanned ignitions. Management actions, such as implementing green strips and hazardous fuel reductions, can reduce the occurrences of such fires.

3.8 FLUID MINERALS

Fluid leasable minerals include oil, gas, and geothermal heat. In general, 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. Geothermal heat is also considered a leasable mineral and is governed by the Geothermal Steam Act of 1970. There are no geothermal resources within the planning area; therefore, geothermal resources will not be discussed in **Chapter 3** or **Chapter 4**.

The BLM reserves the right to require additional mitigation measures in the form of COAs after a lease is issued if doing so is necessary to fulfill the BLM's multiple-use mandate.

3.8.1 Conditions of the Planning Area

This discussion focuses solely on oil and gas because those are the only fluid minerals that exist within the planning area.

In 2013, Chouteau County was the top gas-producing county in the planning area, producing nearly 900,000 MCF (thousand cubic feet) of gas. However, only a portion of Chouteau County is within the planning area, and the gas fields in that county are outside the planning area. Fergus and Petroleum Counties are the only counties currently producing oil and gas within the planning area (see

Figure 3-4 in **Appendix A**). **Table 3-27** provides oil and gas activity in counties within the planning area.

Table 3-27
2013 County Drilling and Production Statistics

County	Production			Well Completion				
	Oil Barrels	Associated Gas (MCF)	Gas (MCF)	Oil	Gas	Coalbed Methane	Dry	Service
Fergus	0	0	24,590	0	0	0	0	0
Petroleum	23,626	4,380	0	0	0	0	0	0
Chouteau[1]	0	0	885,890	0	0	0	0	0
Judith Basin	0	0	0	0	0	0	0	0
Meagher	0	0	0	0	0	0	0	0
Total	**23,626**	**4,380**	**910,480**	**0**	**0**	**0**	**0**	**0**

Source: DNRC 2013
[1]Production and wells within Chouteau County are not within the range-wide planning area.

The primary fields producing in the planning area are Cat Creek field in Petroleum County and Leroy field at the northern border of Fergus County. Approximately 5,586 acres (90 percent) of the Cat Creek field lies within PH. The other 10 percent (633 acres) is within GH.

The majority of the Leroy field lies north of the planning area within the Upper Missouri River Breaks National Monument. Of the 7,246 acres of the Leroy field within the planning area, 5,206 acres (72 percent) are within PH. Approximately 1,786 acres (25 percent of the field in the planning area) are in GH. The remaining three percent of this field in the planning area is not within GRSG habitat.

Oil production from the Cat Creek field began in the 1920s. Since that time, wells in the field have produced over 24 million barrels of oil. In 2013, the 39 producing wells in the field produced 23,364 barrels of oil (DNRC 2013 p.16-10). Oil and gas resources in the field have largely played out, and most wells are plugged and abandoned.

The Leroy Field contains gas resources, primarily in the Judith River and Eagle gas sands. Cumulative gas production from the field is nearly 7.3 million MCF. In 2013, the 26 producing wells in the field produced 142,466 MCF of gas (DNRC 2013 p.16-30). Four of the producing wells in this field are within the planning area. Gas resources in this field have been depleted, and approximately half of the wells in the area are plugged and abandoned.

In addition to activity within these fields, some exploration activity has occurred within the Heath oil shale play in the southern portion of Petroleum County.

This play overlaps PH and GH. The Montana Board of Oil and Gas did not issue any drilling permits for the Heath shale in Petroleum County in the past year. Of the 18 wells drilled in the Heath shale during the past seven years, only one remains active as a shut-in oil well. The remainder have been plugged or temporarily abandoned. No further federal or private permits have been issued for drilling in the Heath play, and the economics of producing oil from this play appears unfavorable.

There are 11 active wells in Fergus County (outside of the Leroy field). These are all shut-in gas wells on private or state minerals. Twelve drilling permits remain with the Montana Board of Oil and Gas for potential wells to be drilled in Fergus County on private minerals.

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Table 3-28 through **Table 3-32** display data compiled in a BER produced by the USGS and BLM (Manier et. al. 2013). In each table, acres are presented by surface management agency and their occurrence within GH and PH in the planning area, and MZs I and IV.

There are no oil shale leases in the planning area (Manier et al. 2013).

Table 3-28
Open to Oil and Gas Leasing within GRSG Habitat

Surface Management Agency	Acres within GH			Acres within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM[1]	273,800	3,970,400	4,662,800	225,100	2,792,800	12,348,100
Forest Service	0	484,100	240,200	0	284,300	234,200
Tribal and Other Federal	36,000	329,800	500	3,100	84,000	10,300
Private	157,200	6,510,600	173,100	148,600	2,071,900	275,900
State	900	98,800	8,600	1,800	82,200	20,400
Other	0	900	0	0	0	0

Source: Manier et al. 2013

[1]There is an existing protest resolution decision affecting BLM-administered lands within the LFO that does not allow oil and gas leasing of nominated parcels that would require a special stipulation to protect important wildlife values, including leasing on PH and GH, or PH and GH. Existing fluid mineral leases within GRSG habitat that expire can be renominated for leasing but would be deferred as described above. New leasing of areas with important wildlife values cannot occur until the BLM completes a plan amendment/EIS or a new/revised RMP/EIS, including oil and gas leasing decisions identified in a ROD. Because this RMPA only considers management actions for GRSG and does not address oil and gas leasing options for other wildlife resource values, oil and gas leasing will not be addressed in this RMPA/EIS. The information provided in this table is for establishing the baseline for cumulative effects analysis only.

Table 3-29
Closed to Oil and Gas Leasing within GRSG Habitat

Surface Management Agency	Acres within GH			Acres within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM[1]	100	370,100	261,500	0	150,100	1,304,200
Forest Service	0	16,600	4,600	0	0	69,600
Tribal and Other Federal	0	1,594,400	442,300	0	1,400	637,300
Private	500	1,848,000	9,800	100	505,600	26,500
State	0	315,400	9,300	0	63,700	21,600
Other	0	0	45	0	0	0

Source: Manier et al. 2013

[1]There is an existing protest resolution decision affecting BLM-administered lands within the LFO that does not allow oil and gas leasing of nominated parcels that would require a special stipulation to protect important wildlife values, including leasing on PH and GH, or PH and GH. Existing fluid mineral leases within GRSG habitat that expire can be renominated for leasing but would be deferred as described above. New leasing of areas with important wildlife values cannot occur until the BLM completes a plan amendment/EIS or a new/revised RMP/EIS, including oil and gas leasing decisions identified in a ROD. Because this RMPA only considers management actions for GRSG and does not address oil and gas leasing options for other wildlife resource values, oil and gas leasing will not be addressed in this RMPA/EIS. The information provided in this table is for establishing the baseline for cumulative effects analysis only.

Table 3-30
Oil and Gas Leases within GRSG Habitat

Surface Management Agency	Acres within GH			Acres within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	15,200	624,200	74,500	30,200	327,600	215,700
Forest Service	0	29,700	3,800	0	24,900	1,700
Tribal and Other Federal	0	5,000	900	0	0	0
Private	12,100	1,721,900	21,000	12,300	546,200	28,500
State	400	27,900	0	400	17,400	40
Other	0	0	0	0	0	0

Source: Manier et al. 2013

Table 3-31
Oil and Gas Leases Held by Production within GRSG Habitat

Surface Management Agency	Acres within GH			Acres within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	3,200	673,900	0	100	110,600	0
Forest Service	0	80,900	0	0	36,900	0
Tribal and Other Federal	0	19,500	0	0	0	0
Private	2,000	1,819,300	0	800	236,400	0
State	0	13,500	0	0	3,400	0
Other	0	0	0	0	0	0

Source: Manier et al. 2013

Table 3-32
Oil and Gas Wells within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	100	26,200	25	200	4,600	100
Forest Service	0	2,100	6	0	1,500	3
Tribal and Other Federal	0	3,400	0	0	6	3
Private	700	140,400	100	1,300	21,400	100
State	100	15,400	8	0	2,500	6
Other	0	0	0	0	0	0

Source: Manier et al. 2013
[1]Assumes footprint of 62 square meters per well. Includes wells that are either not plugged and abandoned, or plugged and abandoned beginning October, 2001.

3.8.2 Conditions on BLM-Administered Lands

While the BLM administers 593,995 acres of surface within the planning area, the BLM also manages the subsurface minerals underlying 968,032 acres in the planning area (including federal subsurface beneath BLM-administered lands). Split-estate lands are lands on which the surface is owned or controlled by an entity other than the BLM and the subsurface is managed by the BLM. **Table 3-33** provides the surface ownership above federal minerals in the planning area.

Table 3-33
Federal Mineral Status in the Planning Area

Land Status	Acres
BLM Surface/Federal Minerals	595,150 (61%)
Private Surface/Federal Minerals	288,515 (30%)
Other Federal Surface/Federal Minerals	77,949 (8%)
State/Federal Minerals	6,418 (1%)
Total	**968,032**

Source: BLM 2012a

There are 42,770 acres of existing oil and gas leases on federal minerals in the planning area. These leases cover four percent of the federal mineral estate in the decision area. **Table 3-34** breaks down existing leases within PH and GH. A total of 12,851 acres (30 percent) of existing leases in the decision area are within PH and 19,902 acres (47 percent) are within GH.

Table 3-34
Existing Oil and Gas Leases

Habitat Type	Acres Leased
Total Area *(BLM surface/federal minerals)*	24,420
Total Area *(Private or state surface/federal minerals)*	17,643
PH *(BLM surface/federal minerals)*	5,779
PH *(Private or state surface/federal minerals)*	7,072
GH *(BLM surface/federal minerals)*	11,860
GH *(Private or state surface/federal minerals)*	8,042
Other Areas *(BLM surface/federal minerals)*	7,426
Other Areas *(Private or state surface/federal minerals)*	3,229

Source: BLM 2012a

The BLM manages surface and subsurface minerals in each of the main oil and gas fields in the planning area. While much of the historical development of the Cat Creek Field has been on federal mineral estate, no new drilling activity in the field is occurring on federal minerals. The Cat Creek Field has 28 active

wells on federal minerals: 19 producing oil wells, four shut-in oil wells, and five active injection wells for enhanced oil recovery. One permit remains on the records with the Montana Board of Oil and Gas Conservation in Petroleum County. The proposed well is approximately four miles west of the Cat Creek Field and would be located on private mineral estate. The portion of the Leroy Field within the planning area currently has five active wells on federal mineral estate. Four are producing gas wells, and one is a gas shut-in well.

A protest resolution decision applicable to the LFO requires all nominated oil and gas lease parcels that would require a special stipulation to protect important wildlife values be deferred until an RMPA for oil and gas, or an RMP revision that includes an oil and gas leasing decision in the ROD is completed. All federal fluid mineral estate acres within PH and GH are deemed to require special wildlife stipulations and will be deferred from leasing. The boundaries of PH and GH are equal to PH and GH, respectively. As such, the deferral of nominated lease parcels would continue in PH and GH after the ROD for this amendment is signed. Existing leases within PH and GH, or PH and GH, which expire, could be renominated for leasing; however, the leasing would be deferred in accordance with the protest resolution.

3.8.3 Trends

Because the primary oil and gas fields within the planning area are largely played out, the level of activity on existing leases within the planning area is likely to remain relatively stable for the life of the Judith Resource Area and Headwaters Resource Management Plans. The one possible exception is the Heath shale play, where activity on leases is still in early stages. If this play proved to be economic, drilling and production in the vicinity of the play in southern Petroleum County could greatly increase.

Due to an existing protest resolution, the LFO will not issue, or reissue, oil and gas leases for parcels that provide important wildlife habitat, including PH and GH.

3.9 SOLID LEASABLE MINERALS

Solid leasable minerals are primarily governed under two acts: the Mineral Leasing Act of 1920, as amended, and the Mineral Leasing Act for Acquired Lands of 1947, as amended.

The Mineral Leasing Act of 1920 authorized specific minerals, including but not limited to coal, sodium, potash, and phosphate, to be disposed of through a leasing system. Coal is the only mineral governed by this Act that exists within the planning area, but no coal is being developed.

Pursuant to the Mineral Leasing Act for Acquired Lands of 1947, as amended, all minerals that qualify as locatable minerals in public domain lands may only be obtained through leasing on acquired lands. (Public domain lands have always

been in federal ownership, while acquired lands were purchased by the government from private individuals.)

The BLM first issues a prospecting permit for exploration for nonenergy solid leasable minerals. A prospecting permit term is two years, but it may be extended by another four years with adequate justification. If, during the term of the permit, the permittee demonstrates discovery of a valuable deposit of the leasable mineral resource, the BLM may issue a lease to that permittee.

3.9.1 Conditions of the Planning Area

No coal mining is occurring within the planning area, although potential for coal resources does exist within the area. The Kootenai formation underlies the central portion of the planning area and contains the Lewistown and Great Falls coal fields (BLM 1992 p. 105). This formation is not within GRSG habitat.

Because leasing of hardrock minerals only occurs beneath BLM-administered lands, discussion of conditions of these resources occurs under *Conditions on BLM-Administered Lands*.

3.9.2 Conditions on BLM-Administered Lands

The BLM administers 890,083 acres of federal mineral estate (595,150 acres of BLM-administered land with federal minerals and 294,933 acres of split-estate) in the planning area. Within GRSG habitat, the BLM administers 345,560 acres (16 percent) of surface over federal minerals and another 143,332 acres (six percent) of split-estate.

The BLM has not issued leases for development of federal coal resources in the planning area. There are no known federal coal resources within GRSG habitat.

Over the last 10 years, the BLM has issued 14 prospecting permits for nonenergy solid minerals on acquired lands in the planning area. Generally, three to four prospecting permits are authorized at any given time. As of December 2012, one prospecting permit is currently valid. All prospecting permits in the planning area have been issued within PH in Petroleum County. Most have been issued along the southwestern border of Petroleum County. Others have been issued along the southeastern border of the county near the Musselshell River or further north along the western border of the county. The primary minerals of interest for prospecting permits are diamonds and gems.

3.9.3 Trends

Based on the nature and depth of the coal beds in area, the most likely location for development within the planning area would be the Lewistown and Great Falls coal fields in the Kootenai Formation. Neither of these coal fields lies within PH or GH.

Although no mineral development potential was identified in the 1992 Hardrock Mineral Resources Reasonable Foreseeable Development Scenario for the Judith

Resource Area, the acquired lands overlying hardrock minerals likely have low to medium development potential for hardrock minerals based on the exploration activity in recent years. Hardrock mineral prospecting is anticipated to continue at the current rate of three to four active prospecting permits per year throughout the life of Judith Resource Area and Headwaters Resource Management Plans.

3.10 LOCATABLE MINERALS

Locatable minerals are minerals for which the right to explore or develop the mineral resource on federal land is established by the location (or staking) of mining claims and is authorized under the General Mining Law of 1872. Locatable minerals include metallic minerals (such as gold, silver, copper, lead, zinc, molybdenum, uranium) and non-metallic minerals (such as gypsum).

3.10.1 Conditions of the Planning Area

Locatable mineral development potential exists within Fergus and Judith Basin Counties. In Fergus County, development potential exists in the Judith Mountains and the North and South Moccasin Mountains. The Judith and Moccasin Mountains range from low to high potential with gold and silver as the primary minerals of interest. Mining and exploration have occurred and continue in each of these areas (BLM 1992 Map K, p. 105–107, 324).

In Judith Basin County, development potential exists in the Little Belt Mountains and Yogo Gulch area. Locatable mineral development potential in this area ranges from low to high, with sapphires as the primary mineral of interest. Historic mining for lead, zinc, silver, and gold ores has also occurred in this area (BLM 1992 Map K, p. 107, 327, 331).

None of the areas identified having locatable mineral development potential in the planning area is within PH or GH.

3.10.2 Conditions on BLM-Administered Lands

The BLM administers 890,083 acres of federal mineral estate (595,150 acres of BLM-administered land with federal minerals and 294,933 acres of split-estate) in the planning area. Within GRSG habitat, the BLM administers 345,560 acres (16 percent) of surface over federal minerals and another 143,332 acres (six percent) of split-estate.

A total of 1,207 acres (less than one percent) of federal mineral estate PH is withdrawn from locatable mineral entry and therefore cannot be developed. Additionally, 4,764 acres (two percent) of federal mineral estate in GH are withdrawn from locatable mineral entry.

3.10.3 Trends

While locatable mineral exploration and development is likely to continue to occur within the planning area, no locatable mineral development is anticipated

within GRSG habitat over the life of the Judith Resource Area and Headwaters Resource Management Plans.

3.11 SALABLE MINERALS

Salable minerals include common varieties of construction materials and aggregates, such as sand, gravel, cinders, roadbed, and ballast material. Salable minerals are sold or permitted under the Mineral Materials Sale Act of 1947.

Sand and gravel, as construction aggregate, is an extremely important resource. The extraction of the resource varies directly with the amount of development nearby – road building and maintenance and urban development – as sand and gravel is necessary for that infrastructure development. Even more so than other resources; however, the proximity of both transportation and markets are key elements in the development of a deposit.

3.11.1 Conditions of the Planning Area

Much of the surface geology in the planning area is dominated by late Cretaceous shale and sandstone layers, deposited during transgression and regression of the inland sea. These rocks are source to building materials and clays. In more recent times, erosion has dissected the landscape to its present form. Alluvial material derived from erosion of exposed bedrock or reworking of glacial deposits is the primary source of sand and gravel.

WAFWA Management Zones I and 4

Table 3-35 displays data compiled in a BER produced by the USGS and BLM (Manier et al. 2013). Acres are presented by surface management agency and their occurrence within GH and PH in the planning area, and MZs I and IV.

Table 3-35
Salable Material Disposal Sites within GRSG Habitat

Surface Management Agency	Acres within GH			Acres within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	200	64,500	189,900	100	65,000	462,100
Forest Service	0	1,200	56,500	0	0	113,700
Tribal and Other Federal	0	0	400	0	0	500
Private	0	430,500	80,200	1,200	49,000	139,200
State	0	7,800	3,400	0	8,900	3,600
Other	0	0	45	0	0	39

Source: Manier et al. 2013

3.11.2 Conditions on BLM-Administered Lands

The BLM administers 890,083 acres of federal mineral estate (595,150 acres of BLM-administered land with federal minerals and 294,933 acres of split-estate) in the planning area. Within GRSG habitat, the BLM administers 345,560 acres (16 percent) of surface over federal minerals and another 143,332 acres (six percent) of split-estate.

The salable minerals program on BLM-administered lands within the planning area is based on the use of sand and gravel for construction and road surfacing (BLM 1992 p. 110).

Most salable minerals permits issued within the planning area have been free use permits issued to the county or state governments for road construction or maintenance. Several other small sales have been made to local contractors for maintenance of Air Force missile roads (BLM 1992 p. 111).

There are four active sand and gravel pits on federal minerals within the planning area. Two of these are within PH, and one is within GH. Each pit is less than five acres.

Within PH, 1,207 acres (less than one percent) of federal mineral estate are closed to the disposal of salable minerals. Within GH, 4,764 acres (two percent) of federal mineral estate are closed to the disposal of salable minerals.

3.11.3 Trends

Future demand for salable minerals will vary depending upon market conditions, which differ according to economic conditions and construction activity. It is expected that salable mineral activity will continue at roughly the same level for the life of the Judith Resource Area and Headwaters Resource Management Plans.

3.12 COMPREHENSIVE TRAVEL AND TRANSPORTATION MANAGEMENT

The transportation system throughout the planning area consists of seven major highways, numerous paved and unpaved local roads, as well as unpaved primitive OHV roads and trails. Where roads cross BLM-administered land, ROW authorizations are required to maintain the road on federal land. A more detailed inventory of the existing transportation network will be conducted as part of a future LFO RMP revision.

3.12.1 Conditions of the Planning Area

Transportation routes in the planning area reflect the region's low population density and challenging topography. Throughout the planning area there are approximately 4,390 total miles of roads and trails. Major highways (such as US Highways 87, 191, and 89 and State Route 19) provide arterial connections to population centers mainly outside the planning area. Smaller local paved and unpaved roads, primitive roads, and trails account for the remainder of the

transportation network in the planning area. Local roads mainly provide access to large private ranchlands.

WAFWA Management Zones I and 4

Table 3-36 through **Table 3-38** display data compiled in a BER produced by the USGS and BLM (Manier et. al. 2013). In each table, acres and miles are presented by surface management agency and their occurrence within GH and PH in the planning area, and MZs I and IV.

Table 3-36
Miles of Roads within GRSG Habitat

Surface Management Agency	Miles within GH			Miles within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	319	7,400	6,500	454	4,700	18,900
Forest Service	0	1,200	1,200	0	700	1,900
Tribal and Other Federal	124	5,800	700	10	300	1,000
Private	1,447	59,700	7,200	2,036	16,600	8,700
State	121	5,200	1,300	168	1,900	1,800
Other	0	0	79	0	0	100

Source: Manier et al. 2013

Table 3-37
Acres of Roads within GRSG Habitat

Surface Management Agency	Acres within GH[1]			Acres within PH[1]		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	3,200	79,600	68,500	4,500	48,200	199,400
Forest Service	0	12,300	12,900	0	7,200	20,100
Tribal and Other Federal	1,300	61,500	8,000	100	3,300	11,200
Private	14,800	675,000	83,500	20,800	176,200	100,900
State	1,200	58,600	14,100	1,700	20,300	18,800
Other	0	300	800	0	0	1,200

Source: Manier et al. 2013, p. 35
[1]Assumes footprint of 73.2 meters for interstate highways, 25.6 meters for primary and secondary highways, and 12.4 meters for other roads.

Table 3-38
Miles of Railroads within GRSG Habitat

Surface Management Agency	Miles within GH			Miles within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	0	50	100	0	9	100
Forest Service	0	28	1	0	0	8
Tribal and Other Federal	0	83	14	0	0	19
Private	41	1,200	300	0	146	100
State	1	90	12	0	10	12
Other	0	1	0	0	0	0

Source: Manier et al. 2013

Off-Highway Vehicles

OHVs are used primarily as a mode of transportation for accessing areas to participate in other recreation activities such as hunting, camping, or fishing. OHVs are also used throughout the planning area to manage livestock grazing. In accordance with Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota, motorized cross-country travel is prohibited in all three states. OHVs must therefore remain on existing travel routes at all times unless travel is administrative use or an exception as described in the OHV ROD (BLM 2003b) (see Glossary for a definition of administrative access).

3.12.2 Conditions on BLM-Administered Lands

Transportation routes on BLM-administered lands in the planning area are limited due to the dispersed nature of BLM parcels. The combined length of all roads and trails on BLM-administered lands in PH areas is 467 miles, while GH areas contain 128 miles of roads and trails. Travel routes on BLM-administered lands are primarily a mixture of publically-maintained paved and unpaved roads and privately-maintained unpaved roads. Local and agricultural traffic is the primary use of these roadways. Additionally, based on data from Recreation Management Information System, there are approximately 20,100 visits to the 15 ERMAs located in PH. Due to the popularity of the ERMAs, which are all reservoirs, the use of access roads to the ERMAs increases travel in the area, especially during popular recreation seasons.

3.12.3 Trends

Use of the existing transportation network in the planning area is expected to steadily increase over time as adjacent areas become more urbanized and national demand for outdoor recreation opportunities, such as hunting, fishing, and camping increase. OHV use is expected to continue as a means to support hunting opportunities and the maintenance of grazing rights.

3.13 RECREATION

Recreation opportunities in the planning area are abundant. Most recreation users participate in dispersed recreation activities, including hunting, fishing, camping, biking, hiking, horseback riding, boating on area lakes and rivers, pleasure driving, and wildlife viewing. Users often participate in these activities individually or in small groups.

3.13.1 Conditions of the Planning Area

PH and GH areas, which are dispersed mainly throughout the eastern portion of the planning area, cover 2,223,029 acres. PH is confined to Fergus and Petroleum counties, while GH occurs within Chouteau, Judith Basin, Meagher, Fergus, and Petroleum counties. ERMAs are located only within PH, and SRMAs are only located within GH.

Recreation opportunities in these areas are mainly of a dispersed nature with hunting and fishing being the primary activities. Within the planning area, 76 percent of the surface land area is privately owned. The scattered distribution of BLM-administered land limits the extent of public recreation opportunities throughout the planning area.

Since hunting is one of the primary recreation uses in the planning area, fall is the most popular season for recreation activity. Summer activities are largely concentrated around water bodies and include fishing, camping, hiking, sightseeing, and wildlife viewing. Winter recreation activities include ice fishing, hiking, and trapping.

Hunting

Big game hunting is a popular recreation activity in the planning area. The MFWP issues hunting licenses for deer, pronghorn antelope, and Rocky Mountain elk. The MFWP places restrictions on the time of year, location, method of take, and daily bag and possession limits. Statewide, annual harvest of elk averaged 16,182 between 2004 and 2011. During the same period, the annual harvest of deer averaged 49,583, while antelope harvest averaged 16,854 (MFWP 2011).

The MFWP also permits the hunting of a number of smaller upland bird species, including GRSG. The 2014 GRSG hunting season was from September 1 through September 30. Within the planning area, Chouteau, Judith Basin, Fergus, and Petroleum Counties are open to all hunters who hold a valid current year Upland Game Bird license. Meagher County is closed to GRSG hunting (MFWP 2014a).

GRSG may be hunted using a ten gauge or smaller shotgun or by bow and arrow. The daily bag limit is two, and the possession limit is four.

Statewide, annual harvest of GRSG has averaged 29,700 birds between 1958 and 2011. Between 1997 and 2001, the annual harvest averaged less than 7,000

(MFWP 2004). The MFWP estimated the harvest to be approximately 2,816 in 2012 and 2,443 in 2013, (MFWP 2014b).

Nez Perce Historic Trail

Approximately two miles of the Nez Perce Historic Trail, a part of the National Trails System, crosses through the planning area north of Winifred. However, within the planning area there are limited opportunities for historic or cultural interpretation since much of the historic trail location is on private land.

3.13.2 Conditions on BLM-Administered Lands

The BLM manages 593,995 acres within the planning area, and 345,560 acres are located in PH and GH areas. Recreation activities on BLM-administered lands are comparable to those that occur in the broader planning area; however, BLM-administered lands within the planning area are widely distributed and largely noncontiguous. This distribution limits recreation opportunities on BLM-administered land. The most popular recreation activity on BLM-administered land in the planning area is hunting, which accounts for the majority of all recreation activities and takes place predominately during the autumn months. Other popular activities include fishing, hiking, and camping.

There are three SRMAs in the planning area: Judith Mountains, Judith River, and Snowy Mountains (see **Figure 3-5**, Recreation Management Areas, in **Appendix A**). **Table 3-39** summarizes the acreage of SRMAs that overlap PH and GH.

Table 3-39
Designated SRMAs in the Planning Area

SRMA	Size (acres)	Area in PH (acres)	Area in GH (acres)
Judith Mountains	19,179	0	0
Judith River	10,079	0	9,763 (97%)
Snowy Mountains	75	0	0
Total	**29,334**	**0**	**9,763 (33%)**

Source: BLM 2012a

Judith River Special Recreation Management Area

The Judith River SRMA is comprised of scattered BLM-administered lands straddling a 27-mile stretch of the Judith River along the northern border of Fergus County. Due to its pristine qualities, this river segment was found to be eligible as part of the Wild and Scenic River System. However, a determination of non-suitability was made in the Judith Resource Area RMP (Appendix I, page 377; BLM 1994). Judith River SRMA is the only SRMA in GRSG habitat; therefore, will be the only SRMA analyzed in this RMPA/EIS.

BLM-administered lands associated with the Judith River SRMA are scattered and represent a fraction of the land area studied as part of the Wild and Scenic River evaluation. The remaining land in the study area is privately owned. Noncontiguous public lands prevent any significant recreational opportunities on BLM-administered land and present recreation management challenges. Most recreation activities in the SRMA are dispersed and occur either on the river (boating and fishing) or directly adjacent to the river (hunting, camping, sightseeing). There are no BLM-administered trails in the SRMA and the scattered distribution of BLM parcels limits public access to the river. Public access to the river is possible at Anderson Bridge via Judith River Road. While the bridge and roadway are public within a public ROW, the properties surrounding the bridge are private. Anderson Bridge is located approximately 10 miles west of Winifred, Montana.

Extensive Recreation Management Areas

There are 15 ERMAs in the planning area. Of these 15, there are two ERMAs outside GRSG habitat and two others identified in the existing RMPs that are no longer located on BLM-administered lands. All 11 ERMAs located in GRSG habitat within the decision area are in PH. No ERMAs are located in GH. ERMAs generally correspond with small reservoirs and provide mainly water-based recreation activities such as fishing, canoeing, and swimming. Each ERMA boundary corresponds with the high water line of the applicable reservoir. Payola Reservoir ERMA is the only ERMA with recreation facilities. At Payola Reservoir, recreation users have access to a cabana, picnic tables, and two fire pits. **Table 3-40** summarizes the acreage of ERMAs in the planning area. All ERMAs are located in either PH or outside the planning area.

Table 3-40
Designated ERMAs in the Planning Area

ERMA	Outside Habitat (acres)	Area in PH (acres)	Area in GH (acres)
Box Elder/Vogel Reservoir	0	12	0
Buffalo Wallow Reservoir	0	15	0
Crooked Creek Reservoir	0	7	0
Drag Creek Reservoir	36	0	0
Dry Blood Reservoir	0	12	0
Fritzner Reservoir	3	1	0
Holland Reservoir	0	10	0
Jakes Reservoir	0	17	0
Lower Dry Wolf Reservoir	0	6	0
Mauland Reservoir	1	0	0
Payola Reservoir	0	20	0

Table 3-40
Designated ERMAs in the Planning Area

ERMA	Outside Habitat (acres)	Area in PH (acres)	Area in GH (acres)
South Fork Dry Blood Reservoir	0	10	0
Upper Dry Wolf Reservoir	0	5	0
*Hopalong Reservoir	0	0	0
*Yellow Water Reservoir	0	0	0
Total	**40**	**115**	**0**

Source: BLM 2012a
*Identified as ERMA in Judith Resource Area RMP, but currently no BLM ownership.

Off-Highway Vehicles

OHVs are used primarily as a mode of transportation for accessing areas to participate in other recreation activities such as hunting, camping, or fishing. In accordance with the Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota, motorized cross-country travel is prohibited in all three states (BLM 2003b). OHVs must therefore remain on existing travel routes at all times.

Special Recreation Permits

The BLM uses SRPs to authorize certain commercial, competitive, and group recreation events and activities on BLM-administered lands and related waters. BLM field offices issue SRPs on a discretionary basis. SRPs are one of many tools used by the BLM to implement land use plans, achieve the goals and objectives of the field office's recreation program, manage visitor use, protect resources, and help ensure the health and safety of the visiting public (BLM IM 2011-019, BLM 2010a).

The BLM authorizes SRPs for big game hunting and upland bird hunting in the planning area. These recreation activities are provided by recreation outfitters throughout the LFO. The BLM currently issues seven SRPs in the planning area. Of these, six permits are for big game hunting, and one is for upland bird hunting.

3.13.3 Trends

Recreation use in the planning area is expected to continue to increase over time. In particular, more dispersed recreation activities (e.g., hunting, fishing, and hiking) are likely to increase because of the region's rural landscape, clean air, increasing national population and increasing number of local employment opportunities in the energy sector. The number of SRPs issued on an annual basis is expected to remain steady, or increase slightly. Additional factors expected to increase demand for recreation on GRSG habitats in central Montana include:

- Increasing popularity of outdoor recreation as a family-oriented activity
- Increasingly active retired population with more disposable time and income
- Displacement from other recreation areas due to decreasing opportunities or changes in management in those areas
- Increasing importance of recreation as a component of the local economy
- Increasing importance of natural-resource recreation as other areas of the country become more urbanized
- Treatment of noxious/invasive weeds

3.14 RANGE MANAGEMENT

The primary laws that govern livestock grazing on public lands are the Taylor Grazing Act of 1934, FLPMA, and the Public Rangelands Improvement Act of 1978. In addition, the BLM manages grazing lands under 43 CFR, Part 4100 and applicable policy.

In accordance with 43 CFR, Part 4180, the BLM is required to meet or make progress towards meeting standards defined in the Lewistown District Standards for Rangeland Health and Guidelines for Livestock Grazing Management (BLM 1997) (see **Appendix F**). Standards are statements of physical and biological condition or degree of function required for healthy sustainable rangelands. Guidelines are preferred or advisable grazing management approaches to maintaining or ensuring progress towards achieving land health standards. These standards and guidelines were developed with public input through the processes established by the NEPA. The Judith Resource Area and Headwaters Resource Management Plans were amended by this document upon its approval by the Secretary of the Interior in August 1997. Adherence to the Standards for Rangeland Health and Guidelines for Livestock Grazing Management is also a requirement of BLM grazing regulations as set forth by 43 CFR, Part 4180.

The BLM is required to make changes where an allotment is not meeting standards due to current livestock grazing. The LFO assesses grazing allotments in conjunction with the grazing permit/lease renewal process, which occurs every 10 years. An interdisciplinary team of BLM specialists complete the allotment assessments in coordination with the permittees/lessees using the Interpreting Indicators for Rangeland Health Process, which has been scientifically reviewed through the USGS peer-review process (BLM 2005c).

When the grazing allotment assessment process has been completed, the interdisciplinary team completes and allotment evaluation and, if the evaluation indicates that an allotment is not achieving the Standards for Rangeland Health, a

determination of what is causing the allotment to not achieve the standards is completed. When it is determined that current livestock grazing management is a causal factor in the allotment on achieving the standards, a change in the grazing management must be initiated within one year in order to allow the grazing allotment to achieve or make significant progress towards achieving the standards.

Changes to allotment management, include, but are not limited to:

- increasing length of rest periods between grazing periods
- changing season of use
- altering livestock turnout location
- changing grazing intensity
- changing grazing duration
- improving livestock distribution
- treatment of noxious/invasive weeds

Improved livestock distribution could be achieved through construction of water developments and fences, selective salt and mineral placement, and changes to livestock turnout location and season of use. In some cases, fencing may be used to protect upland and/or riparian areas.

A grazing permit is the document which authorizes livestock grazing use of BLM-administered lands within an established grazing district, whereas a grazing lease is the document which authorizes livestock grazing use of public lands outside an established grazing district as defined by the Taylor Grazing Act (43 CFR, Part 4100.0-5). The kind and number of livestock, the period of use (seasonal), the allotment to be used, and the amount of use in AUMs are mandatory terms and conditions of every grazing permit or lease (43 CFR, Part 4130.3). An AUM is the amount of forage necessary for the sustenance of one cow or its equivalent for one month and an allotment is an area of land designated and managed for grazing of livestock (43 CFR, Part 4100.0-5).

3.14.1 Conditions of the Planning Area

Grazing is permitted throughout the majority of the planning area. Rangeland vegetation in the planning area consists primarily of sagebrush grasslands, grasslands, and lightly vegetated badlands. Mixed shrub communities are common in coulees and benches throughout all of these vegetation types.

Within the planning area, many ranches have grazing leases on state lands that are intermingled with private and public land. Public lands cover approximately eight percent of the planning area.

WAFWA Management Zones I and 4

Table 3-41 through **Table 3-43** display data compiled in a BER produced by the USGS and BLM (Manier et. al. 2013). In each table, acres and miles are presented by surface management agency and their occurrence within GH and PH in the planning area, and MZs I and IV.

On lands of all surface management, there are 1,189,200 acres of grazing allotments, with 609,700 in GH and 579,500 in PH as displayed in **Table 3-41.**

Table 3-41
Grazing Allotments within GRSG Habitat

Surface Management Agency	Acres within GH			Acres within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	106,499	4,443,000	4,670,700	230,716	2,982,200	13,408,800
Forest Service	0	510,300	1,050,800	0	291,000	1,566,700
Tribal and Other Federal	78,800	137,200	153,800	3,600	10,600	266,200
Private	218,700	11,338,100	1,201,300	309,800	4,619,800	3,044,600
State	34,300	1,194,300	257,900	36,500	681,000	693,600
Other	0	3,100	400	0	300	1,500

Source: Manier et al. 2013

Current livestock grazing was a significant causal factor for not achieving land health standards in 78 (54 allotments within GRSG habitat) of the 526 allotments within the planning area (**Table 3-42**). See **Section 3.14.2**, Conditions on BLM-Administered Lands, for a detailed description of land health assessments in the LFO. All grazing allotments within the planning area, including those in GRSG habitat, that were determined to not be meeting land health standards due to livestock grazing have had management changes implemented to address these causal factors.

Table 3-42
Allotments Not Meeting Land Health Standards within GRSG Habitat

Surface Management Agency	Acres[1] within GH			Acres[1] within PH		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	23,800	52,100	968,900	81,900	82,500	2,617,200

Source: Manier et al. 2013
[1]Only includes allotments not meeting Land Health Standards with grazing as the causal factor

Structural range improvements may present a risk to GRSG, particularly fences, which when not designed with special provisions for GRSG, can cause fence collisions or provide hunting raptors a place to perch. In the planning area, there

are approximately 3,900 miles of fence; 1,800 in GH and 1,900 in PH (**Table 3-43**).

Table 3-43
Fences within GRSG Habitat

Surface Management Agency	Miles within GH[1]			Miles within PH[1]		
	Planning Area	MZ I	MZ IV	Planning Area	MZ I	MZ IV
BLM	700	11,300	7,200	700	18,700	16,100
Forest Service	0	900	1,900	0	6,100	2,800
Tribal and Other Federal	100	500	400	0	500	400
Private	900	32,100	3,900	1,100	100	7,400
State	100	3,300	500	100	10,700	1,200
Other	0	0	13	0	1,400	26

Source: Manier et al. 2013
[1]Derived from a dataset that identifies pasture and allotment borders on BLM and Forest Service land as potential fences.

3.14.2 Conditions on BLM-Administered Lands

Within the planning area the majority of BLM-administered acreage is open to grazing (570,112 acres, 96.0 percent) (see **Table 3-44**). Approximately 6,781 acres (1.1 percent) of BLM-administered lands within the planning area, all within the Judith Resource Area, are closed to grazing for protection of other resources, including area within Judith Mountains and Square Butte. Approximately 17,148 acres (2.8 percent) of the BLM-administered lands in planning area is unallocated for grazing (BLM 2012a).

Currently the BLM manages grazing on 526 grazing allotments in the planning area. Cattle are the most prevalent class of livestock. On GRSG habitat (PH and GH), there are all or portions of 207 and 107 allotments respectively (**Table 3-45**).

Table 3-44
Lewistown Field Office Planning Area—Grazing Allocation

RMP	Type	Acres in Non GRSG Habitat	Acres in PH	Acres in GH	Total Acres
Judith Resource Area RMP	Open to grazing	225,716 (40%)	230,716 (41%)	106,089 (19%)	562,521
	Closed to grazing	6,780 (100%)	0	0	6,780
Headwaters RMP	Open to grazing	7,186 (95%)	n/a	360 (5%)	7,546
	Closed to grazing	0	0	0	0

Table 3-44
Lewistown Field Office Planning Area—Grazing Allocation

RMP	Type	Acres in Non GRSG Habitat	Acres in PH	Acres in GH	Total Acres
Planning Area Total	**Open to grazing**	**232,947 (41%)**	**230,716 (40%)**	**106,449 (19%)**	**570,112**
	Closed to grazing	**6,781 (100%)**	**0**	**0**	**6,781**

Source: BLM 2012a

Table 3-45
Lewistown Field Office Planning Area—Summary of Allotments and AUMs by Habitat Type

	Non GRSG Habitat (acres)	GH (acres)	PH (acres)	Total
Number of Active AUMS	34,398 (33%)	19,460 (19%)	49,948 (48%)	103,806
Number of Allotments	212 (40%)	107 (21%)	207 (39%)	526

Source: BLM 2012a

A wide range of management approaches are practiced among the permittees/lessees that graze livestock. Some grazing permits/leases are held by producers that are primarily involved in farming. In these cases, livestock are often grazed on BLM-administered land during the summer and on private land stubble fields in the fall and winter. In most cases, isolated tracts of BLM-administered land are grazed in conjunction with private land because the intermingled land ownership pattern and terrain make it difficult to manage the BLM-administered land separately from private land. In other cases, large blocks of BLM-administered land are authorized to producers that are primarily involved in ranching. The allotments with significant acreages of isolated tracts and larger contiguous blocks of BLM-administered lands are usually managed under grazing prescriptions and/or rotations that are outlined in a watershed plan or an AMP that includes private, state, and BLM-administered land.

Many allotments have range improvements such as fences, stock ponds, pipelines, springs, windmills, seedings, wells, and access roads for livestock management purposes.

Over the past decade, the BLM undertook a field office-wide planning effort, focused on implementing decisions in the 1994 Judith Resource Area Resource Management Plan. As part of this effort, grazing allotments were assessed as to whether or not Range Land Health Standards were being achieved and Guidelines for Livestock Grazing Management were being followed. Environmental assessments (EAs) were prepared for the following plans relevant to the planning area (http://www.blm.gov/mt/st/en/fo/lewistown_field_office/Watershed_Plans.html):

- Petrolia Watershed Plan EA (BLM 2007b)
- North-East Fergus Watershed Area Plan EA (BLM 2009b)
- Musselshell Breaks Watershed Plan EA (BLM 2005d)
- Upper Arrow Creek Watershed Area Plan EA (BLM 2008d)
- Great Falls Area Grazing Lease Renewal EA (BLM 2011b)
- Snowies/Little Belts Grazing Lease Renewal EA and Permit Renewal EA (BLM 2009c)
- Forest Health and Vegetation Management for the Judith and Moccasin Mountains (BLM 2006)

Details for each watershed area are provided in the applicable EA and summarized in **Table 3-46** below. An assessment of rangeland health standards and guidelines has been made on all allotments in the planning area. Allotments have been assessed for adherence to the Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands Administered by the BLM for Montana and the Dakotas (**Appendix F**).

Table 3-46
Lewistown Field Office Planning Area—Land Health Assessment

Type	Acres (Allotments) in Non GRSG Habitat	Acres (Allotments) in PH	Acres (Allotments) in GH	Total Acres (Allotments)
Total assessed for land health standards	232,902 (212)	230,716 (207)	106,449 (107)	570,067 (526)
Meeting land health standards	159,052 (121)	105,836 (124)	68,736 (78)	333,625 (323)
Not meeting land health standards	73,848 (91)	124,881 (83)	37,713 (29)	236,427 (203)
Not meeting land health standards due to livestock grazing	38,418 (24)	91,878 (48)	13,559 (6)	143,856 (78)
Not meeting land health standards due to livestock; appropriate action taken to ensure significant progress toward meeting the standards	38,418 (24)	91,878 (48)	13,559 (6)	143,856 (78)
Not assessed	0	0	0	0

Source: BLM 2012a

Current livestock grazing was a significant causal factor for not achieving land health standards in 78 (54 allotments within GRSG habitat) of the 526 allotments within the planning area. On 92,571 acres, current livestock grazing

was not a causal factor for failing to achieve all standards and guidelines. For all allotments determined to not be achieving standards due to current livestock grazing management, changes in livestock grazing management were implemented through changes in the mandatory and/or other terms and conditions of the grazing permits or leases by grazing decision in accordance with BLM grazing regulations (43 CFR, Part 4160) and analyzed in the EAs listed above. The management changes implemented included, but were not limited to, vegetative treatments (including the treatment of noxious weeds), construction of range improvement projects (i.e., fences, water developments, including pipelines, reservoirs/pits, and spring developments), the implementation of grazing rotations, reductions in authorized AUMs, and suspension of authorized AUMs. The effectiveness of the management changes implemented will be evaluated on a 10-year cycle, based on the dates of the watershed plans listed above. As of the current time, none of the allotments have been reassessed to determine if the changes implemented have resulted in allotments that were not achieving standards to meet or make significant progress.

The LFO renews term grazing permits and leases through the completion of sub-landscape level NEPA analysis in the form of EAs. The EAs are undertaken after land health evaluations and as necessary land health determinations have been completed, in accordance with BLM policy and regulation. **Figure 3-6** in **Appendix A** illustrates the sub-landscape level resource activity planning areas that are used to renew grazing authorizations (permits and leases) as well as analyze other actions and projects that may be completed to achieve BLM priorities and mission goals associated with other programs. These planning areas have been delineated based on BLM administrative, Cooperative State Grazing District (CSGD) and watersheds boundaries, as well as other factors that allow LFO to meet the requirement of BLM grazing regulations 43 CFR, Parts 4160, 4180 and policy as it relates to grazing authorization renewal, land health standards and most efficiently complete BLM's mission based on LFO staffing levels.

The list below shows the priority order for grazing authorization renewal for the planning units within LFO; the renewal process for the Crooked Creek Plan will be completed in early 2014 and therefore has been moved to the bottom of the priority list. The land health assessment process for the Crooked Creek Plan will be completed in early 2014 in accordance with Washington Office IMs WO-2012-043 and 044, which provide guidance on GRSG management and conservation. The remaining planning units would be completed as listed by priority by 2023. The planning units listed below contain PH and GH unless noted otherwise.

- Judith
- Lower Missouri

- Petrolia
- SE Fergus County
- Upper Missouri
- Section 15 (no PH)
- Great Falls (no PH)
- Crooked Creek

3.14.3 Trends

Permitted use levels have been assessed in watershed EAs and grazing management changes recommended as needed to work towards achieving livestock grazing standards. In some cases, permitted AUMs for individual allotments have been reduced. Actual use of allotments has decreased in many areas over the past decade as a result of drought. Changes in land use on private and public lands, such as increased use for recreational purposes, have also influenced livestock grazing.

Drought has influenced the condition of vegetation in some areas. Noxious weeds are a serious threat to the planning area. Within the Petrolia Watershed Area, where the majority of PH is located, higher concentrations of weed infestations are present along the major drainages and their tributaries, including Ford's Creek, Box Elder Creek, Pike Creek, Buffalo Creek, Duck Creek, and the Musselshell River. The largest areas of infestation noted within PH and GH are Leafy spurge, spotted knapweed, Russian knapweed, Whitetop (Hoary cress), and Houndstongue. Many invasive weed species are unpalatable to livestock, which may over time decrease total productivity or result in the need to alter grazing management practices.

One program underway to restore vegetation for livestock and GRSG use on private lands is the West-wide National Resource Conservation Service (NRCS) Sage-Grouse Initiative (SGI), which is cooperatively working with ranchers to boost both livestock and grouse productivity (NRCS 2011).

Recently, land sales for recreational purposes have increased, primarily for private hunting. This trend often results in the private lands associated with ranches being sub-divided into smaller properties that may or may not have BLM grazing privileges. The new owners often sub-lease the newly divided ranch, including BLM-administered grazing privileges for grazing, and recreate on the ranch property. The trend of recreational land sales is likely to increase as long as the economy remains relatively stable and may result in changes to administration needs by the BLM if the number of grazing permits/leases changes.

3.15 AREAS OF CRITICAL ENVIRONMENTAL CONCERN

ACECs are defined in FLPMA and in 43 USC 1702(a) and 43 CFR, Part 1601.0-5(a) as areas where special management attention is required to protect and prevent irreversible 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 intent of Congress in mandating the designation of ACECs was to give priority to the designation and protection of areas containing unique and significant resource values. These values identified in the ACEC nomination process must meet a set of importance criteria (BLM 1988). The value, resource, process or natural system, or hazard present must have one or more of the following:

- More than locally significant qualities which give it special worth, consequence, meaning, distinctiveness, or cause for concern
- Qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change
- Recognition as warranting protection in order to satisfy national priority concerns or to carry out mandates of FLPMA
- Qualities that warrant highlighting in order to satisfy public or management concerns about safety and public welfare
- Qualities that pose a significant threat to human life and safety or to property

An ACEC must also require special management attention to protect the identified relevant and important values. Special management attention refers to management prescriptions that are developed during preparation of an RMP or RMPA expressly to protect relevant and important values of an area from the potential effects of actions permitted by the RMP. These are management measures that would not be necessary and prescribed if the critical and important features were not present (BLM 1988). ACECs are areas where natural processes are allowed to predominate and that are preserved for the primary purposes of research and education.

3.15.1 Conditions of the Planning Area

The Acid Shale-Pine Forest ACEC is the only ACEC in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area that is also within GRSG habitat. The ACEC comprises 2,674 acres on two separate BLM tracts: 1,646 acres in the Briggs Coulee tract and 817 acres in the War Horse tract. The ACEC is generally located northeast of the community of Grass Range; its boundary is entirely within PH (see **Figure 3-7** in **Appendix A**).

The Square Butte ACEC, Judith Mountains Scenic Area ACEC, and Collar Gulch ACEC are also located in the planning area, but are located outside GRSG habitat.

3.15.2 Conditions on BLM-Administered Lands

Acid Shale-Pine Forest ACEC

Designation of the Acid Shale-Pine Forest as an ACEC/Research Natural Area signified the need to research the effects of grazing, fire, and other activities on the landscape and to protect unique resources in the area from potentially harmful activities. The Acid Shale-Pine Forest's fragile shale landscape is vulnerable to erosion from man-made surface disturbances and natural weather events such as heavy rain storms. The BLM management objectives for the Acid Shale-Pine Forest ACEC are intended to protect the area's unique pine forest and shale landscape. Vegetation in the ACEC is limited mostly to slow-growing ponderosa pine trees, with a sparse distribution of juniper bushes and grasses in the understory. Dense clay soil beneath the pine trees prevents a more robust understory vegetative community from becoming established. The vegetative communities that comprise shale-pine forest landscapes are unique and appear to be confined to central and eastern Montana.

Due to the lack of low-lying vegetative cover and fragile soil conditions, wind and water soil erosion is common in shale-pine forest landscapes. Where the topography becomes steep, deep gullies carve into the landscape. Any improper surface-disturbing activities, such as grazing, mineral exploration, motorized vehicle use, or recreation, would exacerbate soil erosion. The geology composition may make the ACEC attractive for oil and gas exploration.

PH is found within the entire Acid Shale-Pine Forest ACEC. Although shrub and grass vegetation more typical of GRSG habitat is generally sparse within the ACEC, openings between pine trees provide more opportunities for shrubs, forbs, and grasses to become established. These areas provide food and shelter for wildlife and, in some cases, provide the proper landscape for species reproductive activities (BLM 1992, p.135-136).

Motorized travel in the ACEC is limited to existing routes and trails. In addition, the ACEC is managed as a ROW avoidance area. Timber harvest is prohibited, and the ACEC is closed to fluid minerals leasing.

3.15.3 Trends

The BLM would continue to analyze and consider designating BLM-administered lands as ACECs where special management attention is required to protect or to prevent irreparable damage to relevant values, as necessary.

3.16 AIR RESOURCES

Air resources include air quality and air quality related values. As part of the planning and decision-making process, the BLM considers and analyzes the potential effects of BLM and BLM-authorized activities on air resources.

The US Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including criteria air pollutants subject to National

Ambient Air Quality Standards (NAAQS). Pollutants regulated under NAAQS include carbon monoxide (CO), lead, nitrogen dioxide (NO_2), ozone, particulate matter with a diameter less than or equal to 10 microns (PM_{10}), particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2). Two additional pollutants, nitrogen oxides and volatile organic compounds are regulated because they form ozone in the atmosphere. Air quality is determined by pollutant emissions and emission characteristics, atmospheric chemistry, dispersion meteorology, and terrain. Air quality related values include effects on soil and water, such as sulfur and nitrogen deposition and lake acidification, and aesthetic effects, such as visibility.

In addition to EPA federal regulations, air quality is regulated by the MTDEQ. This agency develops state-specific regulations and issues air quality permits to emission sources.

3.16.1 Conditions of the Planning Area

There are no state-operated ambient air quality monitors in the planning area. Consequently, data used in this analysis are data from monitors east and west of the planning area.

The closest monitoring station to the planning area is in Cascade County; however, this station only has one year of monitoring data for CO. The closest monitoring stations with three years of data are located in Lewis and Clark County, west of the planning area, and Richland County, east of the planning area. Based on available data collected from these monitoring sites between 2011 and 2013, most monitored criteria pollutant values were below the NAAQS. In 2013, the monitor in Richland County recorded an exceedance of PM_{10}, and in 2011 one of the monitors in Lewis and Clark County recorded an exceedance of $PM_{2.5}$. However, the three-year averages for PM_{10} and $PM_{2.5}$ do not exceed 150 μg/m and therefore are still considered in attainment. High particulate concentrations in Lewis and Clark County in the past have been attributed to wood burning in Helena during the winter. A study conducted by the University of Montana found wood burning to be responsible for nearly two-thirds of winter particulate pollution (Ward 2008).However, the data from the Richland County monitor outside of Sidney, Montana, is more representative of PM_{10} and $PM_{2.5}$ concentrations within GRSG habitat areas than the Helena data from Lewis and Clark County.

Table 3-47 shows the concentrations of monitored pollutants in the latest three years for which data has been finalized in Richland, Lewis and Clark, and Cascade Counties.

The EPA classifies areas of the US according to whether they meet the NAAQS. Areas that violate air quality standards are designated as nonattainment areas for the relevant criteria air pollutants. Areas that comply with air quality standards are designated as attainment areas for the relevant criteria air

Table 3-47
Air Quality Monitor Values Near the Planning Area (2011-2013)*

Criteria Pollutant	Averaging Time	2011[1]	2012[1]	2013[1]	3-year average	NAAQS	% of NAAQS
Richland County							
NO_2	1 hour	9	9	13	10	100 ppb	10%
CO[3]	1 hour	-	-	-	-	35 ppm	-
Ozone	8 hours	0.052	0.061	0.056	0.056	0.075 ppm	75%
SO_2	1 hour	6	4	3	4	75 ppb	5%
$PM_{2.5}$[2]	24 hours	15	19	17	17	35 μg/m³	49%
PM_{10}[2]	24 hours	102	122	163	129	150 μg/m³	86%
Lewis and Clark County							
CO	1 hour	0.5	0.6	0.4	0.5	35 ppm	1%
CO	8 hours	0.4	0.5	0.3	0.4	9 ppm	4%
Ozone	8 hours	0.057	0.053	0.054	0.055	0.075 ppm	73%
SO_2	1 hour	1	2	2	2	75 ppb	3%
$PM_{2.5}$[2]	24 hours	10, 41	21, 28	10, 24	22	35 μg/m³	63%[4]
Cascade County							
$PM_{2.5}$[2]	24 hours	-	-	-	-	35 μg/m	-
CO	1 hour	1.9	-	-	1.9	35 ppm	5%
CO	8 hours	0.9	-	-	0.9	9 ppm	10%

Source: EPA 2014a
*Exceptional events data included.
[1]Monitored concentrations are the maximum second highest for 24-hour PM_{10}; 4th highest daily maximum for 8-hour O_3; 98th percentile for 24-hour $PM_{2.5}$ and 1-hour NO_2; 99th percentile for 1-hour SO_2; maximum first highest for 1-hour and 8-hour CO; and maximum arithmetic mean for annual $PM_{2.5}$.
[2]Data from multiple monitoring stations.
[3]Pollutant not monitored at this station.
[4]Average values monitored for each year to determine 3-year average.

pollutants. Areas that have been redesignated from nonattainment to attainment are considered maintenance areas. The planning area is in attainment for all of the NAAQS (MTDEQ 2011).

Air quality also may be assessed using the EPA's air quality index (AQI). The AQI is an index used for reporting daily air quality to the public. The index tells how clean or polluted an area's air is and whether associated health effects might be a concern. The EPA calculates the AQI for five criteria air pollutants regulated by the Clean Air Act: ground-level ozone, particulate matter, CO, SO_2, and NO_2. An AQI value of 100 generally corresponds to the primary NAAQS for the pollutant. The following terms help interpret the AQI information:

- **Good –** The AQI value is between 0 and 50. Air quality is considered satisfactory and air pollution poses little or no risk.
- **Moderate –** The AQI is between 51 and 100. Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to ozone may experience respiratory symptoms.
- **Unhealthy for Sensitive Groups –** When AQI values are between 101 and 150, members of "sensitive groups" may experience health effects. These groups are likely to be affected at lower levels than the general public. For example, people with lung disease are at greater risk from exposure to ozone, while people with either lung disease or heart disease are at greater risk from exposure to particle pollution. The general public is not likely to be affected when the AQI is in this range.
- **Unhealthy –** The AQI is between 151 and 200. Everyone may begin to experience some adverse health effects, and members of the sensitive groups may experience more serious effects.
- **Very Unhealthy –** The AQI is between 201 and 300. This index level would trigger a health alert signifying that everyone may experience more serious health effects.

The AQI of Lewis and Clark County, Cascade County, and Richland County are displayed in **Table 3-48**. In general the air quality in these areas has consistently been good for the past three years (EPA 2014b).

Table 3-48
Air Quality Index Report, 2011-2013

Year	Number of Days with AQI data	Number of Days Rated Good	Percent of Days Rated Good	Number of Moderate Days	Number of Unhealthy for Sensitive Groups Days	Number of Unhealthy or Very Unhealthy Days
Lewis and Clark County (west of the planning area)						
2013	365	315	86%	50	-	-
2012	366	271	74%	88	7	-
2011	365	309	85%	54	2	-
Total:	**1,096**	**895**		**64**	**9**	**-**
Average:			**82%**	**6%**	**1%**	**0%**

Table 3-48
Air Quality Index Report, 2011-2013

Year	Number of Days with AQI data	Number of Days Rated Good	Percent of Days Rated Good	Number of Moderate Days	Number of Unhealthy for Sensitive Groups Days	Number of Unhealthy or Very Unhealthy Days
Cascade County (west of the planning area)						
2013	337	311	92%	26	-	-
2012	360	299	83%	58	3	-
2011	347	287	83%	60	-	-
Total:	**1,044**	**897**		**144**	**3**	**-**
Average:			**86%**	**14%**	**0%**	**0%**
Richland County (east of the planning area)						
2013	365	318	87%	45	2	-
2012	366	302	83%	64	-	-
2011	365	325	89%	40	0	-
Total:	**1,096**	**945**		**149**	**2**	**-**
Average:			**86%**	**14%**	**0%**	**0%**

Source: EPA 2014b

Air quality related values include visibility, which can be degraded by regional haze due primarily to sulfur, nitrogen, and particulate emissions. Since 1980, the Interagency Monitoring of Protected Visual Environments (IMPROVE) network has measured visibility in national parks and wilderness areas. The nearest IMPROVE site is in the UL Bend Wilderness adjacent to the northeastern edge of the planning area. Visibility at this IMPROVE station has improved slightly in the 2005 to 2009 time period compared with the 2000-2004 time period on both the 20 percent haziest days and the 20 percent clearest days (Hand 2011).

Atmospheric deposition refers to processes in which air pollutants are removed from the atmosphere and deposited into terrestrial and aquatic ecosystems. Air pollutants can be deposited by either wet precipitation (via rain or snow) or dry (gravitational) settling of particles and adherence of gaseous pollutants to soil, water, and vegetation. Much of the concern about deposition surrounds the secondary formation of acids and other compounds that can contribute to acidification of lakes, streams, and soils and affect other ecosystem characteristics, including nutrient cycling and biological diversity. Deposition varies with precipitation and other meteorological variables such as temperature, humidity, winds, and atmospheric stability.

The National Atmospheric Deposition Program/National Trends Network is an interagency sponsored network of monitoring stations that measures wet

atmospheric deposition. The Clean Air Status and Trends Network is an interagency network of monitoring stations managed by EPA that measures dry deposition. The closest National Atmospheric Deposition Program/National Trends Network sites are in Havre, north of the planning area, and in Clancy, west of the planning area. There are no Clean Air Status and Trends Network sites near the planning area; the nearest sites are in Glacier National Park and Theodore Roosevelt National Park.

Table 3-49 shows the deposition levels of sulfates, nitrates, and ammonium, as well as pH and precipitation, from 2011 to 2013. The annual average precipitation pH between 2011 and 2013 was 5.7 at the Havre site and 5.52 at the Clancy site; normal rain has a pH level of 5.6, while acid rain has a pH level around 4.3 (NADP/NTN 2011-2013).

Table 3-49
Annual Average Deposition (2011-2013)

Year	pH	Precipitation (cm)	Annual Average Wet Deposition (kg/ha/yr)		
			SO_4	NO_3	NH_4
Havre, MT (MT98)					
2013	5.85	50.7	2.14	3.1	3.1
2012	5.67	31.4	1.66	2.67	1.23
2011	5.58	27.8	1.26	1.93	1.2
Average	*5.7*	*36.6*	*1.69*	*2.57*	*1.84*
Clancy, MT (MT07)					
2013	5.67	40.13	1.28	2.22	1.14
2012	5.45	30.84	0.79	1.54	0.53
2011	5.43	44.9	1.12	1.8	0.82
Average	*5.52*	*115.87*	*1.06*	*1.85*	*0.83*

Source: NADP/NTN 2011-2013
SO_4=sulfates; NO_3=nitrates; NH_4=Ammonium

There are no Class I areas within the planning area. The closest Class I area is the UL Bend Wilderness, adjacent to the northeastern edge of the planning area. The Gates of the Mountains Wilderness Area in Lewis and Clark County is west of the planning area and is also in close proximity to the planning area. The land in the planning area is designated as Class II.

3.16.2 Conditions on BLM-Administered Lands

The area managed by the BLM is in compliance with all NAAQS (MTDEQ 2011). The Richland and Cascade County monitoring locations are the most representative air quality monitors for the BLM-administered lands in the planning area. As such, these monitoring locations have the best estimate to what kind of air quality is present in the planning region, and more specifically,

on BLM-administered lands. The conditions on BLM-administered lands are similar to those discussed in **Section 3.16.1**, Conditions of the Planning Area.

3.16.3 Trends

Quantitative data provided by the Richland and Cascade County monitors show air quality near the planning area has been good over the past several years (EPA 2014a). Based on the proximity of these monitoring sites to the planning area, and on past trends for air quality, it is reasonable to assume the air quality in the planning area will remain good. Measures that are implemented to protect GRSG may also benefit air resources if they prohibit surface disturbance or reduce access to habitat, consequently limiting fugitive dust or pollution caused by transportation.

The good air quality in the area is largely attributed to the rural nature of the planning region. In the event that more development occurs in the future, air quality may be affected.

Visibility trend plots at the UL Bend Wilderness IMPROVE site shows slight improvements in visibility on both the 20 percent haziest and 20 percent clearest days since the early 2000s (Hand 2011). Trend plots at National Atmospheric Deposition Program/National Trends Network monitoring sites MT2007 and MT98 likewise show SO_2, NO_3, and NH_4 deposition rates to be generally stable since the early 2000s, with recent increases in 2013 (NADP/NTN 2014).

3.17 CLIMATE

Climate change is defined by the Intergovernmental Panel on Climate Change (IPCC) as "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and persist for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity" (IPCC 2007). Climate change and climate science are discussed in detail in *the Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management* (BLM 2010b). This document is often referred to as the "Climate Change SIR" and is incorporated by reference into the Lewistown Field Office Greater Sage-Grouse RMPA/EIS.

Earth has a natural greenhouse effect, wherein naturally occurring gases such as water vapor, carbon dioxide, methane, and nitrous oxide absorb and retain heat. Without the natural greenhouse effect, the earth would be approximately 60°F cooler (BLM 2010b). Climate change is caused in part by the increase in

GHGs in the atmosphere beyond naturally occurring levels[1]. Over time the amount of energy sent from the sun to the Earth's surface should be approximately the same as the amount of energy radiated back into space, leaving the temperature of the Earth's surface roughly constant. Increased levels of GHGs trap more heat in the atmosphere rather than allowing it to escape back into space.

Climate models predict that if GHGs continue to increase, the average temperature at the Earth's surface could increase from 3.2 to 7.2°F (1.8 to 4.0°C) above 1990 levels by the end of this century (EPA 2011b). An increase in the average temperature of the Earth may produce changes in sea levels, rainfall patterns, and intensity and frequency of extreme weather events. The IPCC, in its Fourth Assessment Report, stated that warming of the earth's climate system is unequivocal and that warming is very likely due to anthropogenic (human-caused) GHG concentrations (IPCC 2007).

3.17.1 Conditions of the Planning Area

Climate

The planning area has a semiarid continental climate marked by cold winters, warm to rarely hot summers, winds primarily from the west, and abundant sunshine.

The average temperature in central Montana over the last thirty years is between 40°F and 50°F. The average January temperature is around 23°F. The average July temperature is about 66°F, though temperatures as high as 110°F have been recorded (Western Regional Climate Center 2012).

Average annual precipitation ranges from 11 inches to 22 inches, with an average of 15 inches of precipitation (Western Regional Climate Center 2012).

Snow in the mountain areas may be several feet deep. On the plains, snow more than 12 inches deep is uncommon but not rare. Snow generally falls between November and April, although traces have been reported at Lewistown in July and August.

Rainfall is concentrated between April and June. Precipitation from July through September is characterized by localized intense thunderstorms that can drop

[1]There are six GHGs tracked by the IPCC: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (State Department 2010). The latter three gases are known as high global warming potential gases due to their warming effectiveness (140 to 23,900 times greater than carbon dioxide) and their long atmospheric lifetimes (between 1-50,000 years) (EPA 2013). Carbon dioxide, methane, and nitrous oxide have both natural and human-generated sources, while high global warming potential gases are strictly human-generated from various industrial processes. GHGs are tracked as carbon dioxide equivalents, with one gram of carbon dioxide molecule counting as one and other GHG molecules counting as some multiple (EPA 2012a).

more than an inch of rain or hail on a small area in a few minutes. Low humidity, high temperatures, and moderate to strong winds cause rapid loss of soil moisture (Western Regional Climate Center 2013).

Greenhouse Gas Emissions

GHG emissions are generally reported at national and statewide levels. Montana's GHG emissions were inventoried by the state in 2005 (Montana Climate Change Advisory Committee 2007). In 2005, activities in Montana accounted for approximately 37 million metric tons of carbon dioxide equivalents gross emissions, approximately 0.6 percent of total US GHG emissions. Montana's gross emissions increased 11 percent from 1990 to 2004, while national emissions rose by 15 percent during this period.

Electricity use, agriculture, and transportation are Montana's principal GHG emissions sources. Together, the combustion of fossil fuels for electricity generation used in-state and in the transportation sector account for about 46 percent of Montana's gross emissions. The contribution of agriculture-related GHG emissions is much higher in Montana (26 percent) than in the nation as a whole (seven percent). The state also has higher levels of emissions from the fossil fuels industry—natural gas, oil products, and coal—than the national average (Montana Climate Change Advisory Committee 2007).

3.17.2 Conditions on BLM-Administered Lands

Conditions on BLM-administered lands are similar to those described above for the planning area.

3.17.3 Trends

Climate changes over the past 100 years are well documented, and climate change is expected to continue into the future. Fossil fuel combustion and other human-caused GHG-producing activities are ongoing, although public awareness and future regulations may reduce annual GHG emissions. Due to the long atmospheric lifetimes of most GHGs, climate change impacts will continue to increase for many years after GHG emissions decrease (EPA 2012a).

Over the past 100 years, annual temperature and precipitation have increased, and climate models predict that they will continue to increase through the 21st century. Extreme weather events such as severe drought and intense rainfall are expected to increase in frequency in the future as well (NCSL 2008).

Depending on the model, in Montana temperatures are predicted to increase 3 to 4°F by the mid-21st century and 5 to 6°F by the end of the century (USGCRP 2009). Precipitation is expected to be similar to existing conditions, with small changes seasonally: a small increase during winter and spring, slight decrease in the summer, and relatively unchanged in the fall (USGCRP 2009). Annual median runoff is expected to decrease between two and five percent (USGCRP 2009).

Temperature increases may increase crop yields, which may encourage parts of the state not previously used for agriculture to be obtained for that purpose (NRC 2010). The risk of wildfire is expected to increase throughout the state (NRC 2010). Future conditions for annual grasses in the planning area are expected to be similar to existing conditions of limited spread, given the anticipated temperature and precipitation changes. These hotter, drier conditions would be expected to exacerbate the spread of cheatgrass by increasing the risk of wildland fire and reducing the ability of native species to compete with nonnative species. Invasion by nonnative grasses can result in increased fire frequency, which typically results in removal of sagebrush canopy in affected areas with replacement by annual species that provide little, to no habitat value (Baker 2011).

3.18 SOIL RESOURCES

Soil processes determine, to a large extent, the structure and function of ecosystems. Soil health is integral to the BLM's mandate to sustain the health, diversity, and productivity of BLM-administered lands.

The existing Headwaters Resource Management Plan has the following objective related to soils:

- Soils will be managed to maintain productivity and to minimize erosion.

The existing Judith Resource Area Resource Management Plan has the following objective related to soils:

- The BLM will maintain or improve soil productivity by increasing vegetation cover and reducing erosion.

Soil type and quality, along with climate, determine whether sagebrush can grow in a given location, and can determine the type or variety of sagebrush community that is able to thrive. Among other factors, the presence of GRSG is dependent upon the presence of sagebrush. Due to sagebrush type and viability being dependent on soil type and quality, soils are an important element to GRSG habitat.

3.18.1 Conditions of the Planning Area

In the portion of the planning area covered by the Judith Resource Area Resource Management Plan, soils are derived from glacial till, sedimentary or igneous bedrock, and alluvium from mixed rock sources. This creates complex and diverse soil patterns, varying greatly in character capability, limitations and productivity. This diversity in soils is reflected in the four Physiographic Provinces that occur across the Judith Resource Area Resource Management Plan portion of the Planning Area (BLM 1992). These four Physiographic Provinces are described below.

Soils located in the Glacial Till Upland Province formed during several periods of late Wisconsin glaciation and are found on landscapes that range from nearly level to gently rolling and from strongly rolling to steep, particularly along drainage-ways. The soils are commonly loamy or clayey till soils, with the clayey soils sometimes being poorly drained. Erosion hazards vary in the Glacial Till Upland Province, but are generally slight to moderate due to the gently rolling topography and short slopes. When disturbed or cultivated, erosion hazards increase, especially wind erosion hazards (BLM 1992).

Soils in the Sedimentary Uplands Province are composed of mostly clayey soils weathered from calcareous and acid shales, but loamy and sandy sedimentary uplands are also common. The soils in this province are usually fragile and highly erosive because of steep slopes and extreme physical properties such as high clay or salt content, slow permeability, relatively shallow depth to bedrock, and sparse vegetation ground cover. Wind and water erosion susceptibility is increased when vegetation ground cover is sparse. Due to the fragile nature of the soils in this portion of the planning area, they are highly susceptible to compaction, severe rutting, and erosion, caused by vehicular travel (BLM 1992).

The Alluvial Soils Province contains deep, clayey, loamy, and sandy soils in valley bottoms, valley sides, and slopes and upland terraces, with local areas that have rock fragments throughout the soil or in the underlying parent material. These soils have high vegetation production potential and are therefore used by livestock and wildlife, particularly near water sources. Soils with high clay contents in these areas are especially susceptible to compaction, which results in reduced water infiltration, which then leads to increased surface water runoff and associated erosion (BLM 1992).

The Mountains and Foothills Province is composed primarily of loamy and clayey soils that range from shallow to deep, and generally have rock fragments throughout the soil. The soils are found on bedrock ridges and on footslopes that form a rolling to very steep terrain with areas of bedrock and talus. Erosion hazards here are slight to high, and compaction susceptibility is moderate to high (BLM 1992).

The Headwaters Resource Management Plan notes that soil data is incomplete for the Meagher County, which is the only portion of the planning area covered by this RMP. This data is still unavailable from the NRCS (it is in the publishing phase at this time of writing); however, GIS mapping provided the major soil orders in the planning area, described below.

Soils are categorized into 12 orders that are based on the conditions under which the soil develop, with each order having specific inherent soil properties. NRCS data indicates that entisols, mollisols, and vertisols are the predominate soils of the planning area. Entisols are often classified as young soils, or soils that are characterized by little to no soil horizon (layer) development, and poor surface nutrient or organic content. Soil characteristics of Mollisols include dark

colored soils with high base chemical content (as opposed to acidic content), high mineral content, and a nutrient enriched surface layer (A horizon). Vertisols are clayey soils that often swell when moistened and shrink when dry, resulting in characteristic cracks in the soil through at least part of the year (NRCS 1999).

Soil orders that comprise the remaining portions of the planning area include Alfisols, Inceptisols, and Aridisols. Alfisols are characterized by a thin or light surface horizon that is rich in nutrients, and often have a clayey subsurface horizon. Inceptisols commonly occur in areas of active erosion, such as slopes, and as a result are characterized by poorly developed soil layers or horizons, with thin surface layers that often have little organic content. Aridisols are characterized by a low water holding potential or capacity, and can have high salt contents (NRCS 1999).

3.18.2 Conditions on BLM-Administered Lands

Soil classifications and interpretations on BLM-administered land are provided through a series of tables that breakdown the planning area into dominant soil orders, NRCS farmlands, acreage with sensitive soils, and soil restoration potential classes.

Table 3-50 provides acreage numbers for soils within the BLM-administered lands that occur within the planning area (see **Figure 3-8**, Major Soil Orders, in **Appendix A**).

Table 3-50
Dominant Soil Order on BLM-Administered Lands

Headwaters	Total (acres)	PH (acres)	GH (acres)
Alfisols	313	0	13 (4%)
Entisols	139	0	60 (43%)
Inceptisols	1,138	0	3 (0.3%)
Mollisols	4,330	0	265 (6%)
Undefined	1,961	0	70 (4%)
Judith Resource Area	**Acreage**	**PH**	**GH**
Alfisols	48,771	34,511 (71%)	1,612 (3%)
Aridisols	24,538	21,078 (86%)	2,034 (8%)
Entisols	312,956	88,252 (28%)	79,429 (25%)
Inceptisols	44,228	12,430 (28%)	8,652 (20%)
Mollisols	76,952	29,934 (39%)	9,193 (12%)
Vertisols	63,876	42,919 (67%)	6,044 (9%)

Table 3-50
Dominant Soil Order on BLM-Administered Lands

Headwaters	Total (acres)	PH (acres)	GH (acres)
Undefined	14,773	4,093 (28%)	4,933 (33%)

Source: BLM 2012a

NRCS farmlands on BLM-administered and private lands within the planning area are shown in **Table 3-51** NRCS Farmlands in Planning Areaand in **Figure 3-9**, NRCS Farmland Classification, in **Appendix A**.

Table 3-51
NRCS Farmlands in Planning Area

Headwaters	BLM (acres)	BLM PH (acres)	BLM GH (acres)	Private (acres)	Private PH (acres)	Private GH (acres)
Prime	200	0	0	37,180	0	16,860 (45%)
Statewide Importance	270	0	10 (4%)	77,120	0	36,710 (48%)
Not Primeland	15,740	0	420 (3%)	815,110	0	577,740 (71%)
Prime if Irrigated	70	0	0	24,550	0	14,670 (60%)
Judith Resource Area	**BLM (acres)**	**BLM PH (acres)**	**BLM GH (acres)**	**Private (acres)**	**Private PH (acres)**	**Private GH (acres)**
Prime	800	250 (31%)	150 (19%)	341,230	1,950 (0.5%)	13,780 (4%)
Statewide Importance	49,330	15,880 (32%)	7,120 (49%)	801,220	104,780 (13%)	85,280 (11%)
Not Primeland	560,720	210,960 (38%)	102,660 (18%)	3,974,740	1,071,280 (27%)	552,210 (14%)
Prime if Irrigated	18,270	6,130 (34%)	1,960 (11%)	324,630	29,960 (9%)	59,570 (18%)

Source: BLM 2012a

Sensitive soils on BLM-administered lands and BLM sub-surface administered lands within the planning area are shown in **Table 3-52**. Sensitive soils in the planning area are classified as soils that are susceptible to water erosion and soils that have low restoration potentials. The planning area does not have soils susceptible to wind erosion.

Table 3-52
Sensitive Soils in the Planning Area

Land Status	Acreage with Severe Water Erosion Potential	Acreage with Low Soil Restoration Potential
BLM	179,431	73,388
Department of Defense	2	0
USFWS	25,327	5,872
Private	720,505	403,104
State Land	81,471	39,356
State Water	3,523	970
Forest Service	16,489	399
Water	327	1,565

Source: BLM 2012a

Soil Restoration Potential on BLM-administered lands within the planning area is shown in **Table 3-53**, and **Figure 3-10** in **Appendix A**.

Table 3-53
Soil Restoration Potential on BLM-Administered Lands

Headwaters	Total (acres)	PH (acres)	GH (acres)
High	4,626	0	270 (6%)
Moderate	1,172	0	41 (3%)
Low	123	0	60 (49%)
Not Rated	1,964	0	70 (4%)
Judith Resource Area	**Total**	**PH (acres)**	**GH (acres)**
High	191,904	78,718 (41%)	32,714 (17%)
Moderate	309,409	93,798 (30%)	70,772 (23%)
Low	73,265	59,567 (81%)	3,639 (5%)
Not Rated	11,516	1,133 (10%)	4,471 (39%)

Source: BLM 2012a

3.18.3 Trends

Qualitative observations indicate that soil health, stability, and watershed health has improved overall on BLM-administered lands; however, there are areas where soil health and stability is diminishing due to concentrated commercial and recreational use and activities.

3.19 WATER RESOURCES

Streams and water quality are the focus of this section. Wetlands (including riparian areas) are discussed in **Section 3.6**. Water on BLM-administered lands is regulated by the Clean Water Act, Safe Drinking Water Act, Public Land Health Standards, and other laws, regulations, and policy guidance at the federal, state, and local levels.

3.19.1 Conditions of the Planning Area

The major sources of surface water in the planning area are the Missouri River, Sacagawea River (Crooked Creek), Musselshell River, Sun River, Dearborn River, Judith River, and Smith River. These rivers are tributaries of the Missouri River. Smaller watercourses in the planning area involve streams that can be ephemeral, intermittent, or perennial. Lakes can be permanent or temporary (see **Figure 3-11** in **Appendix A**). Wetlands and floodplains vary in extent and depth throughout the year (see **Figure 3-2** in **Appendix A**). Permanent waters can also be in the form of wells, springs, ponds, diversions, and reservoirs developed for human, wildlife or livestock consumption, as seen in **Table 3-54**. Dams and pits provide drinking water sources for GRSG, but can also provide habitat for mosquitos, which can increase the risk of spreading West Nile virus transmission among GRSG populations. Other water developments such as underground wells do not provide a drinking water source for GRSG, but also do not provide a habitat for mosquitos.

Table 3-54
Developed Water Sources in the Planning Area

Habitat Type	Feature Type	Number of Features
No Habitat	Dam/Pit	2,919
	Other	-
GH	Dam/Pit	838
	Other	3,816
PH	Dam/Pit	2,420
	Other	3,699

Source: BLM 2012a

3.19.2 Conditions on BLM-Administered Lands

This discussion of existing conditions includes a description of surface water, water quality, and groundwater. The description is limited to BLM-administered lands within the planning area, especially lands within GRSG habitat.

Surface Water

Stream flow volumes differ greatly within the planning area. Flows in unregulated streams have large seasonal variations, with the largest flows generally occurring during spring or early summer as a result of snowmelt and rainstorms. Peak flows on prairie streams occur in March or April resulting from snowmelt.

Larger peak flows on small drainages can occur from intense summer thunderstorms, but generally not on an annual basis. Peak flows on mountain streams occur from late May to early June. The peaks are less sharp than on prairie streams. Summer rainstorms can result in short intervals of increased stream flow during June through September. During winter, stream flow in prairie streams is greatly reduced or absent as a result of little ground water inflow and ice formation (BLM 1994).

Ephemeral streams do not flow during an average water year but do flow in response to large precipitation events. Intermittent streams flow during spring runoff for an average water year, but generally dry up later in the summer. Perennial streams contain some water all year for an average water year. Most of the streams on BLM-administered land in the planning area are intermittent and flow from March to July. However, streams can still contain water during other months due to stored water being fed to the streams from shallow groundwater sources or floodplains. **Table 3-55** lists information watersheds on BLM-administered lands; **Table 3-56** lists information for perennial and intermittent streams on BLM-administered lands in the planning area; and **Table 3-57** lists information for ponds and lakes on BLM-administered lands in the planning area.

Table 3-55
Watershed Acreages in the Planning Area

Watershed	BLM	PH	BLM PH	GH	BLM GH
Arrow	26,275	0	0	73,548	20,801
Belt	1677	0	0	0	0
Box Elder	58,422	195,060	49,704	24,276	1,950
Bullwhacker-Dog	9,438	53,763	437	12,442	1,125
Flatwillow	55,548	119,038	39,583	87,849	5,582
Fort Peck Reservoir	32,086	108,179	12,901	51,364	14,393
Judith	25,635	0	0	86,464	14,915
Lower Musselshell	123,465	120,300	23,523	49,482	22,047
Middle Musselshell	10252	85,364	6,364	30,541	3,888
Smith	153	0	0	2,827	0
Upper Missouri	645	0	0	2,384	0
Upper Musselshell	1,044	0	0	37,917	144

Source: BLM 2012a

Table 3-56
Streams on BLM-Administered Lands in the Planning Area

RMP	Intermittent or Perennial Stream Miles	GRSG Habitat Type
Headwaters	Intermittent: 21.0	No habitat
Headwaters	Perennial: 0.8	No habitat
Headwaters	Intermittent: 3.4	GH
Headwaters	Perennial: 0.0	GH
Judith Resource Area	Intermittent: 1237.4	No habitat
Judith Resource Area	Perennial: 22.9	No habitat
Judith Resource Area	Intermittent: 706.1	GH
Judith Resource Area	Perennial: 8.1	GH
Judith Resource Area	Intermittent: 1320.4	PH
Judith Resource Area	Perennial: 12.8	PH

Source: BLM 2012a

Table 3-57
Acres of Freshwater Pond and Lacustrine in PH and GH on BLM-Administered Lands in the Planning Area

RMP	GRSG Habitat Type in Wetlands	Acres
Headwaters	GH	<1
Headwaters	Outside of GRSG habitat	<1
Judith Resource Area	PH	974
Judith Resource Area	GH	60
Judith Resource Area	Outside of GRSG habitat	209
Total		**1,243**

Source: BLM 2012a

Riparian areas are ecosystems that occur along rivers, streams, or waterbodies. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Typical riparian areas are lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers, streams, and shores of lakes and reservoirs with stable water levels. Excluded are such sites as ephemeral streams or washes that do not exhibit vegetation dependent on free water in the soil. Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and which, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, swamps, lakeshores, sloughs, bogs, wet

meadows, estuaries, and riparian areas. Even though riparian and wetland areas occupy only a small percentage of BLM-administered land in the planning area (approximately 0.4 percent), these areas provide a wide range of functions critical to many different wildlife species, improve water quality, provide scenery, and provide recreational opportunities.

Healthy surface water sources (such as ponds, lakes, and wetlands) provide habitat for insects and animals that are predators of mosquitos. Areas that both have standing water and do not support predators of mosquitos can be areas where mosquito populations increase. The conditions of wetlands (including riparian areas) are discussed in **Section 3.6**.

Water developments are also influential sources of water for wildlife. Water developments can function for multiple uses. They provide additional and alternative sources of water for wildlife and livestock, and can decrease use of riparian areas. Within the planning area, most of the water developments are intended for livestock, followed by water developments intended for fish. There are 13,702 water developments in the decision area, and 10,733 water developments in GRSG habitat, none of which are for GRSG. However, wildlife will often take advantage of available water developments.

Water Quality

Water quality, as defined by the Clean Water Act, includes all the physical, biological, and chemical characteristics which affect existing and designated beneficial uses. The State of Montana is required to identify which beneficial uses a water body currently supports or could support in the future. Water quality standards are established to protect the beneficial uses of the state's waters. Beneficial uses are identified for specific waters.

The State of Montana is required by Section 303(d) of the Clean Water Act to identify waters which are water quality impaired because of failing to meet their designated beneficial uses. Section 303(d) requires that each state develop a list of water bodies that fail to meet water quality standards and delineate stream segments and listing criteria for all streams. The Section 303(d) list of impaired waters is updated biannually, and the state is required to develop a total maximum daily load allocation for each pollutant of concern. **Table 3-58** lists information for impaired streams on BLM-administered lands in the planning area.

Upland and, especially riparian land health conditions greatly influence water quality. The functioning condition of riparian and wetland areas is a result of the interaction of geology, soil, water, and vegetation (BLM 1998). Riparian areas surrounding rivers, streams, and springs (lotic waters) are in PFC when adequate vegetation, landform, or large woody debris is present to:

- Dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality

Table 3-58
Impaired Streams on BLM-Administered Lands in the Planning Area

RMP	GRSG Habitat Type	Cause or Source of Stream Impairment	Stream Name	Miles
Headwaters	No Habitat	Sedimentation/Siltation [CFL 1990], Phosphorus (Total) [CFL 2006], Nitrogen (Total) [CFL 2006], Temperature, water [CFL 1988]	Elk Creek	0.26
		Sedimentation/Siltation [CFL 1990], Temperature, water [CFL 2006], Phosphorus (Total) [CFL 2006]	Battle Creek	0.42
		Grazing in Riparian or Shoreline Zones, Natural Sources	North Fork Musselshell River	0.32
Judith Resource Area	No Habitat	Grazing in Riparian or Shoreline Zones, Natural Sources	Blood Creek	9.02
		Grazing in Riparian or Shoreline Zones, Flow Alterations from Water Diversions, Impacts from Resort Areas (Winter and Non-winter Resorts), Agriculture, Impacts from Hydrostructure Flow Regulation/modification, Streambank Modifications/destabilization	Musselshell River	1.33
		Cadmium [CFL 1992], pH [CFL 1992], Mercury [CFL 1992], Copper [CFL 1992], Zinc [CFL 1992]	Armells Creek	1.60
		Cyanide [CFL 2004], Thallium [CFL 2004], Selenium [CFL 2004], Iron [CFL 2004]	Last Chance Creek	0.14
		Iron [CFL 2006], Phosphorus (Total) [CFL 2006], Aluminum [CFL 2006], Lead [CFL 2006], Nitrogen (Total) [CFL 2006]	Fargo Coulee	0.09
		Nitrate/Nitrite (Nitrite + Nitrate as N) [CFL 2004], Sedimentation/Siltation [CFL 2004]	Dog Creek	10.98
		pH [CFL 1992], Lead [CFL 1992], Zinc [CFL 1992]	Chicago Gulch	1.33
		pH [CFL 1992], Lead [CFL 1992], Zinc [CFL 1992]	Collar Gulch	2.50
		Sedimentation/Siltation [CFL 1988], Chromium (total) [CFL 1988], Copper [CFL 1988]	Belt Creek	0.20
		Sedimentation/Siltation [CFL 1996], Nitrates [CFL 2000]	Big Otter Creek	0.00
		Sedimentation/Siltation [CFL 2002]	North Fork Flatwillow Creek	0.28
		Selenium [CFL 2006], Total Dissolved Solids [CFL 2006], Nitrate/Nitrite (Nitrite + Nitrate as N) [CFL 1990]	Coffee Creek	0.92

Table 3-58
Impaired Streams on BLM-Administered Lands in the Planning Area

RMP	GRSG Habitat Type	Cause or Source of Stream Impairment	Stream Name	Miles
Judith Resource Area	GH	Agriculture, Grazing in Riparian or Shoreline Zones, Loss of Riparian Habitat, Rangeland Grazing	Judith River	6.96
		Agriculture, Channelization, Streambank Modifications/destabilization, Impacts from Hydrostructure Flow Regulation/modification	Musselshell River	0.91
		Iron [CFL 2006]	Arrow Creek	0.74
		Nitrate/Nitrite (Nitrite + Nitrate as N) [CFL 2004], Sedimentation/Siltation [CFL 2004]	Dog Creek	1.33
		Selenium [CFL 2006], Iron [CFL 2006], Total Dissolved Solids [CFL 1992]	Wolf Creek	0.25
		Selenium [CFL 2006], Total Dissolved Solids [CFL 2006], Nitrate/Nitrite (Nitrite + Nitrate as N) [CFL 1990]	Coffee Creek	0.23
Judith Resource Area	PH	Unknown Reason for Stream Impairment	Snoose Creek	4.59
		Grazing in Riparian or Shoreline Zones, Natural Sources	Blood Creek	11.86
		Agriculture, Channelization, Streambank Modifications/destabilization, Impacts from Hydrostructure Flow Regulation/modification	Musselshell River	0.03
		Iron [CFL 2006], Phosphorus (Total) [CFL 2006], Aluminum [CFL 2006], Lead [CFL 2006], Nitrogen (Total) [CFL 2006]	Fargo Coulee	0.03
		Iron [CFL 2006], Sulfates [CFL 2006], Phosphorus (Total) [CFL 2006], Sedimentation/Siltation [CFL 1994], Specific Conductance [CFL 2006], Solids (Suspended/Bedload) [CFL 1994], Nitrogen (Total) [CFL 2006]	North Willow Creek	2.03
		Total Dissolved Solids [CFL 2006], Sedimentation/Siltation [CFL 1988], Specific Conductance [CFL 2006]	McDonald Creek	0.04

Source: BLM 2012a
CFL = cycle first listed

- Filter sediments, capture bedload, and aid floodplain development
- Improve floodwater retention and groundwater recharge
- Develop root masses that stabilize streambanks against cutting action

- Develop diverse ponding and channel characteristics to provide the habitat, water depth, duration, and temperature necessary for fish production, waterfowl breeding and other uses
- Support greater biodiversity

Streams that are in PFC typically have channel dimensions that are appropriate for the landscape and setting and adequate riparian-wetland vegetation to stabilize banks from cutting action. Both of these features help to reduce erosion and mitigate non-point source pollutants, thereby improving water quality. Functional conditions of streams on BLM-administered lands can be found in **Table 3-22**. However, PFC does not connote adequate or good water quality. Water of poor water quality flowing into a section of stream with PFC would still have poor water quality.

Groundwater

Groundwater is used for irrigation, domestic use, and livestock use. The quality of the groundwater is a function of the chemical makeup of the underground formation containing the water. Springs and seeps occur in areas where water from aquifers reaches the surface. Many springs begin in stream channels; others flow into small ponds or marshy areas that drain into channels. Some springs and seep areas form their own channels that reach flowing streams, but other springs lose their surface expression and recharge alluvial fill material or permeable stratum.

Springs and seeps are important to aquatic habitats because of the perennial base flow they provide to a stream. The outflow from springs in summer usually helps to maintain lower water temperatures. In winter, especially in small streams, base flow helps to maintain an aquatic habitat in an otherwise frozen environment.

Springs have been disturbed either by management activities that have affected the volume of water available to the vegetation and soils where springs begin, or by activities that have affected the vegetation and soils directly. Activities, such as grazing, water developments, recreation use, mining, road construction, and vegetation management, have affected spring systems in the past. Activities such as well drilling or blasting can affect springs by reducing the amount of water in their aquifers or by affecting subsurface flow patterns.

3.19.3 Trends

Demands on water resources have increased over the past few decades. Although most early water rights were established for irrigation and livestock, today's demand includes municipal water supplies, commercial and industrial supplies, and maintenance of adequate stream flows for fish, recreation, and water quality.

Management activities involving ROW disturbance, grazing, and fire have created situations that alter land health, thereby impairing water quality. Livestock water impoundments have altered surface and subsurface water flow. The number of new livestock water impoundments has leveled off due to a lack of appropriate locations for such developments. Consequently, future water developments are expected to rely more on wells and stock tanks.

The availability of water in much of the planning area is limited and may hamper additional developments that depend on water. Future water development for wildlife, recreation, and livestock would require a water right before project implementation could occur. Any additional water developments would require adhering to Montana state laws for surface and ground water.

3.20 SPECIAL STATUS SPECIES—OTHER SPECIES OF ISSUE

This section provides a description of special status species other than GRSG. Refer to **Section 3.4**, Greater Sage-Grouse, for a discussion of GRSG. **Section 3.4** also includes a discussion of special status species policies and regulations.

3.20.1 Conditions of the Planning Area

The planning area consists of over 7.3 million acres of land which provides potential habitat for special status species (**Table 3-59**). The BLM directly manages approximately 593,993 acres of habitat within the planning area. Private landowners, the State of Montana, and others (not managed by an organization) hold the remaining 6.7 million acres within the planning area. It is critical to work with all landowners and resource agencies throughout the planning area to provide protection for special status species since the majority of habitat across the landscape is held by entities outside of the BLM.

Table 3-59
Habitat by Ownership within the Planning Area

	BLM	State	Private	Other	Total
GH (acres)	112,341 (11%)	83,438 (8%)	816,869 (80%)	2,378 (0.2%)	1,015,035
PH (acres)	233,219 (19%)	90,587 (7%)	878,171 (73%)	6,017 (0.5%)	1,207,994
Outside of GRSG habitat (acres)	248,435 (5%)	352,479 (7%)	3,473,125 (68%)	1,014,451 (20%)	5,088,490
Total	**593,995 (8%)**	**526,504 (7%)**	**5,168,165 (71%)**	**1,022,855 (14%)**	**7,311,519**

Source: BLM 2012a

Federally Proposed, Threatened, and Endangered Species

Within the counties of the planning area (Chouteau, Fergus, Judith Basin, Meagher and Petroleum), the USFWS (USFWS 2015) identified Canada lynx (Threatened), Black-footed ferret (Endangered), and Pallid sturgeon

(Endangered) in one or more counties "where one would reasonably expect the species to occur." No proposed species are listed for any counties within the planning area.

Canada lynx (Lynx canadensis) Threatened

No Critical Habitat occurs in the planning area. GRSG GH in Meagher County occurs in mapped lynx secondary habitat (Forest Service 2007) and is adjacent to unoccupied habitat on the Helena and Lewis & Clark National Forests. The remaining PH and GH are outside of mapped lynx habitat.

Black-footed ferret (Mustela nigripes) Endangered

The nearest ferret population is approximately 10 miles north of GRSG habitat in the planning area and is north of the Missouri River on the Charles M. Russell National Wildlife Refuge in Phillips County. No prairie dog colonies occur in the planning area on PH and GH of sufficient size to support black-footed ferrets.

Pallid Sturgeon (Scaphirhynchus albus) Endangered

Pallid sturgeon occurs in the Missouri River, and GH occurs adjacent to sturgeon habitat west of Fort Benton. No active leks occur in this area, and the closest lek occurs on state land 1.5 miles from the Missouri River. The closest PH in the planning area is approximately 1.5 miles south of the Missouri River.

More detailed information regarding special status species, including status and general habitat descriptions for confirmed or potentially known species to inhabit the planning area, can be found in **Appendix L**.

3.20.2 Conditions on BLM-Administered Lands

The planning area has over 1.2 million acres of PH and over one million acres of GH; however, the BLM manages 233,219 acres of PH and 112,341 acres of GH (refer to **Table 3-59)**. The BLM-administered lands have the potential to provide habitat to a wide range of special status species (see **Appendix L**).

3.20.3 Trends

The State of Montana provides status and trends data for special status species on the Montana Natural Heritage Program (MTNHP) website (MTNHP 2014a and 2014b). Below is a general description of the current trends for special status animal and plant species in Montana.

Animals

A list of special status animal species with the potential to inhabit the planning area is included in **Appendix L**. Special status mammals, birds, reptiles and amphibians are vulnerable to global extinction or extirpation in Montana due to limited or declining populations and declining range or habitat. Breeding populations of mountain plover and chestnut-collared longspur are at greatest risk of extirpation or extinction for bird species. The northern leopard frog is likely to occur in GRSG habitat and is at high risk to global extinction or extirpation in the state.

Plants

No special status plant species are known to inhabit BLM-administered lands within the planning area; however, whitebark pine has been documented within the planning area counties and is vulnerable to pine beetle outbreaks (MTNHP 2014a).

3.21 FISH AND WILDLIFE

MFWP and USFWS are directly responsible for the management of fish and wildlife species in the planning area, and the BLM is responsible for land management. Therefore, on BLM-administered lands in the planning area, the BLM is directly responsible for the management of habitat for fish and wildlife species and indirectly responsible for the health of fish and wildlife populations that are supported by these habitats.

Implementation of any of the alternatives would result in general and unquantifiable indirect beneficial effects for fish in terms of greater protection through new restrictions on surface and resource use resulting in reduced opportunities for surface disturbance or habitat disruption where they exist. Therefore, general fish species will not be discussed further in **Chapter 3**.

The wildlife habitats that occur in the planning area are primarily characterized in the vegetation, soil, and water, and vegetation existing conditions discussions in **Sections 3.6**, Vegetation (Including Noxious Weeds; Riparian and Wetlands), **3.18**, Soil Resources, and **3.19**, Water Resources, respectively. See **Table 3-3** and **Table 3-4** for acres of PH and GH within vegetation types on lands in the LFO. The discussions of aquatic and terrestrial habitat below identify attributes of these resources that are particularly important to their role in providing habitat. **Table 3-60** lists species of high priority for BLM management efforts due to their economic value, regulatory status, high public interest, or other qualities. Special status species are described in **Section 3.20**, Special Status Species—Other Species of Issue.

Table 3-60
Wildlife Species of the Lewistown Field Office

Species or Group	Rationale for Key Designation
Birds	
Waterfowl and migratory birds (cranes, ducks, geese, and swans)	Economic and recreational value/high interest and protected by law
Upland game (partridge, pheasant, and grouse)	Economic and recreational value
Eagles/other raptors (hawks)	High interest, protected by law, keystone species
Mammals	
Big game (elk, deer, pronghorn)	High interest, economic and recreational value

Table 3-60
Wildlife Species of the Lewistown Field Office

Species or Group	Rationale for Key Designation
Herptiles	
Reptiles	Ecological function and indicators of ecosystem health
Amphibians	Ecological function and indicators of ecosystem health

Source: MTNHP 2014b

3.21.1 Conditions of the Planning Area

There are 7.3 million acres within the planning area and the BLM directly manages nearly 593,995 acres of wildlife habitat (refer to **Table 3-59)**. The remaining 6.7 million acres are primarily held by private landowners. The presence and interspersion of many habitat types support a large number of wildlife species throughout the planning area regardless of ownership. The discussion of wildlife populations and habitat addresses the entire planning area, not just the lands managed by BLM. Since wildlife are mobile and may readily cross these boundaries, it is important to work cooperatively with all landowners and resource agencies to improve wildlife management throughout the planning area.

Big game including elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*), pronghorn (*Antilocapra americana*), mountain lion (*Puma concolor*), black bear (*Ursus americanus*); upland game birds including pheasant (*Phasianus colchicus*), sharp-tailed grouse (*Tympanuchus phasianellus*), and gray (Hungarian) partridge (*Perdix perdix*); and numerous waterfowl species are among the species that use habitat in the planning area. The diversity and populations of wildlife throughout the planning area provide considerable recreational opportunities and economic benefits for the State of Montana. A minimum of 81 species of mammals, 303 species of birds, and 21 species of amphibians and reptiles occur in the planning area (MTNHP 2014b).

Wildlife species of primary management concern to one or more agencies, such as the BLM, MFWP, and USFWS include game species, rare, or keystone species. Therefore, they require consideration in management activities and may affect land management decisions. A keystone species is one whose presence and role within an ecosystem has a disproportionate effect on other organisms within the system.

3.21.2 Conditions on BLM-Administered Lands

The LFO has 345,560 acres of GRSG habitat including 233,219 acres of PH (refer to **Table 3-59**). These lands have the potential to provide habitat to a wide range of wildlife species as described above in **Section 3.21.1**, Conditions of the Planning Area.

3.21.3 Trends

Wildlife species trend data for the planning area were obtained from the MTNHP Tracker web tool (MTNHP 2014b). Below are general descriptions of the current trends for key wildlife species groups as described in **Section 3.21.1**.

The majority of waterfowl within the planning area are common, widespread, and abundant (although they may be rare in parts of their ranges). These common waterfowl species are not considered vulnerable in most of its range or during the breeding season. Harlequin duck populations are at risk; hooded merganser and trumpeter swan are potential species of concern and species of concern respectively. Gray partridge and ring-necked pheasant are introduced upland game bird species, and their statuses are not ranked by the State of Montana. These upland birds occur year round in all five counties within the planning area. GRSG are currently being considered for listing by the ESA. For more information regarding GRSG refer to **Section 3.4**. The sharp-tailed grouse population within the planning area is secure though it may be quite rare in parts of its range. Sensitive raptor species are secure to declining throughout the planning area. Big game species of Montana including elk, mule deer, white-tail deer, and pronghorn antelope as well as black bear are considered common, widespread, and abundant. Mountain lion populations are secure to declining within its range. In general, reptile and amphibian populations within the LFO are not in decline or at risk of extinction (Maxell et al. 2009).

3.22 RENEWABLE ENERGY

Renewable energy projects on BLM-administered lands throughout the US include wind, solar, geothermal, and biomass projects and the siting of transmission facilities needed to deliver this power to the consumer. Geothermal heat is also considered a leasable mineral and is governed by the Geothermal Steam Act of 1970. There are no geothermal resources within the planning area; therefore, geothermal resources will not be discussed in **Chapter 3** or **Chapter 4**.

As of 2010, the BLM's renewable energy policy is directed by the following regulations and executive orders:

- The Energy Policy Act of 2005 (Title II, Section 211), which requires the DOI to approve at least 10,000 megawatts of renewable energy on public lands by 2015.
- Executive Order 13212, Actions to Expedite Energy-Related Projects, which requires federal agencies to expedite review of energy project applications.
- Secretarial Order 3285, which requires the DOI to identify and prioritize specific locations best suited for large-scale renewable energy production.

Additionally, the BLM has specific guidance for certain types of renewable energy. The main IMs are summarized here:

- IM 2011-003, Solar Energy Development Policy (BLM 2011c), establishes policy for the processing of ROW applications for solar energy development projects on BLM-administered lands and evaluating the feasibility of installing solar energy systems on BLM administrative facilities and projects.
- IM 2009-043, Wind Energy Development Policy (BLM 2008e), provides updated guidance on processing ROW applications for wind energy projects on BLM-administered lands.
- IM 2011-061, Solar and Wind Energy Applications – Pre-Application and Screening (2011d), establishes screening criteria used by the BLM to assist in prioritizing the processing of and in determining what actions to take on new and existing solar and wind energy development ROW applications. The processing of applications with the least environmental resource conflicts should facilitate the development of environmentally responsible solar and wind energy projects on the public lands, consistent with the provisions of the Secretarial Order.
- IM 2004-227, Biomass Utilization Strategy (BLM 2004b), updated in July 2005, provides sets of goals to help focus and increase utilization of biomass from BLM-administered lands. In June 2005, the final rule in the Federal Register revised the authority of 48 CFR, Part 1452 by adding 1452.237-71, which is a new contract clause for removal and utilization of woody biomass generated as a result of land management service contracts whenever ecologically and lawfully appropriate. The BLM issued IM 2009-120 in May 2009, which updated the contract clause for utilization for woody biomass (BLM 2009d).

Solar and wind projects are authorized via the ROW authorization process. ROW applications for development on BLM-administered lands must be accompanied by a processing fee as set forth in 43 CFR, Part 2804.14. ROW applications are generally accepted and processed on a first-come, first-served basis. The ROW regulations (43 CFR, Part 2804.23[c]) provide authority for offering BLM-administered lands under competitive bidding procedures for ROW authorizations. The BLM may initiate a competitive process if a land use planning decision has specifically identified an area for competition, or when two or more applications are submitted for the same facility or system. The BLM may also consider other public interest and technical factors in determining whether to offer lands for competitive leasing. Competitive bidding follows procedures required by 43 CFR, Part 2804.23(c).

3.22.1 Conditions of the Planning Area

WAFWA Management Zones 1 and 4

There are no acres of solar or wind energy ROWs in the planning area (Manier et al. 2013). Below is a summary of renewable energy interest in Montana.

Solar

No interest in commercial-scale solar energy development has occurred in Montana. Fewer annual days of sunshine and the low angle of the sun during the winter contribute to low solar development in the state.

Wind Energy

A number of new wind farms have been developed and proposed on private lands along the I-15 corridor in northwestern Montana in proximity to the recently approved Montana Alberta Tie Line transmission project. Projects continue to be proposed all across Montana in a number of counties. However, the distance from current transmission infrastructure continues to be a challenge for wind developers in Montana, and grid capacity is also be a limiting factor. Currently, the only wind facility authorized on BLM-administered lands in the Montana/Dakotas is located in South Dakota.

The LFO planning area has three sites on private lands, with a total of 42 wind turbines (Diffendorfer et al. 2014). Spion Kop in Chouteau County is near the south end of the Highwood Mountains and has 25 turbines. In the Belt Mountains, 17 turbines (11 in the north area and 6 in the south) are in two areas near Martinsdale in Meagher County. The wind facility near Judith Gap is in Wheatland County outside of the planning area.

Biomass

Montana may have good prospects for biomass development using its agricultural resources and land base. The growth of this energy development will still be hampered in Montana by lack of easy access to large consumption markets.

3.22.2 Conditions on BLM-Administered Lands

The National Renewable Energy Laboratory only considers solar resources to be viable when they occur at intensities of 6.0 kilowatt hours per square meter per day, and allocate designations of "Good," "Excellent," or "Premium." Solar potential on BLM-administered land in the Lewistown District is below 6.0 kilowatt hours per square meter per day. Therefore, no BLM-administered lands in the planning area are considered likely to be pursued by commercial energy developers for utility scale solar (that is, ≥20 megawatts electricity that will be delivered into the electricity transmission grid [Manier et al. 2013]).

The National Renewable Energy Laboratory only considers wind resources to be viable when they occur at intensities of 400 watts per square meter or higher, and allocate designations of "Good," "Excellent," or "Outstanding" wind

potential. Only 16 percent, or 62,916 acres, of the BLM-administered land in the Lewistown District has wind potential greater than 400 watts per square meter. Approximately 70 percent of this acreage is found within PH and another nine percent of this acreage is found within GH. **Table 3-61** shows the wind potential for all the BLM-administered Lands in LFO.

Table 3-61
Wind Potential on Slopes <15% on BLM-administered Lands

Wind Potential	Total acres	PH acres	GH acres
Class 2, Poor, (below 300)	83,774	10,657 (13%)	1,552 (2%)
Class 3, Fair, (300-400)	248,989	165,627 (67%)	30,176 (12%)
Class 4, Good (400-500)	55,950	41,601 (74%)	5,247 (9%)
Class 5, Excellent (500-600)	5,701	2,121 (37%	301 (5%)
Class 6, Outstanding (600+)	1,265	6 (0.5%)	46 (4%)

Source: BLM 2012a

3.22.3 Trends

Within the planning area, greater pressure to develop renewable energy resources on BLM-administered lands could occur as a result of public energy policy coming from individual states or the federal government. The development of more energy-efficient technologies for wind, biomass, and solar power will continue to grow with increasing regulation and price of fossil fuels and the increasing demand for energy products. In Montana, the source of renewable energy will most likely be wind energy, as Montana is ranked as the fifth highest state in wind energy potential by the National Renewable Energy Laboratory (NREL 2011).

3.23 SOCIAL AND ECONOMIC CONDITIONS

This section discusses the social and economic conditions of the planning area. These conditions are discussed in greater detail in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS Socioeconomic Baseline Assessment Report prepared in support of the planning effort (Forest Service Enterprise 2013).

Changes in BLM management of GRSG habitats are anticipated to have a considerable impact on existing GRSG populations and have the potential to affect local social and economic conditions. Certain defining features of every area influence and shape the nature of local social and economic conditions. These defining characteristics include the local population, the presence of or proximity to large cities or regional population centers, types of longstanding industries, predominant land and water features, and unique area amenities. The characteristics of counties in Central Montana containing GRSG habitat influence the relationship between BLM-administered lands and local social and economic activity.

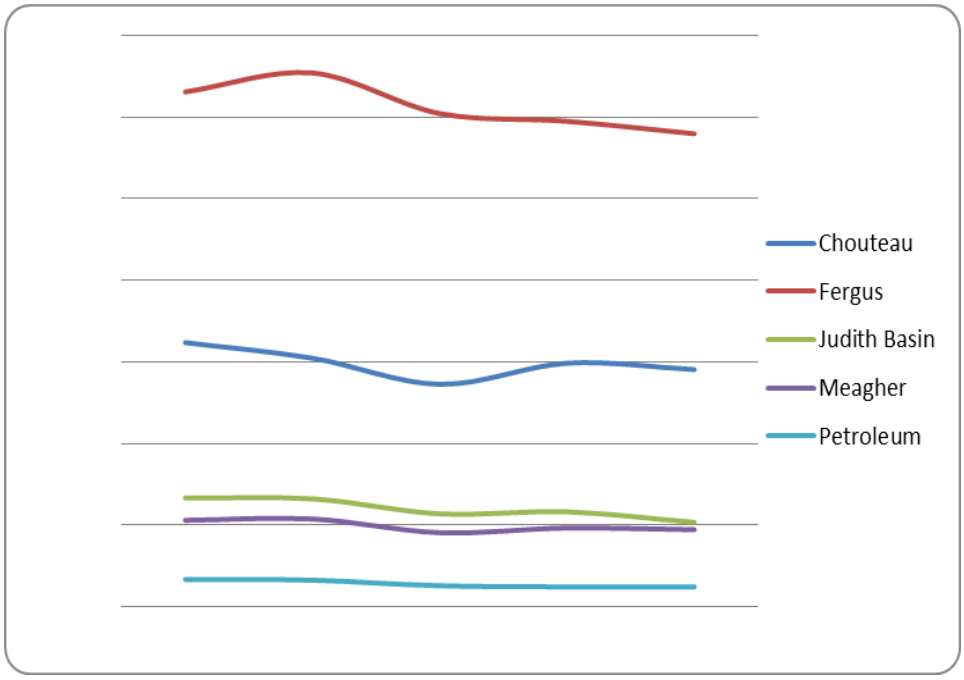
Changes in management of BLM-administered lands can have social and economic effects which extend beyond the immediate boundaries of the lands managed, affecting the social and economic conditions of neighboring counties and communities. Individual counties and communities may respond to change differently than the larger region; consequently a multidimensional approach is used to analyze the impacts of the proposed GRSG conservation measures. For this analysis, social and economic conditions, current conditions and trends are presented for a five-county region which includes Chouteau, Fergus, Judith Basin, Meagher, and Petroleum counties. Data is provided for the state as a whole as a reference region where appropriate.

3.23.1 Existing Conditions

Population Change

While the total US population grew by 24 percent between 1970 and 2010, the five-county impact area experienced an 11 percent decline. Over the past four decades populations in all five counties of the planning area have fallen: Chouteau (-660 people), Fergus (-1,025 people), Judith Basin (-595 people), Meagher (-231 people), and Petroleum (-181 people) (**Diagram 3-5**). Population declines within the five-county region have gradually tapered off over the last decade as the total population within the five-county region fell by 761 people, or just over three percent. Although population loss in Petroleum County halted and losses in Chouteau (-3 percent), Fergus (-3 percent), and Meagher (-2 percent) slowed, Judith Basin continued to experience a significant loss of 11 percent.

Diagram 3-5
Population Change for the Five-County Impact Area



Source: US Department of Commerce, 2005, 2000, and 2010

Employment and Economic Specialization

Average annual unemployment in the five-county impact area has remained relatively constant over the last decade, with unemployment in each of the five counties remaining below state and national averages. While national unemployment in the US rose from four percent in 2000 to 9.6 percent in 2010, unemployment in the five-county impact area remained relatively more constant increasing from 4.9 percent in 2000 to 5.8 percent in 2010. Average annual unemployment varied across the five counties but was reported to be lower than the 2010 national average in all five counties. In 2010, Chouteau, Fergus, Judith Basin, Meagher, and Petroleum counties were reported to have had an average annual unemployment rate of 4.4 percent, 6.1 percent, 5.6 percent, 8.6 percent, and 6.3 percent, respectively, while unemployment was 6.9 percent in Montana and 9.6 percent for the US (Bureau of Labor Statistics 2011).

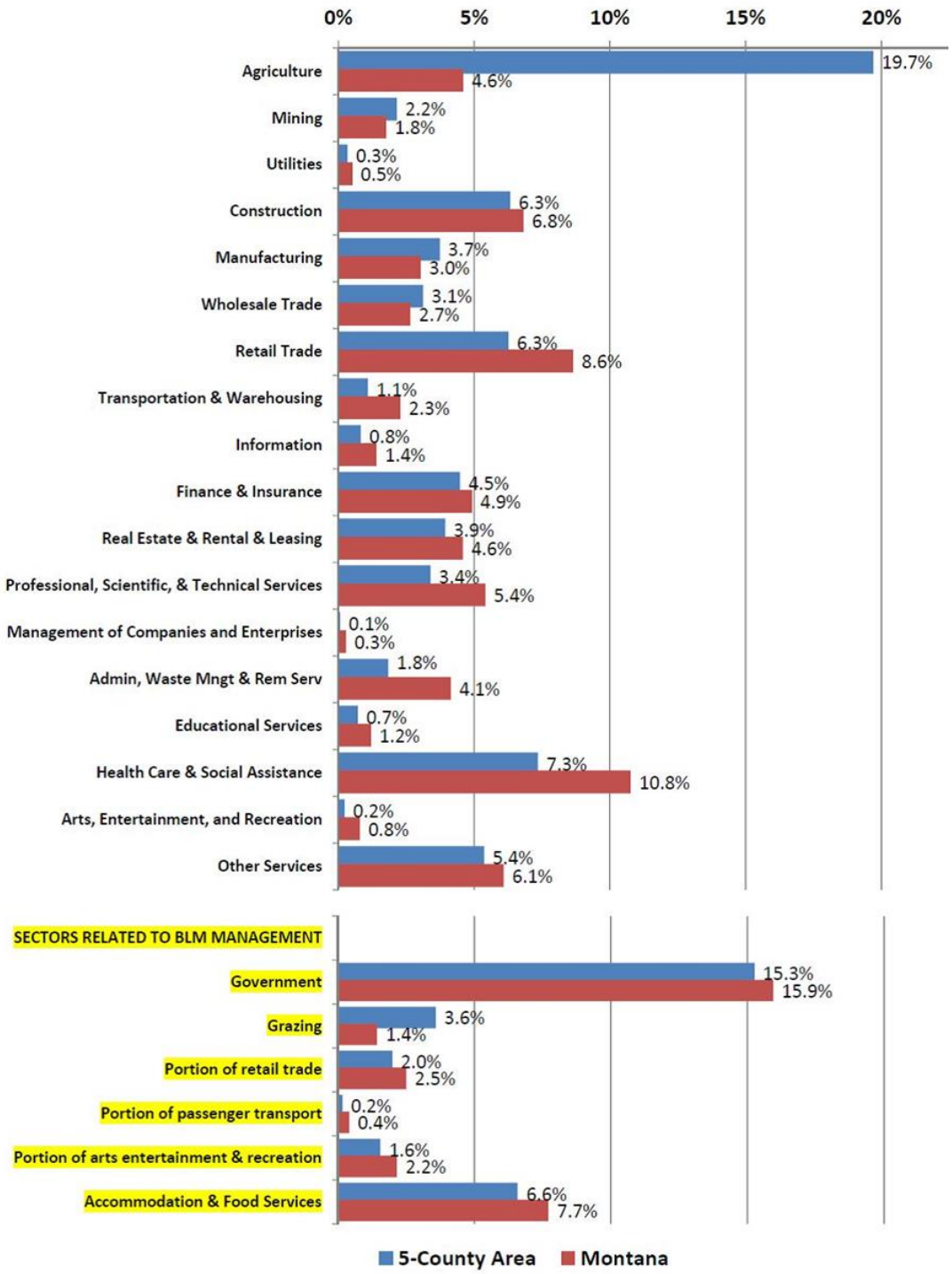
Employment within the five-county impact area is distributed amongst economic sectors and displayed below in **Diagram 3-6** relative to statewide employment in these sectors. The bottom six highlighted sectors are directly related to BLM land management. The contributions from BLM represent only a portion of the industry employment displayed in these six sectors. The government sector includes all federal, state, and local employment, while the grazing sector includes both cattle and sheep ranching. The last four sectors are all specifically attributable to tourism and recreation (Forest Service Enterprise 2013). Further discussion of the contributions to these sectors from BLM management is presented below.

Using the ratio of the percent employment in each industry in the region of interest (five-county impact area) to the percent of employment in that industry for a larger reference region (the state of Montana) reveals whether labor specialization exists within the impact area. For a given industry, when the percent employment in the impact area is greater than in the reference region, local employment specialization exists in that industry (Forest Service 1998). Identification of employment specialization within the impact area provides a frame of reference for the contributions of BLM-administered lands within the impact area. Applying this criterion to 2010 data reveals that the planning area can be characterized as most specialized in the agricultural sectors, which include sectors related to livestock grazing. Since BLM-administered lands within the five-county area provide local livestock producers with forage to supplement other sources of feed, a portion of this specialization can be attributable to BLM management.

Community Well-Being

Community well-being relates to the economic, social, cultural, and political components of community life which allows residents to fulfill their basic needs, while creating an enjoyable place for citizens to live. While many factors contribute to quality of life in a region, unemployment, poverty and personal

Diagram 3-6
Employment Distribution in the Five-County Impact Area and Montana



Source: IMPLAN 2010

income are the most commonly used social indicators of well-being. As discussed above, labor participation in Chouteau, Fergus, Judith Basin, Meagher, and Petroleum counties is high; average annual unemployment rates have persistently been lower than state and national averages over the last decade.

Following the Office of Management and Budget's Directive 14, the US Census Bureau uses a set of predetermined income thresholds which vary by family size and composition to detect who is poor. If the total income for a family or an unrelated individual falls below the relevant threshold, then the family or unrelated individual is classified as being "below the poverty level." While poverty rates for individuals and families at the state (14.5 percent and 9.7 percent) and national (13.8 percent and 10.1 percent) level remained high in 2010, poverty in the five-county area was reported to be even more prevalent with 16.4 percent of individuals and 12.9 percent of families living below the poverty level in 2010. Poverty at the county level varied across the five counties, with Judith Basin reporting the lowest rates and Chouteau reporting the highest. In 2010, 21 percent of individuals and 14.8 percent of families in Chouteau, 14.7 percent of individuals and 12.5 percent of families in Fergus, 9.9 percent of individuals and 6.4 percent of families in Judith Basin, 19 percent of individuals and 14.1 percent of families in Meagher, and 16.7 percent of individuals and 18.1 percent of families in Petroleum were estimated to be living in poverty (US Department of Commerce 2012a).

Total personal income (TPI) and per capita personal income (PCPI) are two more widely used measures of economic well-being within communities. From 1970 to 2010, annual TPI in the five-county impact area increased from $581 million to $769 million, and annual PCPI increased from $23,683 to $35,183 (all measures adjusted for inflation to 2011 dollars). This translates to a TPI increase of 32 percent and a PCPI increase of 48 percent over this time period (US Department of Commerce 2012b). While PCPI is a useful measure of economic well-being it should be examined alongside changes in real earnings per job. Since PCPI includes income from 401(k) plans as well as other non-labor income sources like transfer payments, dividends, and rent, it is possible for per capita income to rise, even if the average wage per job declines over time. While PCPI rose between 1970 and 2010 by 48 percent, average earnings per job shrank by 21 percent (from $38,663 to $30,511; values adjusted for inflation to 2011 dollars) (Forest Service Enterprise 2013). Increased PCPI in the face of falling wages indicates that non-labor income's share of TPI significantly rose during this period.

Components of Personal Income

Further examining trends within personal income provides insight to the area economy and its connection to BLM-administered lands within the five-county impact area. There are three major sources of personal income: (1) labor earnings or income from the workplace; (2) investment income, or income received by individuals in the form of rent, dividends, or interest earnings; and

(3) transfer payment income or income received as Social Security, retirement and disability income or Medicare and Medicaid payments.

In 2010, labor earnings accounted for nearly half of TPI in the five-county region, but long-run trends indicate that labor earnings' share of TPI has been declining. Labor earnings' share of TPI has decreased from 1970 to 2010 (from 72.3 to 49.9 percent) while the share of non-labor income has risen (from 27.7 to 50.1 percent). As a share of TPI, investment income and transfer payments rose from 18.6 to 28.1 and 9.1 to 22 percent, respectively, over this 40-year time period. Although transfer payments' share of TPI rose drastically over this period, data indicated this increase was only slightly due to increases in income maintenance payments related to welfare or unemployment. The data shows the share of income maintenance increased from less than one percent to 3.7 percent while the share of age related transfer payments in the form of retirement, disability insurance, and Medicare increased from six to 15.3 percent between 1970 and 2010 (US Department of Commerce 2012b). Increased shares of age-related transfer payments is an indication that the region's population is growing older, with people 65 and older accounting for a large percent of the region's population.

Area Economic Conditions Related to Grazing

From 1970 to 2010, employment in the farm sector (including livestock grazing) decreased by 43.9 percent (from 4,030 to 2,740 jobs), with nearly 78 percent of farm employment in 2010 attributable to farm proprietors. Although employment has been declining, the farm sector continued to support 13,090 jobs (or 17.3 percent of total employment) in the five-county area in 2010 (US Department of Commerce 2012a). In 2011, livestock production in Montana accounted for 40.1 percent of the state's total farm receipts and was valued at $1.4 billion dollars (NASS 2012). According to agricultural statistics collected by the state, the five-county area was reported to have an inventory of 2,500,000 cattle and calves, and 225,000 head of sheep in 2011.

Under the Taylor Grazing Act and FLPMA, the BLM permits grazing on administered allotments for the purpose of fostering economic development for private ranchers and ranching communities by providing ranchers access to additional forage (Forest Service Enterprise 2013). The BLM estimates the grazing potential of each allotment permitted for grazing under ideal forage conditions, but determines the number of AUMs allocated each year based on range conditions. Currently, the LFO allocates 103,806 AUMs annually on allotments potentially affected by conservation measures under this RMPA. On an annual basis use of the allocated forage can be less based on market conditions, drought or range practices to protect other resources. Allocated forage in the decision area was used to estimate employment and labor income contributions to the five-county impact area economy using an IMPLAN input-output model. If all allocated AUMs were used, about 201 jobs (direct, indirect and induced) and $2.8 million in labor income (direct, indirect and induced)

would be contributed to the impact area economy on an average annual basis. Direct employment to the grazing (refer to **Diagram 3-6**) sector amounts to approximately 128 jobs which accounts for 29 percent of employment in this sector (IMPLAN 2010).

Lands and Realty

Lands and realty can be divided between land use authorizations and land tenure adjustments. Land use authorizations consist of ROWs, communication sites, and other leases or permits, while land tenure adjustments focus primarily on land exchange, acquisition (including purchase and easement acquisition), and disposal. Land tenure adjustments can be important to local and regional economies depending on their complexity and impacted resources, but overall land tenure adjustments are currently inactive within the planning area. Therefore, the discussion in this section focuses on land use authorizations (e.g., ROWs) given their importance to local and regional communities.

Currently, there are ROWs within GRSG habitat: 643 in PH and 266 in GH. These include ROWs for roads, trails and highways, transmission lines, telephone or communication lines, water facilities, railroad, pipeline and conduit. The area community and economy depends in part on these ROWs for access on roads, power to businesses and homes, and communication lines for expanding technology. Future expansion of Central Montana's rural fiber optic network may cross BLM-administered land in the decision area. Currently, there are no existing wind energy ROWs within the decision area.

Recreation

The economic influence of recreation use on BLM-administered lands is related to local expenditures for goods and services such as gasoline, lodging, meals, and supplies. To understand the local economic influence of recreation use, it is important to understand that local expenditures vary depending on the type of activity, whether the recreation use is from local residents or non-local residents, and whether the activity involves overnight stays. Local expenditures related to recreation use support local employment and labor income. Generally, employment related to recreation and tourism tends to be seasonal and relatively low paid, with a high portion of the labor force self-employed. The recreation opportunities available in the decision area play an important role in the quality of life of local residents, and also attract visitors from elsewhere in the state and region. The BLM-administered lands in the decision area received an estimated 45,500 recreation visits in 2012 (Forest Service Enterprise 2013). Major recreation activities on BLM-administered lands in the decision area include motorized and non-motorized activities such as hunting, hiking, and wildlife viewing.

Market and Non-Market Values

Generally goods and services can be traded in markets where interactions between buyers and sellers dictate the price, or value, of a good through the

unit prices and quantities sold. BLM-administered lands produce a wide range of environmental goods and services which society benefits from. Some goods, like forage for cattle, can easily be valued because livestock feed can be bought and sold in markets. Other resources provided by these lands, such as recreational opportunities, ecological processes, and habitat for unique species, cannot be bought and sold in traditional markets, which is why they are often characterized as non-market goods. Measuring the value of these non-market goods is important because these resources tend to be undervalued and estimates can enable management to make more informed decisions regarding their use to more accurately reflect their true value to society.

Non-market values can be broken down into two categories, use and non-use values. The use-value of a non-market good is the value to society from the direct use of the asset; these values are derived from BLM-administered lands through recreational activities such as hiking, bird watching and OHV use. In addition to hunting, other non-market values exist for public goods such as air quality, scenery and water quality. The use of non-market goods often requires consumption of associated market goods, such as lodging and gas.

Non-use, or passive use, values of a non-market good reflect the value of an asset beyond its current use. These can be described as existence, option and bequest values. Existence values are the amount society is willing to pay to guarantee that an asset simply exists. An existence value for BLM-administered lands might be the value of knowing that undisturbed GRSG habitat exists or the value associated with undeveloped scenic landscapes. In addition to implicit existence values, society's willingness to pay to preserve resources for future use attaches additional passive use values. The potential benefits people would receive from future use are referred to as option values when future use is expected to occur within the same generation and bequest values when preservation allows future generations to benefit from the resource use. Within the LFO bequest and option values might exist for numerous plant and animal species, landscapes, heritage sites, and recreational trails. While use and non-use values exist for these lands, the methodologies for measuring these values are controversial and difficult to apply, making evaluation during the planning process not feasible. However, this does not preclude their consideration.

3.24 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…" (Executive Order 12989).

Minority populations as defined by CEQ guidance under the NEPA (CEQ 1997) include individuals in the following population groups: American Indian or

Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified where "(a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater…" (CEQ 1997). Additionally, "[a] minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds" (CEQ 1997). Low-income populations are determined by the US Census Bureau based upon poverty thresholds developed every year.

US Census data is used to determine whether the populations residing in the 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; or
- The percentage of population that is of minority or low-income status is at least 10 percentage points higher than for the entire State of Montana.

Data for the identification of low-income is from the US Census Bureau, Small Area Income and Poverty Estimates (SAIPE). The SAIPE program produces yearly single year poverty estimates for states, counties, and school districts and is considered the most accurate for these geographic scales, especially for areas with populations of 65,000 or less (US Department of Commerce 2014). Minority populations are identified using the US Census Population Estimates program which provides estimates for the resident population by age, sex, race, and Hispanic origin at the national, state and county scales. Total minority population refers to that part of the total population which is not classified as Non-Hispanic White Only by the US Census Bureau. By using this definition of minority population, the percentage is inclusive of Hispanics and multiple race categories and any other minority single race categories. This definition is most inclusive of populations that may be considered as a minority population under Executive Order 12898. Estimates from SAIPE and the Population Estimates program are used in federal funding allocations.

3.24.1 Existing Conditions

For this planning effort the identification of environmental justice populations is conducted at the county level due to the large geographic area. The American Indian population makes up over 20 percent of the population of Chouteau County meeting the criteria of having an environmental justice minority population by having a minority population at least 10 percentage points higher than the State of Montana (6.5 percent American Indian) (Error! Reference source not found.). Although poverty exists in all of the counties, none of the counties meet the criteria above for having an Environmental Justice poverty population.

Table 3-62
Environmental Justice Data for the Planning Area by County, 2013

	Race Alone								
	White	Black or African American	American Indian & Alaska Native	Asian	Native Hawaiian & Other Pacific Islander	Two or More Race	Hispanic (of any Race)	Total Minority[1]	Poverty Percent, All Ages
Montana	89.5%	0.6%	6.5%	0.8%	0.1%	2.5%	3.3%	13.0%	16.1%
Chouteau County	76.6%	0.2%	20.9%	0.5%	0.1%	1.8%	2.0%	24.3%	21.8%
Fergus County	96.3%	0.4%	1.3%	0.3%	0.0%	1.7%	2.1%	5.5%	14.4%
Judith Basin County	97.7%	0.0%	1.1%	0.3%	0.0%	0.8%	1.5%	3.8%	14.3%
Meagher County	97.0%	0.4%	0.6%	0.5%	0.0%	1.5%	1.8%	4.5%	19.6%
Petroleum County	98.4%	0.0%	0.6%	0.0%	0.0%	1.0%	1.0%	2.6%	14.8%

Source: US Department of Commerce 2014
[1]Total minority population refers to the part of the total population which is not classified as Non-Hispanic White Only by the US Census Bureau.

Overall, the planning area does have at least one county that meets the criteria for environmental justice populations.

Chapter 4
Environmental Consequences

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 CHANGES BETWEEN THE DRAFT EIS AND FINAL EIS

- The likely direct and indirect impacts on the human and natural environment that could occur from implementing the Proposed Plan Amendment presented in **Chapter 2** were incorporated into **Chapter 4**. Analysis shown under the draft alternatives may be referenced in the Proposed Plan Amendment analysis with such statements as "impacts would be the same as, or similar to, Alternative D" or "impacts would be the same as Alternative D, except for...," as applicable.
- **Section 4.3**, Greater Sage-Grouse, was updated to include the following:
  - Potential impacts on GRSG from conversion of private rangeland to agricultural land were added to the analysis of impacts from land tenure decisions.
  - Additional impacts on GRSG from predation.
  - Potential increases in wildfires due to climate change.
  - Potential impacts on GRSG and habitat from excluding livestock grazing from BLM-administered lands.
  - Discussion of potential impacts on GRSG populations from conifer encroachment.

4.2 INTRODUCTION

This chapter presents the likely direct and indirect impacts on the human and natural environment that could occur from implementing the Proposed Plan Amendment and draft alternatives presented in **Chapter 2**. Cumulative impacts from the proposed alternatives are presented **Chapter 5**. This chapter is organized by topic, similar to **Chapter 3**. Each topic area includes a method of analysis section that identifies indicators, methods, and assumptions; a discussion

of the nature and type of effects; a summary of effects common to all alternatives; and an analysis of impacts for each of the four draft alternatives and Proposed Plan Amendment. A separate section describing irretrievable or irreversible commitment of resources is presented at the end of the chapter. Indicators are factors that describe resource condition and change and can help the BLM determine trends over time. The section on methods and assumptions describes methodologies and assumptions for assessing impacts specific to the resource or resource use. These are in addition to those general assumptions and methodologies listed in **Section 4.2.1**, Analytical Assumptions, and **Section 4.2.2**, General Methodology for Analyzing Impacts. The nature and type of effects section describes in general terms impacts on resources or resource uses from allowable uses or restrictions on allowable uses. Impacts describe how the indicators would change the magnitude of the nature and type of effect.

All management actions proposed in **Chapter 2** are primarily planning-level decisions and do not result in direct, on-the-ground changes. However, by planning for uses on BLM-administered surface estate and federal mineral estate during the planning horizon for the Judith Resource Area RMP and Headwaters RMP, this impact analysis focuses on impacts that could eventually result in on-the-ground changes. Impacts for some resources or resource uses, such as livestock grazing and OHV use, could be confined to the BLM-administered surface estate. Other impacts, such as energy and minerals and requirements to protect GRSG from such activity, could apply to all BLM-administered federal mineral estate (including split estate). Some BLM management actions may affect only certain resources under certain alternatives. This impact analysis identifies impacts that may enhance or improve a resource as a result of management actions, as well as those impacts that have the potential to impair a resource. However, the evaluations are confined to the actions that have direct, immediate, and more prominent effects. If an activity or action is not addressed in a given section, no impacts are expected, or the impact is expected to be negligible based on professional judgment.

The BLM manages BLM-administered lands for multiple uses in accordance with FLPMA. Land use decisions are made to protect the resources while allowing for different uses of those resources, such as energy and mineral development, OHV use, recreation, and livestock grazing. When there are conflicts among resource uses or when a land use activity could result in unacceptable or irreversible impacts on the environment, the BLM may restrict or prohibit some land uses in specific areas. To ensure that the BLM meets its mandate of multiple use in land management actions, the impacts of the Proposed Plan Amendment and draft alternatives on resource uses are identified and assessed as part of the planning process. The projected impacts on land use activities and the environmental impacts of land uses are characterized and evaluated for each of the draft alternatives and Proposed Plan Amendment.

Impact analysis is a cause-and-effect process. The detailed impact analyses and conclusions are based on the BLM planning team's knowledge of resources and the project area; reviews of existing literature; and information provided by experts in the BLM, other agencies, and interest groups, as well as by concerned citizens. The baseline used for the impact analysis is the current condition or situation, as described in **Chapter 3**. Impacts on resources and resource uses are analyzed and discussed in detail commensurate with resource issues and concerns identified throughout the process. Occasionally, impacts are described using ranges of potential impacts or in qualitative terms.

This chapter describes the environmental consequences associated with the impacts on GRSG and its habitat from activities carried out in conformance with this plan, in addition to BLM management actions. In undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM would require mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This would be achieved by avoiding, minimizing, and compensatory mitigation for impacts by applying beneficial mitigation actions. In addition, to help implement the Proposed Plan Amendment, a WAFWA Management Zone Regional Mitigation Strategy (per **Appendix G**) would be developed within one year of the issuance of the ROD. The Strategy would elaborate on the components identified in **Chapter 2** (avoidance, minimization, compensatory mitigation, additionality, timeliness, and durability), and would be considered by the BLM for BLM management actions and third party actions that result in habitat loss and degradation. The implementation of a Regional Mitigation Strategy would benefit GRSG, the public, and land-users by providing a reduction in threats, increased public transparency and confidence, and a predictable permit process for land-use authorization applicants.

4.2.1 Analytical Assumptions

Several assumptions were made to facilitate the analysis of the projected impacts. These assumptions set guidelines and provide reasonably foreseeable projected levels of development that would occur within the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area during the planning period. These assumptions should not be interpreted as constraining or redefining the management objectives and actions proposed for each alternative, as described in **Chapter 2**. The following general assumptions apply to all resource categories. Any specific resource assumptions are provided in the *Methods and Assumptions* section for that resource.

- Each draft alternative and the Proposed Plan Amendment in **Chapter 2** constitute a possible RMPA and would be implemented.
- Implementing actions from any of the draft RMPA alternatives or Proposed Plan Amendment would be in compliance with all valid

existing rights, federal regulations, BLM policies, and other requirements.

- Implementation-level actions necessary to execute the land use plan-level decisions in this RMPA would be subject to further environmental review, including NEPA, as appropriate.
- Direct impacts of implementing the RMPA primarily occur on the decision area lands, and indirect impacts primarily occur on the decision area and adjacent private lands.
- Local climate patterns of historic record and related conditions for plant growth may change with warmer, drier conditions likely to occur throughout the life of the Judith Resource Area RMP and Headwaters RMP.
- In the future, as tools for predicting climate changes in the planning area improve and changes in climate affect resources and necessitate changes in how resources are managed, the BLM may reevaluate decisions made as part of this planning process and adjust management accordingly.
- The discussion of impacts is based on the best available data. Knowledge of the planning area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used to infer environmental impacts where data are limited.
- RDFs apply to certain activities (i.e., water developments, mineral development, and fire fuels management) conducted by the BLM. Because the BLM does not have jurisdiction over split estate lands for activities not related to fluid mineral leasing and development, RFDs apply only to the 593,995 acres of BLM surface in the decision area.
- Restrictions on land use authorizations are identified for ROW avoidance or ROW exclusion areas. Because the BLM does not have jurisdiction over split estate lands for land use authorizations, ROW avoidance and ROW exclusion restrictions apply only to the 593,995 acres of BLM surface in the decision area.
- Administrative access includes motorized wheeled cross-country travel for lessees and permittees that is limited to the administration of a federal lease or permit. Persons or corporations having such a permit or lease could perform administrative functions on public lands within the scope of the permit or lease; however, this would not preclude modifying permits or leases to limit motorized wheeled cross-country travel during further site-specific analysis to meet resource management objectives or standards and guidelines (BLM 2003b).

- Data from GIS have been used in developing acreage calculations and to generate the figures in **Appendix A**. Calculations depend on the quality and availability of data. Most calculations in this RMPA are rounded to the nearest 10 acres or 0.1-mile. Given the scale of the analysis, the compatibility constraints between datasets, and lack of data for some resources, all calculations are approximate and are for comparison and analytic purposes only. Likewise, the figures in **Appendix A** are provided for illustrative purposes and are subject to the limitations discussed above. The BLM may receive additional GIS data; therefore, acreages may be recalculated and revised.

4.2.2 General Methodology for Analyzing Impacts

Potential impacts or effects are described in terms of type, context, duration, and intensity, which are generally defined as follows:

- *Type of Impact* – Because types of impacts can be interpreted differently by different people, this chapter does not differentiate between beneficial and adverse impacts (except in cases where such characterization is appropriate or required by law, regulation, or policy). The presentation of impacts for key planning issues is intended to provide the BLM decision maker and reader with an understanding of the multiple use tradeoffs associated with each alternative. The impact analysis presents the effects caused by an action and the reader is left to interpret if that is a beneficial or adverse impact. Different readers may interpret the effect as either adverse or beneficial.
- *Context* – Context describes the area or location (site specific, local, planning area wide or regional) in which the impact would occur. Site-specific impacts would occur at the location of the action, local impacts would occur within the general vicinity of the action area, planning area-wide impacts would affect a greater portion of the planning area, and regional impacts would extend beyond the planning area boundaries.
- *Duration* – Duration describes the length of time an effect would occur, either short term or long term. Unless specifically defined for a resource topic, short term is defined as anticipated to begin and end within the first five years after the action is implemented. Long term is defined as lasting beyond five years to the end of or beyond the planning time frame of the Judith Resource Area RMP and Headwaters RMP.
- *Intensity* – Rather than categorize impacts by intensity (e.g., major, moderate, and minor), this analysis discusses impacts using quantitative data wherever possible (e.g., miles and acres). Where quantifiable data are unavailable, impacts are characterized qualitatively.

- *Direct and Indirect Impacts* – Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place. Indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur.

Analysis shown under other alternatives may be referenced in the other alternatives with such statements as "impacts would be the same as, or similar to, Alternative A" or "impacts would be the same as Alternative A, except for . . .," as applicable.

Irreversible and irretrievable commitment of resources is discussed in **Section 4.25**, Irreversible and Irretrievable Commitment of Resources. Irreversible commitments of resources result from actions in which resources are considered permanently changed. Irretrievable commitments of resources result from actions in which resources are considered permanently lost.

4.2.3 Incomplete or Unavailable Information

The CEQ established implementing regulations for NEPA, requiring that a federal agency identify relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant adverse effects (40 CFR, Part 1502.22). If the information is essential to a reasoned choice among alternatives, it must be included, unless the cost of obtaining the information is exorbitant. Knowledge and information is, and would always be, incomplete, particularly with infinitely complex ecosystems considered at various scales.

The best available information pertinent to the decisions to be made was used in developing the RMPA. Considerable effort has been taken to acquire and convert resource data from the BLM and outside sources into digital format for use in the RMPA.

Certain information was unavailable for use in developing this RMPA because inventories have either not been conducted or are incomplete. Some of the major types of data that are incomplete or unavailable include:

- Field inventory of soils and water conditions
- Field inventory of vegetation composition
- Field inventory of wildlife and special status species occurrence and condition

For these resources, estimates were made concerning the number, type, and significance of these resources based on previous surveys and existing knowledge. In addition, some impacts cannot be quantified given the proposed management actions. Where this gap occurs, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent project-

level analysis will provide the opportunity to collect and examine site-specific inventory data required to determine appropriate application of RMP-level guidance. In addition, ongoing inventory efforts by the BLM and other agencies in the planning area continue to update and refine information used to implement this RMPA.

4.3 GREATER SAGE-GROUSE

4.3.1 Methods and Assumptions

Indicators

Indicators of impacts on GRSG are as follows:

- Acres of sagebrush habitat
- Number of large, medium, and small leks
- Average male lek attendance

Assumptions

The analysis includes the following assumptions:

- Three general categories of human disturbance to habitats or disruption to animals would be the most influential on GRSG and their habitat: 1) disturbance/disruption from casual use; 2) disturbance/disruption from permitted activity; and 3) changes in habitat condition, such as from fire or weed invasion.
- RDFs, COAs, and standard operating procedures are used for analysis and would be implemented to reduce impacts on GRSG. These are subject to modification, based on subsequent guidance and new science.
- Short-term effects are defined as those that would occur over a time frame of up to two years and long-term effects would occur over longer than two years.
- Ground-disturbing activities could positively or negatively modify habitat or cause loss or gain of individuals. This all depends on the amount of area disturbed, the nature of the disturbance, the species affected, and the location of the disturbance. For example, juniper reduction treatments disturb the ground but could positively modify habitat in the long term.
- Direct impacts of implementing the RMPA primarily occur on the decision area lands; indirect impacts of implementing the RMPA primarily occur on the decision area and adjacent land not administered by the BLM.
- Removing livestock grazing from BLM-administered land would result in private lands being fenced from BLM-administered land.

- Removing livestock grazing from BLM-administered land would result in pits, dams, and reservoirs being removed from BLM-administered land, or these structures would fail over time. For those that support fisheries, important riparian-wetland habitat could remain, but this is less than ten percent of the total pits, dams, and reservoirs.
- Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria. These include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest, including GRSG.
- Impact analysis focuses on the Yellowstone Watershed population, including the survey areas of Winifred, Crooked Creek, War Horse, and Yellow Water Triangle. Leks are categorized as large (more than 25 males), medium (fewer than 25 and more than 10 males), and small (fewer than 10 males).

4.3.2 Nature and Type of Effects

Factors related to the decline in GRSG distribution and abundance throughout their range includes habitat loss and degradation, disease and predation, chemicals, and changes in land use (USFWS 2010, p. 14). Habitat loss and fragmentation reduces the land area available to support GRSG and increases opportunities for other types of disturbance, such as predation, human traffic, wildfire, and spread of invasive plant species. The GRSG impacts section focuses on threats specifically identified for the Yellowstone Watershed population within the LFO: sagebrush elimination/agricultural conversion, fire, weed spread and conifer encroachment, energy, infrastructure, grazing, and recreation (USFWS 2013, p. 17).

Loss and fragmentation of sagebrush habitats is a primary cause of the decline of GRSG populations, (USFWS 2010). Threats posed by conversion to agriculture, infrastructure, wildfire, invasive weeds, conifer encroachment, livestock grazing, and energy development are all associated with loss, fragmentation, and degradation of habitat. The reasons for declining GRSG populations are habitat fragmentation, reductions in lek persistence, lek attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat (USFWS 2010, p. 21).

Yellowstone Watershed and Belt Mountains GRSG Analysis

The alternatives analysis in this chapter focuses on the Yellowstone Watershed population of GRSG. The LFO planning area also includes the Belt Mountain population area. Only 439 acres (0.1 percent) of this area is administered by the BLM, all GHMA, and no leks are located here; the nearest lek is 2.5 miles away. BLM management has less impact here because of the small percentage of BLM-

administered land. The major threats in this area are isolation, conversion to agriculture, conifer encroachment, and weed spread.

Most BLM-administered lands within the population are on the northern border of mapped habitat; these lands are experiencing conifer encroachment. . The BLM and NRCS are currently engaging in a conifer removal project in the North Fork area that will improve GRSG habitat. In the short term, there would be no difference between alternatives for the amount of sagebrush or grassland habitat. In the long term, if conifer encroachment were not treated, approximately 120 acres would transition from sagebrush to Douglas-fir.

Alternative A would allow treatment in GH and Alternatives C and D, and the Proposed Plan Amendment would allow treatment in GHMA, while Alternative B would prioritize treatments in PHMA. It is unlikely that sagebrush habitats would be maintained on BLM-administered land in the Belt Mountains population under Alternative B.

COT Report Threats—Sagebrush Elimination, Agriculture Conversion

Over time, sagebrush habitats have been removed for crop production or development. Such conversion results in the loss of habitat and decreases the connectivity between seasonal habitat. This increases population isolation, which increases the probability for the loss of genetic diversity. This then increases the probability of extirpation from random events (Knick and Hanser 2011).

Habitat loss and fragmentation also increase opportunities for other disturbances, such as human traffic, wildfire, and invasive plant spread. While habitat conversion for agriculture is not directly tied to BLM management, land tenure decisions, such as acquisitions and disposals, can indirectly affect the acreage available for agriculture and urbanization. For example, if the BLM were to dispose of a parcel characterized as sagebrush-steppe, it could be converted to farmland or subdivided into home sites. Lands retained under BLM management would not be converted for agriculture or urbanization. In Montana, large leks are 4.5 times less likely to occur than small leks when tilling fragments 21 percent or more of land within a 0.6-mile radius of breeding sites (Tack 2009).

The continuing pressure for conversion of private rangeland to agricultural land or residential development in LFO poses increasing risks of habitat fragmentation, particularly given the patchwork of land ownership in the area. Temperature increases from climate change may increase crop yields, which may encourage parts of the state not previously used for agriculture to be converted for that purpose (NRC 2010).

Impacts from ACECs

Special designations (e.g., ACECs, Wilderness, and WSAs) and other conservation measures could be established to protect GRSG and their habitats. However, this GRSG-specific amendment includes special management

prescriptions that provide broad protection from habitat fragmentation, loss, and human disturbance. No additional protection would be afforded with ACEC designation. Existing special designations may protect GRSG or their habitat, but they were not established for this purpose.

COT Report Threats—Fire

Fire is particularly damaging to Wyoming big sagebrush, which is most of the sagebrush habitat in the LFO. Big sagebrush, unlike silver sagebrush, does not re-sprout after a fire; instead, it is replenished by wind-dispersed seed from adjacent unburned stands or seeds in the soil. Depending on the species and the size of a burn, sagebrush can reestablish itself within five years of a burn. However, a return to a full pre-burn community cover can take 13 to 100 years (Connelly et al. 2004). While wildfire likely played an important historical role in creating a mosaic of habitat for GRSG, current land use patterns have restricted the system's ability to support wildfire. Slow rates of regrowth and recovery of sagebrush after disturbance, coupled with high rates of disturbance and conversion to introduced plant cover, are largely responsible for the accumulating displacement and degradation of the sagebrush ecosystem (Manier et al. 2013, pp. 4-6). Climate change is expected to increase the risk of wildfire throughout Montana (NRC 2010).

Fire suppression may be used to maintain habitat for GRSG (NTT 2011, pp. 25-27). Fire suppression may preserve the condition of some vegetation communities, as well as habitat connectivity. This is particularly important in areas where fire frequency has increased as a result of weed invasion or where landscapes are highly fragmented. Fire also increases opportunities for invasive species, such as cheatgrass (*Bromus tectorum*), to expand (Balch et al. 2012); fire suppression may limit this expansion. In the LFO, cheatgrass is not widespread and dominant, though isolated patches may be found. The chance of large wildfire in sagebrush is less in the LFO planning area than in the Great Basin, due to the planning area's vegetation (less cheatgrass) and cooler, wetter climate.

Controlled burning may be prescribed to treat fuel buildup and can help sagebrush habitat recover in some vegetation types, especially when silver sagebrush is undergoing conifer encroachment. Reseeding with native plants and long-term monitoring to ensure the production of GRSG cover and forage plants, would assist vegetation recovery (NTT 2011, pp. 26-27). In the LFO, controlled burning is used primarily in ponderosa pine areas to limit conifer spread and is not used in GRSG habitat.

COT Report Threat—Vegetation Management (Conifers, Weeds, and Annual Grasses)

Current treatments and active vegetation management typically focus on vegetation composition and structure for fuels. Habitat management and productivity manipulation also are used to improve habitat and forage for

ungulates and other grazers. An example of this is soil stabilization to manipulate vegetation composition, to increase productivity, or to remove invasive plants (Knick et al. 2011). Distribution of these treatments can affect the distribution of GRSG and sagebrush habitats locally and across a region.

Invasive plants are thought to alter plant community structure and composition, productivity, nutrient cycling, and hydrology. They may outcompete native plant populations. In particular, invasive plants can reduce and eliminate vegetation that GRSG use for food and cover, resulting in habitat loss and fragmentation. Invasive plants also may increase the risk of wildfire. An assortment of nonnative annuals and perennials and native conifers are currently invading sagebrush ecosystems.

Expansion of conifer woodlands, especially juniper (*Juniperus* spp.), also threatens GRSG. This is because conifers do not provide suitable habitat, and mature trees displace shrubs, grasses, and forbs required for GRSG through competition for resources. GRSG may incur population-level impacts at very low levels of conifer encroachment (Baruch-Mordo et al. 2013). Juniper expansion is also associated with increased bare ground, the potential for erosion, and additional perch sites for raptors. For these reasons, woodland expansion may also represent expansion of raptor predation threat, in ways similar to perches on power lines and other structures (Connelly et al. 2004).

Landscapes with large, intact patches of sagebrush are preferred to avoid edge effects. In addition, GRSG require habitats that include a diversity of herbaceous species and healthy native grasses, making management for high condition important (Knick et al. 2011).

The distribution of sagebrush is limited, and the cost of habitat restoration is high. For these reasons, management plans that protect intact sagebrush and restore impacted areas strategically to increase connectivity of intact sagebrush have the best chance of increasing high quality sagebrush cover (Connelly et al. 2004; Beck and Mitchell 2000, cited in Manier et al. 2013, p. 108). Sagebrush-promoting vegetation treatments would increase the amount and quality of GRSG habitat.

Managing and controlling invasive weed species in GRSG habitat would decrease the spread of weeds that directly compete for resources such as water with native plants and that indirectly increase the risk of fire, such as from cheatgrass, impacts on sagebrush. To reduce the likelihood of invasive weed spread and the extent of current infestations, the BLM uses integrated weed management techniques through weed control cooperative range improvement agreements. The BLM implements vegetation treatments, such as mechanical, chemical, hand-cutting, and prescribed burning, to reduce weed infestations and conifer encroachments. Invasive annual grasses (e.g., cheatgrass and Japanese brome) are found throughout the planning area but are usually not dominant. Short-term, surface-disturbing activities, overgrazing, and drought can increase annual

grasses. Proper management and typical precipitation patterns in the planning area allow desirable native plants to thrive in the presence of annual grasses.

These conservation efforts would reduce the impacts of weeds or conifers on sagebrush and would increase the availability of GRSG habitat. In addition, fuels management actions, as described above, can also reduce weeds and conifers and create fire breaks.

Indicators of potential impacts on GRSG from invasive plants and conifers under the proposed alternatives are acres of sagebrush habitat and acres meeting rangeland health standards.

COT Report Threat—Energy

Energy development requires construction of roads, well pads, wells, and other infrastructure, with associated noise, traffic and lights. These improvements disturb wildlife and alter, degrade, or displace native ecosystems. Wildlife is displaced by energy development infrastructure, with power lines and roads having the largest effects, according to a meta-analysis of prairie grouse populations. Population declines associated with energy development result from the abandonment of leks, decreased attendance at the leks that persist, lower nest initiation, poor nest success, decreased yearling survival, and avoidance of energy infrastructure in important wintering habitat (Holloran 2005; Aldridge and Boyce 2007).

Industrial activity to develop surface mines and infrastructure could result in noise and human activity that disrupt the habitat and life cycle of GRSG, potentially resulting in lek or nest abandonment (Patricelli et al. 2013; Blickley et al. 2012a; Patricelli et al. 2012; Blickley et al. 2012b). Impacts from roads may include direct habitat loss, direct mortality, barriers to migration corridors (depending on size of road and season of use) or seasonal habitats, facilitation of predators and spread of invasive vegetation species, and other indirect influences such as noise (Forman and Alexander 1998, pp. 207-231). The number of displaying GRSG on two leks within 1.25 miles of active mines in northern Colorado declined by approximately 94 percent. This was over a five-year period following an increase in mining activity, though limited recovery occurred subsequently (Remington and Braun 1991, cited in Manier et al. 2013, p. 71; Braun 1998).

All studies which assessed impacts of energy development on GRSG found negative effects, whereas no studies reported a positive influence of development on populations or habitats (Naugle et al. 2011). Research has reported that breeding populations of GRSG were negatively impacted, with declines in lek attendance by male GRSG ranging from 13 to 79 percent at conventional well pad densities. This was defined in the study as four to eight pads per square mile; within the planning area conventional well pad density is one per square mile (640 acres). A recent summary of studies investigating GRSG response to natural gas development reported impacts on leks from

energy development were most severe when infrastructure occurred near leks and that impacts remained discernible out to distances up to four miles (Naugle et al. 2011; Manier et al. 2013, p. 51).

An observed 21 percent decline in GRSG population between pre- and post-mine development was primarily attributed to decreased nest success and adult female annual survival; the treatment effect was more noticeable closer to gas field infrastructure.

Annual survival of individuals reared near gas field infrastructure (yearling females and males) was significantly lower than control individuals that were not reared near infrastructure (Holloran et al. 2010, cited in Manier et al. 2013 p. 59). Generally, oil and gas developments within two to four miles of leks or nesting areas had a deleterious effect on populations; the effect increased as well density increased (Lyon and Anderson 2003; Walker et al. 2007; Johnson et al. 2011). Knick and Connelly (2011) found that burned areas and human disturbance were the primary factors influencing the fate of leks.

Current oil and gas leases are substantial across GRSG ranges in MZ I, though oil and gas leasing is inactive on BLM-administered lands in PHMA and GHMA within the LFO. The potential for development is based on locations of geologic fields for traditional oil and gas, distributed extensively across eastern portions of GRSG range (Manier et al. 2013, p. 51). LFO is not leasing any parcels for fluid minerals in PHMA or GHMA under any alternative. Private lands are being leased; however, three wells targeting the Heath formation less than two years ago are plugged or abandoned, and additional wells are not expected.

A lease does not guarantee development; a separate environmental review process is conducted before permission is given to drill. Oil and gas leasing is not currently active in the LFO area but could become prevalent in the future, depending on market conditions.

Restrictions on mineral leasing in GRSG habitat would reduce impacts on the species by reducing the disturbances described above.

COT Report Threat—Grazing and Range Management

Livestock grazing is the most widespread land management practice in western North America; 70 percent of all lands are grazed (Floyd et al. 2003). Cattle grazing is also the dominant agricultural use in the LFO. Since the early 1900s, livestock use on public lands has declined.

Simultaneously with reduced stocking of public rangelands has been measurable improvements in range condition during the latter half of the 1900s (Box 1990; Laycock et al. 1996). The focus of rangeland management on livestock production has been shifting since the 1960s and 1970s toward conservation, ecosystem integrity and services, sustainable use of resources for multiple purposes, the restoration of degraded rangelands, and benefits for wildlife

(Connelly et al. 2004; Vavra 2005; Briske et al. 2011; Knick et al. 2011). The mere presence of livestock does not mean that long-term destruction is occurring to wildlife or habitat. Instead, the degree to which grazing affects habitat depends on the number of animals grazing in an area, the time of grazing, and the grazing system used.

Although the Great Plains ecosystems evolved under grazing pressures from hoofed ungulates, the seasonality and intensity of domestic livestock grazing under current grazing management may differ from historic bison and elk grazing. The impact of grazing on these communities varies with site potential, ecological condition, and climate. If not managed optimally or effectively, cattle and sheep grazing can cause soil compaction, nutrient enrichment, vegetation and nest trampling, direct disturbance, and negative effects on GRSG recruitment (Connelly et al. 2004 pp.7-29 –7-32). This would result from livestock reducing invertebrate prey or increasing GRSG exposure to predators (Beck and Mitchell 2000, pp. 998-1000; Knick 2011; Coates 2007, pp. 28-33).

Impacts on habitat vary with livestock densities and distribution: the more evenly livestock are distributed, the lower their impact on any given area (Gillen at al. 1984). However, cattle show a strong preference for certain areas, leading to high use in some areas and little to no use in others. In general, livestock use is limited by slopes greater than 30 percent, dense forests and vegetation, poor or little upland forage, and lack of water.

GRSG habitat structure and composition may be affected positively or negatively by livestock grazing (Crawford et al. 2004). Forage utilization standards and guidelines, such as BLM Standards for Rangeland Health, were developed to identify, with proper management, future conditions of rangeland resources.

Properly managed livestock grazing, permitted within standard and guideline limits (as specified in the LFO standards for rangeland health in **Appendix F**), is designed to cause no adverse impacts on rangeland or habitat values. Grazing plans designed to improve fair and poor condition range with rest periods may increase herbaceous cover and concurrently GRSG habitat (Adams et al. 2004).

Changing the timing of grazing to promote grass and forb growth, and residual matter, also benefits GRSG habitat (Woodward 2006). Light grazing may produce mosaics in sagebrush communities and increase grass and forb production needed for nesting and brood-rearing (Adams et al. 2004). Light to moderate grazing does not appear to affect cover of perennial grasses important to nest cover (Strand and Launchbaugh 2013); however, heavy grazing may limit restoration of bunchgrass and promote invasive species spread (Reisner et al. 2013).

Areas with excessive utilization for a number of years have negatively impacted GRSG habitat. The situation has created conditions that favor annual grass

dominance and reduce perennial grasses used as nesting and escape cover (Beck and Mitchell 2000). Periodic overgrazing can damage range resources for the long term. It often exacerbates drought effects when livestock levels are not reduced to match the limited forage production.

Livestock's heavy use of riparian meadows reduces the availability of succulent forbs and may cause GRSG to avoid these habitats (Klebenow 1982). Livestock may also trample nests and disturb GRSG behavior (Beck and Mitchell 2000; Coates 2007, pp.28-33).

Grazing in riparian areas can destabilize streams and river banks, reduce riparian shade, and increase sediment and nutrient loads in the aquatic ecosystem. Timing of grazing influences effects on meadows and riparian areas. Meadow and riparian areas within sagebrush habitat in good condition can withstand moderate spring, early summer, or winter use (Shaw 1992; Clary et al. 1996; Mosley et al. 1997). The length of time livestock access meadows may be more important than the level of use (Mosley et al. 1997). Rest from grazing may be necessary to restore degraded riparian and meadow habitat (Clary and Webster 1989).

Grazing infrastructure, such as water features and pipelines for livestock, can attract livestock to previously undisturbed habitat areas. This artificially concentrates livestock impacts, such as heavy grazing and vegetation trampling (Braun 1998). Standing water for livestock can create puddles that serve as breeding grounds for mosquitoes that carry West Nile virus (Walker and Naugle 2011). Fences provide predator perches and are a cause of direct mortality to GRSG (Braun 1998; Stevens et al. 2012). Grazing management that provides for sagebrush ecosystem health would enhance habitat for GRSG populations.

Birds and other wildlife species do not respond to grazing directly but to habitat changes. In general, livestock can influence habitat by modifying plant biomass, plant height and cover, and plant species composition. As a result, livestock grazing could change habitat and alter species abundances and composition in GRSG insect prey. Changes could occur in varying degrees in plant composition and change in vegetative structure, affecting cover for nesting birds. Grazing could also alter fire regimes (Davies et al. 2010) to varying degrees.

Grazing can reduce the spread of invasive grasses, if applied annually before the grasses have cured, and can be used as a tool to reduce fuel load (Connelly et al. 2004, pp. 7, 28-30).

COT Report Threat—Infrastructure

Impacts from Lands and Realty

Transmission lines and major power lines are widespread throughout GRSG range. GRSG respond negatively to increased human infrastructure in sagebrush

habitats, including roads, power lines, and communication towers (Knick and Connelly 2011; Johnson et al. 2011). Although transmission line and power line construction does not generally result in substantial direct habitat loss, it would temporally disturb individual GRSG and habitat along the ROW.

Following construction, GRSG avoidance of vertical structures, likely due to raptors perching on them, may result in habitat exclusion via behavioral response. One study reported that the frequency of raptor/GRSG interactions during the breeding season increased 65 percent and golden eagle interactions alone increased 47 percent where a transmission line had been constructed (Ellis 1985). GRSG have been observed to avoid brood-rearing habitats within three miles of power lines (LeBeau 2012). Higher densities of power lines within four miles of a lek negatively influence lek attendance (Walker et al. 2007).

Wind generating facilities have increased in size and number and currently surpass the pace of other renewable developments in the GRSG range (USFWS 2010). Similar to nonrenewable energy developments, impacts on GRSG from wind development facilities include roads, power lines, noise, and increased human presence (Connelly et al. 2004). These impacts are associated with both construction and operation of wind energy facilities and increase habitat fragmentation through habitat loss, degradation, and directly disturb GRSG. While there are impacts that are unique to wind development (e.g., noise produced by the rotor blades, GRSG mortality from flying into rotors, and GRSG avoidance of structures) most of the impacts are from the roads and power lines necessary for construction and maintenance (see Infrastructure section; Connelly et al. 2004). Only 16 percent, or 62,916 acres, of the BLM-administered land in the Lewistown District has wind potential that is considered "Good" or better (greater than or equal to 400 watts per square meter).

ROW exclusion areas would prohibit all development of ROWs, while in ROW avoidance areas, whether a ROW should be allowed would be considered on a case-by-case basis. This flexibility may be advantageous where federal and private landownership areas are mixed; exclusion areas may result in more widespread development on private lands.

Impacts from Travel and Transportation Management

Ecological impacts of roads and motorized trails include mortality due to collisions, behavior modifications due to noise, activity, and habitat loss, physical environment alteration, nutrient leaching, erosion, invasive plant spread, increased use, and alteration of habitat by humans accessing it. GRSG avoid nesting and summering near major roads (for example, paved secondary highways) and traffic disturbances. Research suggests that roads within 4.7 miles of leks negatively influence male lek attendance, with larger roads having greater effects (Connelly et al. 2004; Johnson et al. 2011). Negative influences on male lek attendance are increased road length and traffic levels on roads and traffic

activity during the early morning on roads within approximately two miles of leks (Holloran 2005; LeBeau 2012; Forman and Alexander 1998; Lyon and Anderson 2003, cited in Manier et al. 2013, pp. 44 and 50). Research suggests that roads should be sited or traffic should be seasonally limited within 0.8 to 1 mile from the edge of important areas for nesting, foraging, and breeding to protect GRSG from noise disturbance (Patricelli et al. 2013).

Closing and reclaiming unused, minimally used, or unnecessary roads in and around GRSG habitat would reduce disturbance to GRSG in those habitats. It also would increase the amount of GRSG habitat when the roads are reclaimed (NTT 2011, p. 11).

COT Report Threat—Recreation

Recreation in GRSG habitat is benign in most situations, but excessive use may disturb birds or nesting sites, degrade sagebrush habitat, or allow poaching (NTT 2011, p. 12). Activities such as camping, bicycling, OHV use, and hunting make use of the extensive network of BLM roads and trails. These activities impact sagebrush and GRSG by generating noise and dust, spreading invasive plants, and altering wildlife behavior (Knick et al. 2011). In addition, road and trail use may directly cause GRSG mortality via collisions with vehicles.

Closing or seasonally restricting roads used by recreationists in and around seasonal GRSG habitats may reduce the impacts on wildlife. Restricting permitted access to important habitat areas based on seasonal use and coincident with GRSG activities would also protect GRSG (Knick et al. 2011; NTT 2011, p. 11).

4.3.3 Impacts Common to Alternatives B—–D and the Proposed Plan Amendment

Adoption of a Monitoring Framework (see **Section 2.7.2** and **Appendix B**) to oversee the implementation and effectiveness of GRSG habitat improvement efforts could result in habitat improvement and long-term viability of GRSG.

4.3.4 Alternative A

COT Report Threats—–Sagebrush Elimination, Agriculture Conversion

Impacts from Land Tenure Decisions

Land tenure adjustments would be subject to current disposal, exchange, and acquisition criteria. These include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. This would likely include retaining or protecting areas with GRSG and would thus maintain occupied habitats. Thus, management under existing land tenure criteria would likely retain GRSG habitat and other lands with high value to wildlife.

COT Report Threat—Fire

Impacts from Fire and Fuels Management

As shown in **Section 3.7**, under current management, 158,700 acres of GRSG habitat on BLM-administered land are at high risk of wildfire. Fuels treatment may reduce the risk by mechanical means or prescribed fire.

Prescribed burning may also be used in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, or increasing age-class variety. The intention of prescribed burning is to improve wildlife habitat and vegetation production. Sagebrush treatments are designed to maintain sagebrush within the canopy at 15 to 50 percent and to increase succulent forbs in order to improve forage for GRSG and increase population stability. Chemical weed treatments may be applied following prescribed burns to limit the expansion of weeds or invasive species in the burned area.

Rest periods following wildfire or controlled burn are determined on a site-specific basis. Intensive wildfire suppression would be applied to high-value areas, such as sagebrush, fire-sensitive woody riparian areas, and commercial forests. Continuation of this policy would protect sagebrush acreage, but high risks of wildfire would remain in some areas.

COT Report Threats—Vegetation Management (Conifers and Weeds and Annual Grasses)

Under Alternative A, current vegetation management would continue. Grazing methods, land treatments, and other improvements would be designed and monitored to accomplish objectives, including wildlife habitat needs. Noxious weed control would be the responsibility of the affected permittee and lessee under existing weed control cooperative range improvement agreements. Each year, permittees and lessees would provide the BLM with records and maps of treatment areas. Conifer removal projects would continue using mechanical means and controlled burns. These approaches would continue to be effective in combating the spread of weeds and conifers, subject to budget limitations.

COT Report Threats—Energy

Impacts from Fluid Minerals

Mineral exploration and extraction directly disturbs GRSG and degrades their habitat, as described under *Nature and Type of Effects*. Existing leases cover 71,488 acres in the planning area, 17,639 acres of which are in BLM-administered PH and GH. This acreage would remain the same across all the alternatives. As discussed above under *Nature and Type of Effects*, mineral exploration and extraction direct impacts include habitat loss, direct mortality, barriers to migration corridors or seasonal habitats, facilitation of predators and spread of invasive vegetation species, and other indirect influences such as noise.

Leasing restrictions would reduce these impacts by disturbing/degrading fewer acres of sagebrush habitat, and reducing direct disturbance of birds on BLM-managed minerals.

Under Alternative A, fluid mineral leasing and development would continue on previously leased lands, though not all leased areas would ultimately be developed. Under current rates of development, no new wells would be drilled on previously leased land in the coming decade. Additional widespread lease development in the LFO is not expected.

Impacts from Solid Minerals
Before coal exploration licenses or prospecting permits for nonenergy leasable minerals were approved, environmental review would be required to assess impacts and develop mitigation measures. Generally, surface occupancy is prohibited within key wildlife areas, floodplains, and public ROWs. There are no known coal resources in the planning area; therefore, actions associated with coal extraction would not impact GRSG populations. The BLM would issue sales contracts for salable minerals where disposal is deemed to be in the public interest, while providing for reclamation of mined lands and preventing unnecessary or undue impact on nonmineral resources

For locatable minerals, mitigation measures to prevent unnecessary or undue degradation would continue to apply to the proposed Plan of Operations. The BLM may consider conducting valid existing right determinations of mining claims where activities threaten resource values, such as wildlife habitat. These policies are unlikely to impact GRSG due to the lack of mining in the LFO; as discussed in **Section 3.10**, no known locatable mineral development potential has been identified within GRSG habitat in the current RMPs.

COT Report Threat—Infrastructure

Impacts from Lands and Realty
Under Alternative A, ROWs are considered on a case-by-case basis outside of exclusion and avoidance areas, with policy being to collocate when possible. There are no ROW exclusion areas within the planning area, but there are two avoidance areas, Acid Shale Pine Forest ACEC and Judith River Canyon (9,708 acres total, 2,674 acres of which are in GRSG habitat, as shown in **Section 4.14**, Areas of Critical Environmental Concern). The collocation approach provides limited protection for GRSG habitat from ROW construction, which is a cause of fragmentation. **Table 4-1** shows ROW avoidance and exclusion areas under each alternative.

Infrastructure can result in a variety of direct and indirect impacts, including habitat loss, habitat degradation at multiple scales (e.g., invasive species at the microsite habitat scale and increased habitat fragmentation at the seasonal habitat scale and population level), increased likelihood of predation because of

Table 4-1
ROW Exclusion and Avoidance Areas in GRSG Habitat (PHMA and GHMA)

Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ROW avoidance area (acres)	2,674	112,341	0	233,219	345,560
ROW exclusion area (acres)	0	233,219	345,560	0	233,219[1]

[1]PHMA would be exclusion for wind and solar energy only.
Note: Exclusion and avoidance areas are in PHMA and GHMA for Alternatives B-D and Proposed Plan Amendment, and in PH and GH for Alternative A (since no PHMA or GHMA is presently designated).

increased predator abundance, increased likelihood of disturbance because of increased human presence, and functional habitat loss as a result of avoidance of habitat use. GRSG population declines have resulted from avoidance of infrastructure and reduced productivity and/or reduced survival in the vicinity of infrastructure (Naugle et al. 2011).

COT Report Threats—Grazing and Range Management

Impacts from Range Management
As shown in **Table 4-2**, 570,112 acres in the planning area are open for livestock grazing, with 103,806 acres of available AUMs. There are 6,781 acres closed to livestock grazing. Current livestock grazing was a significant causal factor for not achieving land health standards in 78 (54 allotments within GRSG habitat) of the 526 allotments within the planning area.

Table 4-2
Acres and AUMs Available for Grazing in the Planning Area

Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Available AUMs	103,806	103,806	34,398	103,806	103,806
AUMs in GRSG habitat (PHMA and GHMA)	69,408	69,408	0	69,408	69,408
Acres open to grazing	570,112	570,112	232,947	570,112	570,112
Acres open to grazing in PHMA and GHMA	337,165	337,165	0	337,165	337,165

Note: PHMA and GHMA are for Alternatives B, C, D, and Proposed Plan Amendment, and PH and GH are for Alternative A (since no PHMA or GHMA is presently designated).

In accordance with BLM grazing regulations 43 CFR, Part 4180, policy and guidance, the LFO has changed livestock grazing management on the 105,437 acres of PH and GH (see **Table 3-46**) that were not meeting land health standards due to current livestock grazing. The actions taken should allow GRSG habitat to improve by reducing the negative impacts.

At this time the LFO cannot quantify through monitoring that the management changes implemented on these lands have resulted in the acres achieving land health standards; however, management changes were implemented. If future land health evaluations and determinations indicate that lands are still not achieving standards, further action in accordance with grazing regulations (regulatory mechanisms) and BLM policy and guidance would be required.

Under Alternative A, livestock grazing would continue to be managed through existing grazing plans. When grazing regimens are implemented, methods and guidelines from the existing RMPs would be followed to maintain ecological conditions and enhance wildlife habitat and vegetation production. Monitoring would be used to maintain the effectiveness of grazing management practices, and integrated ranch planning may be used to plan allotments as single units.

Land health assessments and other management evaluations aim to meet rangeland health standards, which would provide for the health of rangeland vegetation that supports GRSG and other wildlife. Range improvements would be designed to meet both wildlife and range objectives and fences would be built or modified to permit passage of wildlife and to minimize GRSG fence collision risks.

The acreage in PH found to not be meeting standards would continue to be managed to achieve the standards, which would improve its usefulness as GRSG habitat. Restricting livestock from riparian areas would enhance riparian habitat for wildlife, including GRSG.

Fences could also increase opportunities for raptor perching and predation on GRSG. Impacts would be expected to increase in areas where perching is occurring in proximity to seasonal habitats where GRSG are concentrating. Concentrations of predators may also result in habitat fragmentation due to avoidance strategies by GRSG to avoid areas of high predator use (Dinkins et al. 2012).

COT Report Threat—Recreation

Impacts from Recreation

Alternative A includes no specific recreation plan related to GRSG or their habitat. Although most recreation is benign, hunting, camping, and bird watching may disturb individual GRSG.

Recreation is an important use of BLM roads. As shown in **Table 3-36** in **Section 3.12**, Comprehensive Travel and Transportation Management, there are currently 773 miles of roads on BLM-administered land in PH and GH.

Under Alternative A, BLM-administered lands would continue to permit limited yearlong use for motorized vehicles. Recreation on wildlife habitat may disturb GRSG, may reduce nest success, and may contribute to habitat fragmentation. Under Alternative A, road and trail development is minimized in crucial big game and upland bird habitat. Roads may be closed to vehicles where substantial resource impacts occur, including harm to wildlife or habitat. These policies may limit disturbance of GRSG habitat during the nesting season.

Summary of Direct and Indirect Effects on GRSG in the Planning Area under Alternative A

As discussed in **Chapter 3**, the Yellowstone Watershed GRSG population contains five GRSG priority habitat areas within the Billings, Miles City, and Lewistown BLM field offices. PH within the LFO is made up of Yellow Water Triangle, War Horse, Crooked Creek, and Winifred. **Table 3-6** shows lek size data for these survey areas.

The Winifred survey area contains more agricultural land (11 percent) than any other PH area in the LFO. Any further loss of habitat, regardless of ownership, would likely decrease lek size and population numbers. No further loss of sagebrush habitat on BLM-administered land is expected in this area. The two large leks in the Winifred survey area have declined in size over the monitoring period and are presently just over the 25 GRSG threshold separating large from medium-size leks.

The number of large leks in Crooked Creek (one), War Horse (six), and Yellow Water Triangle (two) are expected to be maintained, assuming no changes to private lands or West Nile virus outbreaks. Habitats with more extensive agricultural production are more impacted (higher GRSG population declines) during West Nile virus outbreaks (Taylor et al. 2010).

The NRCS in both Fergus and Petroleum Counties is working with producers on private and public lands as part of the SGI to improve GRSG habitat. This would continue under all alternatives, as would fence marking on high collision risk fences within 1.25 miles of leks.

The total number of leks and large leks has declined over the course of data collection (see **Diagrams 3-1** and **3-2** in **Section 3.4**), with 2012/2013 representing the lowest counts since surveys began in the 1950s. GRSG population declines are likely driven by habitat loss from conversion to cropland on private lands.

GRSG habitat on state and private lands would remain in the long term. The BLM has taken corrective actions for grazing management on allotments not

meeting rangeland health standards due to livestock management (40 percent of PH). Additional measures currently occurring that benefit GRSG include:

- Fence marking in conjunction with NRCS
- Deferring all oil and gas leases in PH or GH because of existing protest resolution (see **Section 1.3**, Proposed Action)
- Wildfire suppression
- Grazing management under NRCS' SGI
- Conifer removal in GRSG habitat

Under Alternative A, these measures could stabilize GRSG numbers in the short term and maintain numbers in the long term. This would be especially true in the War Horse and Yellow Water Triangle survey areas, where a greater amount of BLM-administrated lands occur.

Grazing would be managed to meet rangeland health standards, which include GRSG habitat as part of the biodiversity standard. Continued grazing would reduce the amount of fine fuels and fires over the next decade. This would likely be similar to what has occurred over the previous decade (less than 2,000 acres burned in BLM PH).

Continued grazing would also require permittees to continue to treat noxious weeds on BLM allotments. Land use patterns, weather, and West Nile virus would continue to play important roles in recruitment and survival rates for both chicks and adults. Recreation effects would continue to be minimal and benign, as described above.

4.3.5 Alternative B

COT Report Threats—Sagebrush Elimination, Agriculture Conversion

Impacts from Land Tenure Decisions

No lands in PHMA would be available for disposal under Alternative B. As discussed above, current disposal, exchange, and acquisition criteria would include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. Thus, Alternative B would not change the likelihood of habitat conversion to agriculture or other uses. Because of the unlikely conversion of land under this alternative, sagebrush habitat would not be removed from BLM administration, resulting in no loss of PHMA on BLM-administered lands.

Impacts from ACECs

No additional ACECs would be designated under Alternative B, and impacts on GRSG are the same as those described under Alternative A.

COT Report Threat—Fire

Impacts from Fire and Fuels Management
Fire and fuels management actions proposed under Alternative B would specifically protect mature sagebrush acreage and GRSG from wildfire and prescribed burning. As under Alternative A, the trend of nearly 2,000 acres burned annually between 2000 and 2012 would be expected to continue over the next 10 years.

The approach to prescribed fire would be as described under Alternative A. Fuels treatments would be designed and implemented with an emphasis on promoting sagebrush. Sagebrush canopy would not be reduced below 15 percent unless fuels management objectives required it. Seasonal restrictions would be applied to fuels management. Rest periods also would be required and invasive species would be controlled with native seeds wherever possible. Fire suppression would be prioritized in PHMA and GHMA, potentially leading to fine fuel buildup. Grazing livestock would be an option to reduce fine fuel load.

The impacts under Alternative B would likely be the same as those under Alternative A.

COT Report Threats—Vegetation Management (Conifers and Weeds/Annual Grasses)

Impacts from Habitat Restoration and Vegetation Management
Current management programs (Alternative A) were already designed to reduce weeds and conifer spread, which benefit GRSG habitat. Habitat restoration and vegetation management actions under Alternative B would additionally improve GRSG habitat and prioritize restoration to benefit PHMA compared to Alternative A. As a result, the restoration and management of vegetation actions would focus on GRSG habitat more than Alternative A. It would do this by requiring the use of native seeds, designing post-restoration management to ensure the long-term persistence of restoration, considering changes in climate, and monitoring and controlling invasive species.

COT Report Threats—Energy

Impacts from Fluid Minerals
Geophysical exploration would be allowed within PHMA but only for obtaining information on fluid mineral resources in areas outside of PHMA. Impacts on GRSG and their habitat could continue as a result of existing fluid mineral leases (44,500 acres in PHMA and GHMA); however, no new wells are likely to be drilled on BLM-administered land in the next decade.

In the event of new permits to drill, additional RDFs and conservation measures would be applied to existing leases as COAs. In comparison to Alternative A, these additional measures would result in potential beneficial impacts related to

drilling. Under current forecasts, no drilling is anticipated, so there would be no change in impacts on GRSG.

Impacts from Solid Minerals
Alternative B would find all surface mining of coal to be unsuitable in PHMA. In LFO there are no coal potential or existing lease areas. PHMA would be closed to nonenergy leasable minerals and salable minerals. For locatable minerals, areas in PHMA would be proposed for withdrawal from mineral entry based on risk to GRSG habitat. The BLM may consider conducting valid existing right determinations of mining claims where activities threaten resource values. Currently there is no coal potential and limited locatable mineral mining in the planning area; therefore, these actions would have little to no impact on GRSG populations or habitat, relative to Alternative A.

COT Report Threat—Infrastructure

Impacts from Lands and Realty
PHMA would be managed as ROW exclusion areas (233,219 acres), with limited exceptions, and GHMA would be managed as ROW avoidance areas (112,341 acres; **Table 4-1**). Potential removal, burial, or modification of power lines could also decrease the likelihood of predator presence in these areas. ROW exclusion areas would protect GRSG habitat and reduce habitat fragmentation on BLM-administered lands, as described above under *Nature and Type of Effects*. However, impacts on GRSG would still continue to occur on non-BLM-administered lands in the LFO. As shown in **Table 4-6** in **Section 4.5**, Vegetation (Including Noxious Weeds; Riparian and Wetlands), more sagebrush habitat is on land not administered by the BLM (863,565 acres) compared to 256,052 acres on BLM-administered land. This suggests that ROW exclusion and avoidance areas may impact more GRSG habitat if development is potentially pushed onto private land.

COT Report Threats—Grazing and Range Management

Impacts from Range Management
Under Alternative B, the amount of PHMA and GHMA open for livestock grazing and available AUMs is the same as under Alternative A (**Table 4-2**). Noxious weed control would be the same as under Alternative A. Impacts on GRSG habitat from grazing, as described under *Nature and Types of Effects*, would continue under Alternative B. However, AMPs, integrated ranch planning, and land health assessments in PHMA would be used to incorporate GRSG habitat objectives into grazing permit renewals. These policies would likely increase the protection and quality of GRSG habitat on grazing lands, compared to current policy (Alternative A). They could increase GRSG populations compared to Alternative A.

COT Report Threat—Recreation

Impacts from Recreation

Under Alternative B, SRPs would be issued in habitat areas only where the effects of recreation were neutral or beneficial to GRSG habitat. The BLM would continue to limit OHVs to existing roads, primitive roads, and trails until travel management planning is complete. Route construction in PHMA would be limited to realignments or built to minimum standards necessary. During the breeding season, recreation permits would not be issued in the vicinity of leks to promote nesting success.

These policies would protect GRSG by limiting disturbance of GRSG habitat from activities associated with OHVs. However, impacts from dispersed recreation, such as hiking or camping, would likely continue to disturb individual GRSG in areas where they occur.

Summary of Direct and Indirect Effects on GRSG in the Planning Area under Alternative B

Grazing and noxious weed control under Alternative B would be similar to Alternative A. Direct effects from ROW exclusion areas within PHMA would be reduced on BLM-administered lands; however, this could result in much greater infrastructure impacts on adjacent private lands, especially in the War Horse, eastern Crooked Creek, and Yellow Water Triangle areas. This would be due to the checkerboard nature and variety of ownerships within PHMA (974,775 acres) and GHMA (902,694 acres). See **Section 4.4**, Lands and Realty, for more information on land ownership patterns in ROW avoidance and exclusion areas. Moving ROW impacts to private lands could prove especially detrimental for GRSG since no RDFs would be required by the BLM there. The limited BLM-administered land in Winifred would likely have negligible potential indirect impacts on private lands as a result of ROW exclusion areas. Over the long term, ROW exclusion areas on BLM-administered land would likely decrease the number of large and medium leks in the planning area, especially War Horse and Yellow Water Triangle due to the potential effect of pushing development onto adjacent private lands with less management oversight. Because more sagebrush habitat is on land not administered by the BLM, development may impact more leks if pushed onto private land.

The human population in PHMA in Fergus and Petroleum Counties is sparse, so impacts from the ROW exclusion areas would be limited. Functioning habitat would increase as a result of vegetation treatments prioritized in PHMA, especially mechanized treatments targeting conifer encroachment. Designating routes as part of travel management would improve GRSG habitat long term once the plan is implemented. Short-term GRSG numbers would be expected to improve until negative impacts associated with long-term ROW exclusion areas are realized.

4.3.6 Alternative C

COT Report Threats—Sagebrush Elimination, Agriculture Conversion

Impacts from Land Tenure Decisions
No lands in PHMA or GHMA would be available for disposal under Alternative C. As discussed above, current disposal, exchange, and acquisition criteria already include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations and natural communities of high interest.

Private land may be acquired to enhance GRSG conservation value of existing lands. Although it is uncertain how much private land could be acquired to enhance GRSG habitat under Alternative C, this policy could increase the BLM acreage of sagebrush compared to Alternatives A, B and D, but impacts are likely to be minimal.

Impacts from Range Management
An indirect impact from excluding livestock grazing from BLM-administered lands is the potential conversion of adjacent private grazing lands to agriculture or other land uses. This is especially a concern in areas with a mosaic of ownership boundaries, which would decrease available habitat for GRSG that inhabit rangeland outside of BLM-administered lands.

Impacts from ACECs
ACECs to protect GRSG would be designated as sagebrush reserves in PHMA, consisting of contiguous blocks of at least 4,000-acre blocks of BLM-administered land, covering 96,246 acres. No additional protections would occur for GRSG with an ACEC designation since all conservation measures would be applied to both PHMA and GHMA under Alternative C. In addition, the ACEC designation could attract increased hunting for GRSG.

COT Report Threat—Fire

Impacts from Fire and Fuels Management
The approach for fire suppression and emergency stabilization projects is as described under Alternative B. Additional policies would be included to ensure the availability of native seed. Relative to Alternatives A and B, fire suppression in sagebrush areas would be less effective since fine fuels would increase without livestock grazing (Strand and Launchbaugh 2013).

COT Report Threats—Vegetation Management (Conifers and Weeds/Annual Grasses)

Impacts from Habitat Restoration and Vegetation Management
Impacts from habitat restoration and vegetation management would be largely similar to those described for Alternative B. However, they would be applied to

a larger area (PHMA and GHMA) and would thus provide more restoration and habitat enhancement for GRSG. Removing livestock grazing on BLM-administered land would eliminate Weed Control Cooperative Range Improvement Agreements with BLM permittees and lessees. Noxious weed control thus would be done by BLM personnel. This could reduce noxious weed control efforts and increase weed patch size and distribution.

COT Report Threats—Energy

Impacts from Fluid Minerals

Geophysical exploration within PHMA would be permitted to obtain information for adjacent areas, with timing restrictions to protect GRSG. As described under Alternative B, additional RDFs and conservation measures would be applied as COAs to existing leases. Alternative C would also include seasonal restrictions to activities that could disrupt GRSG and provide additional mitigation measures in both PHMA and GHMA. Existing leases could continue to impact GRSG and their habitat; however, no new wells are anticipated to be drilled in LFO in the next decade. Thus, beneficial effects from this alternative on fluid minerals would be negligible, compared to Alternative A.

Impacts from Solid Minerals

Impacts would be the same as under Alternative B.

COT Report Threat—Infrastructure

Impacts from Lands and Realty

Under Alternative C, PHMA and GHMA would be managed as ROW exclusion areas (345,560 acres; see **Table 4-1**). Establishing ROW exclusion areas would reduce fragmentation on BLM-administered land and would protect GRSG habitat, as described above under *Nature and Type of Effects*. However, given the checkerboard pattern of landownership in the LFO, ROW impacts could be pushed onto adjacent private lands, potentially over a much larger area.

As shown in **Table 4-6** in **Section 4.5** below, more sagebrush habitat is on land not administered by the BLM (863,565 acres) compared to 256,052 acres of BLM-administered land. This suggests that ROW exclusion and avoidance areas may impact more GRSG habitat if potentially pushed onto private land.

Given the absence of land use controls and management, actions proposed under this alternative could increase habitat fragmentation on lands not administered by the BLM. See **Section 4.4** for more information on landownership patterns in ROW avoidance and exclusion areas.

COT Report Threats—Grazing and Range Management

Impacts from Range Management
Under Alternative C, 337,165 acres would be closed to livestock grazing within PHMA and GHMA. This proposed management would eliminate 69,408 AUMs of available forage, leaving 34,398 AUMs of available forage in the planning area outside GRSG habitat (see **Table 4-2**).

Removing permitted grazing uses in habitat areas would reduce the impacts on GRSG, such as loss of herbaceous nesting cover, described under *Nature and Type of Effects*. However, grazing may reduce fuel buildup, so removing it could increase the occurrence of large wildfires, especially given the potential impact on weed control (see above under *Vegetation Management*). Much of the level shrub grassland in Montana that is preferred grazing land is privately owned and increasingly valuable for residential development (MCFWS 2005).

An indirect impact from excluding livestock grazing from BLM-administered lands is the potential conversion of adjacent private grazing lands to agriculture or other land uses. This is especially a concern in areas with a mosaic of ownership boundaries, which would decrease available habitat for GRSG that inhabit rangeland outside of BLM-administered lands. In the long term, removing grazing permits on federal land could cause ranches to be converted to residential or agricultural use, leading to a loss of GRSG habitat on adjacent private lands. Temperature increases resulting from climate change may also increase crop yields, encouraging lands not previously used for agriculture to be converted for that purpose (NRC 2010).

In addition, no-grazing areas on BLM-administered land would require approximately 3,400 additional miles of fencing to separate these areas from adjacent grazing lands. This would increase the adverse effects of fencing on GRSG, such as raptor predation and potential collision, as well as habitat fragmentation. Construction of 3,400 miles of additional fencing could result in as many as 2,300 additional fence collisions (Stevens et al. 2012), some of which could be fatal for GRSG.

COT Report Threat—Recreation

Impacts from Recreation
Alternative C includes no specific recreation management related to GRSG or their habitat. Impacts are the same as under Alternative A.

Summary of Direct and Indirect Effects on GRSG in the Planning Area under Alternative C

There would be no livestock grazing or noxious weed control by permittees under Alternative C. Removing grazing from BLM-administrated lands would increase residual vegetation and increase concealment for GRSG. Most notably,

these increases would be felt in the War Horse and Yellow Water Triangle survey areas, where most BLM-administered lands occur.

In the short term, GRSG populations may increase as a result of removing grazing. Direct effects from ROW exclusion areas within PHMA would be reduced on BLM-administrated lands. However, this could result in much greater infrastructure impacts on adjacent private lands, especially in the War Horse, eastern Crooked Creek, and Yellow Water Triangle survey areas. Over the long term, absence of grazing would increase fine fuels, making fire suppression within sagebrush habitats less effective. Despite suppression, wildfires would become more prevalent and would increase conversion of Wyoming big sagebrush habitats to grasslands. This would be especially true in the War Horse and Yellow Water Triangle areas.

Grazing would continue on private and state lands in all survey areas and would require BLM-administrated lands be fenced to exclude livestock. The additional fencing would increase GRSG collisions. Smaller ranches that are not viable without BLM grazing permits would be more likely to be converted to agriculture or to be subdivided.

Direct and indirect effects from ROW exclusion areas are similar to Alternative B but would happen over a greater area, encompassing both PHMA and GHMA. Direct effects from ROW exclusion areas would be reduced on BLM-administered lands; however, this could result in much greater infrastructure impacts on adjacent private lands, especially in the War Horse, eastern Crooked Creek, and Yellow Water Triangle survey areas. This could prove especially detrimental for GRSG since no RDFs could be stipulated by the BLM on private lands.

The sparse BLM ownership in Winifred could likely have negligible potential indirect impacts on private lands as a result of ROW exclusion areas. Over the long term, ROW exclusion on BLM-administered land would likely decrease the number of large and medium leks in the planning area, especially War Horse and Yellow Water Triangle. The human population in PHMA in Fergus and Petroleum Counties is sparse, so impacts from the ROW exclusion areas would be limited.

GRSG habitat would increase as a result of vegetation treatments prioritized in PHMA, especially mechanized treatments targeting conifer encroachment.

The GRSG ACEC established under this alternative would provide no additional protections and could attract additional hunting pressure. Short- and long-term GRSG numbers could decline and no large leks would be expected to persist long-term in the LFO portion of the Yellowstone Watershed Population.

4.3.7 Alternative D

COT Report Threats—Sagebrush Elimination, Agriculture Conversion

Impacts from Land Tenure Decisions
No lands in PHMA would be available for disposal under Alternative D. Impacts from land tenure decisions are the same as under Alternative B.

Impacts from ACECs
No additional ACECs would be designated under Alternative D, and impacts on GRSG are the same as that described under Alternative A.

COT Report Threat—Fire

Impacts from Fire and Fuels Management
Fuels treatment would be designed and implemented with seasonal restrictions and avoidance of winter range, as described under Alternative C. As described under Alternative B, livestock grazing would be considered as a means of fuel reduction and fire suppression would be prioritized in GRSG habitat. Fire suppression in sagebrush areas would protect mature sagebrush and GRSG from the disturbance associated with wildfire. Post-burn restoration programs would help regrowth, compared to Alternatives A, B, and C.

COT Report Threats—Vegetation Management (Sagebrush Elimination, Conifer Invasion, Invasive Species)

Impacts from Habitat Restoration and Vegetation Management
Impacts from habitat restoration and vegetation management under Alternative D are similar to Alternative B. However, this alternative includes consideration of other threatened, endangered, or sensitive species, in addition to GRSG. This may reduce protection for GRSG habitat in very limited instances.

COT Report Threats—Energy

Impacts from Fluid Minerals
Operational constraints would be applied to existing leases, with some exceptions to minimize disturbance associated with mineral extraction, as described under *Nature and Type of Effects*. As under Alternatives B and C, RDFs and conservation measures would be COAs for the permit to drill of existing leases. No new drilling permits are anticipated in the next decade in LFO, so impacts from fluid minerals are unlikely to affect GRSG populations.

Impacts from Solid Minerals
Similar to Alternative A, the planning area would be available for coal exploration licensing. However, an environmental review would be conducted to assess impacts and to develop mitigation measures before exploration. Currently there is low coal potential in the planning area; therefore, these

actions are not expected to impact GRSG populations unless future coal resources are discovered.

Locatable minerals and salable minerals would be managed as described under Alternative A. Prospecting for nonenergy leasable minerals would be permitted after appropriate environmental review. These policies would likely have minimal impact on GRSG, given the low level of mining in the planning area.

COT Report Threat—Infrastructure

Impacts from Lands and Realty

PHMA would be managed as ROW avoidance areas (233,219 acres); no ROW exclusion areas would be established (see **Table 4-1**). The policies described under Alternative D would consider ROW authorizations on a case-by-case basis. They would circumvent impacts of outright ROW exclusion areas where there is mixed public/private landownership of sagebrush habitat. Additionally, these policies would protect GRSG habitat from loss and fragmentation by avoiding ROW construction, while retaining the management flexibility to locate ROWs in less sensitive areas in order to preserve connectivity of PHMA.

COT Report Threat—Grazing and Range Management

Impacts from Range Management

Under Alternative D, there would be no change to the acreage open for grazing or available AUMs described under Alternative A (**Table 4-2**). The policies proposed under Alternative D would be similar to those described under Alternative B. Noxious weed control would be the same as under Alternative B; as a result, impacts on GRSG habitat would be beneficial compared to Alternative A.

COT Report Threat—Recreation

Impacts from Recreation

Impacts would be the same as under Alternative B.

Summary of Direct and Indirect Effects on GRSG in the Planning Area under Alternative D

Grazing and noxious weed control under Alternative D would be similar to Alternatives A and B. Fire and fuels management would be the similar to Alternative B, but rest periods following disturbance would be based on vegetation response and desired conditions, not length of time following disturbance. GRSG habitat would increase as a result of vegetation treatments prioritized where they are most beneficial for GRSG, regardless of PHMA or GHMA designation. Treatments targeting species other than GRSG would be allowed, and depending on the habitat targeted, would most likely have no impacts. Additional site-specific NEPA studies would determine impacts for GRSG as well as other listed BLM sensitive species and migratory birds.

Similar to Alternative B, designating routes as part of travel management planning would improve GRSG habitat long term once the plan is implemented. In ROW avoidance areas within PHMA, the BLM would consider ROW requests on a case-by-case basis. This would influence the most appropriate placement and design for future infrastructure needs, especially in the War Horse, eastern Crooked Creek, and Yellow Water Triangle areas.

Short-term and long-term GRSG numbers would improve and the number of large leks would be maintained or would increase. This alternative provides the best possibility for LFO contributions to population viability for the GRSG Yellowstone Watershed Population, compared to Alternatives A, B and C.

4.3.8 Proposed Plan Amendment

COT Report Threats—Sagebrush Elimination, Agriculture Conversion

Impacts from Land Tenure Decisions
No lands in PHMA would be available for disposal under the Proposed Plan Amendment. Impacts from land tenure decisions are the same as under Alternatives B and D.

Impacts from ACECs
No additional ACECs would be designated under the Proposed Plan Amendment, and impacts on GRSG are the same as described under Alternative A.

COT Report Threat—Fire

Impacts from Fire and Fuels Management
Impacts from fire and fuels management would be similar to Alternative D. In addition, fuels management projects in PHMA would be designed to incorporate greater flexibility to maximize the acreage protected. Prescribed fires would only be used in GRSG habitat if the four criteria are met in the Burn Plan, minimizing potential disturbance of GRSG and its habitat. These proposed modifications to fire and fuel management would result in an increase in the protection of sagebrush ecosystems compared to Alternative A and a reduction in the likelihood of adverse impacts from fire and fuels management described under *Nature and Type of Effects*.

COT Report Threats—Vegetation Management (Sagebrush Elimination, Conifer Invasion, Invasive Species)

Impacts from Habitat Restoration and Vegetation Management
Impacts from habitat restoration and vegetation management under the Proposed Plan Amendment are similar to Alternatives B and D. However, this alternative includes consideration of other threatened, endangered, or sensitive species in addition to GRSG. This may reduce protection for GRSG habitat in

very limited instances. Adherence to GRSG habitat objectives (**Objective SS-1.4**) in vegetation management would ensure that projects improve nesting and wintering habitat for GRSG and provide a net conservation gain to the species.

COT Report Threats—Energy

Impacts from Fluid Minerals

Operational constraints would be applied to existing leases, with some exceptions to minimize disturbance associated with mineral extraction, as described under *Nature and Type of Effects*. As under Alternatives B, C, and D, RDFs and conservation measures would be COAs for the permit to drill. No new drilling permits are anticipated in the next decade in LFO, so impacts from fluid minerals are unlikely to affect GRSG populations.

Like Alternative D, BLM would apply restrictions on geophysical exploration and development to protect leks and nesting habitat; however, exploration operations would be allowed to use existing roads and trails, as well as helicopter-portable methods, which could disturb GRSG if they are located in these areas. Timing restrictions would reduce disturbance during the restricted periods. Conservation measures would incorporate surface disturbance reduction, West Nile virus prevention, and guidance for mitigation, as under Alternative D. Mitigation under the Proposed Plan Amendment would be required to avoid, minimize, and compensate for impacts, resulting in a net conservation gain to GRSG. In addition, adaptive management and lek buffers would be applied on a project-specific basis to further reduce impacts and protect PHMA from human disturbances. Such management would reduce disturbance to GRSG populations and habitats associated with fluid mineral development relative to Alternative A. However, if the resources are drilled from adjacent private lands/minerals, disturbance could still occur and the stipulations would not be as effective in protecting GRSG.

In addition, BLM would implement a density and disturbance caps in PHMA. If the caps are exceeded, no further discrete human disturbances would be permitted by BLM until the disturbance has been reduced to less than the caps. As discussed in **Section 2.6.2**, the cap applies to PHMA and BSUs, subject to applicable laws and regulations and valid existing rights. The density and disturbance caps could apply to fluid minerals activities and would prevent further disturbance of GRSG habitat and populations until the overall disturbance has been reduced to less than the cap.

Impacts from Solid Minerals

Impacts under the Proposed Plan Amendment would be similar as those described for Alternative D. However, similar to fluid minerals, potential beneficial impacts on GRSG and habitat from applying mitigation, lek buffers, density and disturbance caps, and RDFs would be the same as described above for fluid minerals and as described under *Nature and Type of Effects*.

Within SFAs (53,440 acres; PHMA), locatable minerals would be recommended for withdrawal from mineral entry. Nonenergy leasable mineral exploration would be closed in PHMA but permitted in GHMA after appropriate environmental review. PHMA would also be closed to saleable mineral disposal. These policies would likely have minimal impact on GRSG, given the low level of mining in the planning area.

Similar to fluid minerals, potential beneficial impacts on GRSG and habitat from applying mitigation, lek buffers, and density and disturbance caps would be the same as described above for fluid minerals and as described under *Nature and Type of Effects*.

COT Report Threat—Infrastructure

Impacts from Lands and Realty

PHMA and GHMA would be managed as major ROW avoidance areas (345,560 acres); PHMA would also be managed as minor ROW avoidance area and wind and solar exclusion area (233,219 acres) (see **Table 4-1**). ROW avoidance areas for non-wind and solar projects would allow for management flexibility and avoid displacing ROWs onto private land where impacts could not be managed and mitigated. New ROWs would be co-located within existing ROWs if possible. These measures would improve management and would result in beneficial impacts from ROW development as described under *Nature and Type of Effects*, compared to Alternative A.

For renewable energy (wind and solar), the Proposed Plan Amendment would establish an ROW exclusion area in PHMA. This exclusion area would avoid impacts from renewable energy, such as disturbance, increased predation, and habitat fragmentation, compared to the no action alternative (Alternative A).

Potential beneficial impacts on GRSG and habitat from applying mitigation, lek buffers, and density and disturbance caps would be the same as described above for fluid minerals.

COT Report Threat—Grazing and Range Management

Impacts from Range Management

Under the Proposed Plan Amendment, there would be no change to the acreage open for grazing or available AUMs described under Alternative A (**Table 4-2**). As with the other alternatives, under the Proposed Plan Amendment, livestock grazing uses could be removed from public lands when a permittee or lessee voluntarily relinquishes a permit. This could provide opportunities to achieve GRSG habitat objectives on the relinquished public lands. Noxious weed control would be the same as under Alternative B; as a result, impacts on GRSG habitat would be beneficial compared to Alternative A.

In SFAs (53,440 acres; PHMA), grazing permits would be prioritized for review in GRSG habitat. Adherence to GRSG habitat objectives (**Objective SS-1.4**) in vegetation management would ensure that projects improve nesting and wintering habitat for GRSG and provide a net conservation gain to the species.

COT Report Threat—Recreation

Impacts from Recreation

Impacts from recreation management would be similar to those described under Alternative D. The Proposed Plan Amendment would provide additional incidental protection to vegetation by limiting construction of new recreation facilities unless they are beneficial (net conservation gain) or required for visitor health and safety or resource protection in PHMA. Applying lek buffers, density and disturbance caps, and mitigation strategies would also reduce disturbances, described under *Nature and Type of Effects*, on GRSG and loss of habitat from constructing recreation facilities.

Summary of Direct and Indirect Effects on GRSG in the Planning Area under the Proposed Plan Amendment

Overall impacts would be similar to Alternative D. Adherence to GRSG habitat objectives (**Objective SS-1.4**) would provide additional opportunities to improve GRSG habitat. Mitigation under the Proposed Plan Amendment would be required to avoid, minimize, and compensate for impacts, resulting in a net conservation gain to GRSG. In addition, lek buffers would be applied on a project-specific basis to further reduce impacts and protect PHMA from human disturbances.

In addition, BLM would implement density and disturbance caps in PHMA. If the cap is exceeded, no further discrete human disturbances would be permitted by BLM until the disturbance has been reduced to less than the cap. As discussed in **Section 2.6.2**, the cap applies to PHMA and BSUs and is subject to applicable laws and regulations and valid existing rights. The density and disturbance caps would prevent further disturbance of GRSG habitat and populations until the overall disturbance has been reduced to less than the cap.

Short-term and long-term GRSG numbers would improve, and the number of large leks would be maintained or would increase. This alternative provides the best opportunity for LFO contributions to population viability for the GRSG Yellowstone Watershed Population, compared to Alternatives A, B C, and D.

Adaptive management soft triggers would require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project-level adaptive management strategies would identify appropriate responses where the project's activities are identified as the causal factor. An appropriate response strategy would be implemented to address causal factors.

The Proposed Plan Amendment includes a "hard-wired" plan-level response; upon reaching the trigger, a more restrictive alternative, or an appropriate component of a more restrictive alternative analyzed in the EIS, would be implemented without further action by the BLM. Specific "hard-wired" changes in management are identified in **Table 2-2**. In addition to the specific changes identified in **Table 2-2**, the BLM would review available and pertinent data to determine corrective strategies. Implementing management responses, or formal directives if needed, would stop a severe deviation from GRSG conservation objectives and could maintain GRSG distribution and abundance throughout its range.

4.3.9 Impacts Summary

Table 4-3 provides a summary comparison of how each alternative alleviates COT report threats to GRSG listed as "Present and Widespread" and "Present but Localized" for the LFO. The major threats to GRSG habitats in populations occurring across WAFWA MZ I are agriculture conversion, weeds and annual grasses, energy development (primarily oil and gas development), and supporting infrastructure and grazing (USFWS 2013, p. 17). The major threats to GRSG habitats in populations occurring across WAFWA MZ IV are the isolation and small size of the population, agriculture conversion, weeds and annual grasses, and grazing (USFWS 2013, p. 23).

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Oil and Gas Development*[1]					
Unleased Fluid Minerals					
Areas closed to fluid mineral leasing (acres)	1,949 Acres closed to fluid mineral leasing (one ACEC, not in PH or GH)	1,949 Acres closed to fluid mineral leasing (one ACEC, not in PHMA or GHMA)	1,949 Acres closed to fluid mineral leasing (one ACEC, not in PHMA or GHMA)	1,949 Acres closed to fluid mineral leasing (one ACEC, not in PHMA or GHMA)	1,949 Acres closed to fluid mineral leasing (one ACEC, not in PHMA or GHMA)
Areas open within the planning area to be nominated for fluid mineral leasing (acres)[2]	1,113,841	1,113,841	1,113,841	1,113,841	1,113,841
Summary of Impacts on GRSG from Oil and Gas Development	Alternatives B, C, D, and the Proposed Plan Amendment would apply RDFs (**Appendix C** for Alternatives B and C and **Appendix D** for Alternative D and the Proposed Plan Amendment) as COAs where appropriate and necessary to drilling permits for currently leased federal minerals. No new leases, or reissuing of expired leases, would be issued in PHMA and GHMA under any alternative, based on an existing RMP protest resolution, which requires deferring nominated lease parcels if a special stipulation is required to protect important wildlife values. The Proposed Plan Amendment would provide additional protections to GRSG and habitat by implementing density and disturbance caps, adaptive management, lek buffers, and regional mitigation, which would further support the COT report objectives.				

[1]Asterisk indicates resources/resource uses identified as threats to the LFO populations of GRSG in the COT report.
[2]Common to all alternatives, acres are open to nomination for leasing; however, due to an existing protest resolution, any nominated lands that would require a special leasing stipulation to protect important wildlife values would be deferred from leasing.

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Infrastructure */Anthropogenic					
ROW avoidance areas in PH and GH, or PHMA and GHMA (acres)	30,403 Various ROW avoidance areas designated, none specified to protect PH and GH	112,341 112,341 acres in GHMA, no PHMA ROW avoidance areas because it would be ROW exclusion area	0 No new ROW avoidance areas because all PHMA and GHMA would be ROW exclusion area	240,464 233,219 acres of PHMA and 7,245 acres of GHMA	345,560 233,219 acres of PHMA and 112,341 acres of GHMA
ROW exclusion areas (acres), in accordance with BLM LUP Handbook, no exceptions permitted	0	233,219 All in PHMA	345,560 233,219 in PHMA and 112,341 in GHMA	0	233,219[3] PHMA would be a ROW exclusion area for wind and solar
Travel management	OHV use is limited to existing roads and trails on all BLM-administered lands within the LFO, including PHMA and GHMA. CTTM planning process for route evaluation and designation is currently underway and would be completed in PHMA within 5 years of the ROD. The BLM would minimize or prevent road and trail development on crucial big game and upland bird habitat areas. Temporary closures for other resources would be considered in PHMA and GHMA under the Proposed Plan Amendment. BLM regulations (43 CFR, Parts 8341.2 and 8364.1) already allow for area, road, primitive road, or trail closures where OHVs are causing, or would cause considerable adverse effects on wildlife and its habitat.				
Summary of Impacts on GRSG from Infrastructure	Overall, Alternative A would have the least protections for GRSG and GRSG habitat from development of infrastructure. Alternative B would have more restrictions on route construction and upgrades, as well as ROWs, than Alternatives A and D, but fewer than Alternative C (some actions under Alternative D are the same as under Alternative B; see **Table 2-4**). The Proposed Plan Amendment would protect the largest amount of GRSG habitat from infrastructure impacts.				

[3]PHMA would be exclusion for wind and solar energy.

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	Alternatives B and C exclude PHMA from new ROWs. The Proposed Plan Amendment excludes wind and solar. This responds directly to the need identified in the COT report (USFWS 2013) to stop population decline and habitat loss by eliminating activities known to negatively impact GRSG and their habitats. Beneficial impacts are from the reduction in the threat of habitat loss, degradation, and fragmentation on BLM-administered lands. Potential adverse indirect effects in GRSG habitat could increase if these activities were excluded from BLM-administered lands because they would still occur on private land without BLM RDFs. Ownership patterns in LFO (highly fragmented, with public land comprising approximately 17% of the planning area) could substantially increase the length of infrastructure required to enclose BLM ROW exclusion areas. Alternative D and the Proposed Plan Amendment would designate PHMA and GHMA as ROW avoidance areas because most PHMA and GHMA within the planning area are on private lands. The potential to concentrate infrastructure development where appropriate, and to use RDFs, would increase direct beneficial effects from infrastructure on GRSG on BLM-administered lands; however, it could substantially reduce potential indirect adverse effects on a much greater area of adjacent land not administered by the BLM. The benefits of maintaining or improving habitat on most of the PHMA would exceed the costs on BLM-administered lands and would be more likely to perpetuate a viable GRSG population. Reducing impacts on more of the existing habitat within the planning area is a reason for the ROW avoidance areas rather than ROW exclusion areas in PHMA and GHMA under Alternative D and the Proposed Plan Amendment. All alternatives and the Proposed Plan Amendment would require collocating new ROWs with existing ROWs in GHMA. Alternative D and the Proposed Plan Amendment would require this of new ROWs in PHMA also because new ROWs are not excluded in PHMA. The action alternatives are in agreement with the following conservation objectives/options in the COT report for infrastructure: 1. Avoid developing infrastructure within PACs (objective). 2. Avoid constructing these features in GRSG habitat, both within and outside of PACs (option). 3. Remove transmission lines and roads that are duplicative or are not functional (option). 4. Construct transmission line towers to severely reduce or eliminate nesting and perching by avian predators, most notably ravens, thereby reducing human subsidies to those species (option). The Proposed Plan Amendment would provide additional protections to GRSG and habitat by implementing density and disturbance caps, adaptive management, lek buffers, and regional mitigation, which would further support the COT report objectives.				

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Recreation					
Recreational uses in GRSG habitat include dispersed (e.g., hiking and camping) and group activities. Recreation is a limited threat in the LFO populations. OHV use is the most potentially damaging recreational use of GRSG habitat, but OHVs are limited to existing roads and trails on BLM-administered lands within the LFO. BLM regulations allow for area, road, primitive road, or trail closures where OHVs are causing, or would cause considerable adverse effects on wildlife and its habitat. Alternatives B and D would restrict issuance of SRPs for group recreation to activities neutral or beneficial to GRSG habitat. The Proposed Plan Amendment would also reduce potential disturbances by not constructing recreation facilities in PHMA unless there would be a conservation gain to GRSG. All alternatives would respond to the COT objective that recreation activities should maintain healthy native sagebrush communities based on local ecological conditions and with consideration of drought conditions.					
Agriculture Conversion, Urbanization, and Sagebrush Elimination*					
Areas identified for disposal	Land tenure adjustments in the Judith Resource Area planning area (MZ I) would be subject to disposal/acquisition criteria. Within MZ I, retain important wildlife habitat (one of the three main criteria for land tenure adjustments outlined in the Judith Resource Area RMP). Land tenure adjustments in the Headwaters planning area (MZ IV) would be subject to disposal/acquisition criteria.	Retain public ownership of PHMA. Consider exceptions where there is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within PHMA.	Same as Alternative B, without exceptions for disposal to consolidate ownership that would benefit GRSG (applies to PHMA and GHMA).	PHMA would be retained in public ownership, except when opportunities for land exchange would provide a greater benefit to GRSG habitat.	PHMA would be retained in public ownership, except when opportunities for land exchange would provide a greater benefit to GRSG habitat.

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Areas identified for acquisition	No parcels identified in existing plans for acquisition. If parcels are acquired, land exchanges, sales, or other methods of acquisition may be used.	Seek to acquire state and private lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance, or restore GRSG habitat.	Strive to acquire important private lands in ACECs. Acquisition would be prioritized over easements.	When offered, PHMA would be a priority in consideration of land acquisitions (refer to **Appendix H**). Consider GRSG for all land tenure actions.	When offered, PHMA would be a priority in consideration of land acquisitions (refer to **Appendix H**). Consider GRSG for all land tenure actions.
Summary of Impacts on GRSG from Agriculture/ Urbanization	Although agriculture and urbanization have been identified as threats within the LFO planning area, including both the Yellowstone Watershed (agricultural conversion) and Belt Mountain (urbanization) populations, the BLM has no direct management authority over those types of activities on private lands. Under Alternatives B and D and the Proposed Plan Amendment, the BLM would take advantage of opportunities to consolidate GRSG habitat through land exchange if the action would benefit GRSG. Alternative C would allow for no disposal of PHMA or GHMA, regardless of benefits to GRSG. The LFO may have limited indirect abilities to influence these threats through maintaining appropriate authorized uses (grazing, ROWs, recreation, energy development) of BLM-administered lands that allow for the maintenance of habitat objectives. One example is to maintain appropriate levels of livestock grazing, which could discourage the conversion of GRSG habitat on private land to nonnative pasture or cropland. As a result of removing grazing from PHMA and GHMA in Alternative C, there is the potential for increased conflicts between grazing and other land uses on adjacent non-federal lands. For example, under this alternative, if permittees and lessees were to lose forage currently provided on BLM-administered lands, ranchers may try to increase forage production on their private and other leased lands, potentially accelerating loss of GRSG habitat on those lands. Regarding the following conservation objectives/options identified in the COT report specific to infrastructure: • Limit urban and exurban development in GRSG habitat and maintain intact native sagebrush plant communities (objective). • Acquire and manage GRSG habitat to maintain intact ecosystems (option).				

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	Alternative D and the Proposed Plan Amendment meet the objectives best because of their flexibility. Alternative B meets the objectives but its focus on ROW exclusion areas could lead to greater impacts on non-BLM-administered lands. Alternative C is in agreement with the first objective, but the consequences of its limitations on grazing, including increased fencing and reduced weed control, would not maintain intact GRSG habitat.				
Conifer Encroachment					
Alternatives A-D and the Proposed Plan Amendment would address conifer encroachment using vegetation management approaches to habitat restoration. Two conifer removal projects are currently underway in the Belt Mountains and Crooked Creek areas. Alternatives A-D and the Proposed Plan Amendment would prioritize restoration, including conifer removal, which is a limited threat in LFO. All alternatives would meet the COT report objective to remove pine and juniper from areas of sagebrush most likely to support GRSG at a rate at least equal to the rate of incursion.					
Grazing, including Range Management Structures*					
Areas closed to livestock grazing (acres)	6,781	6,781	337,165 BLM-administered surface lands within PHMA and GHMA would be closed to livestock grazing.	6,781	6,781
Areas available for livestock grazing (acres)	570,112 BLM-administered surface lands.	570,112 BLM-administered surface lands.	232,947 BLM-administered lands outside of PHMA and GHMA.	570,112 BLM-administered surface lands.	570,112 BLM-administered surface lands.
Summary of Impacts on GRSG from Grazing	GRSG habitat considerations within livestock grazing allotments would be similar across Alternatives B, C, D, and the Proposed Plan Amendment. Range improvement restrictions are the same under Alternatives B and D and the Proposed Plan Amendment. Under Alternative C (no grazing), the need for increased fencing on private land in order to prevent livestock trespass would result in indirect impacts on GRSG, including increased fragmentation, increased potential for wildfire from fine fuel buildup, increased collision with fences, and increased raptor predation. An indirect impact from excluding livestock grazing from BLM-administered lands under Alternative C is the potential conversion of adjacent private grazing lands to agriculture or other land uses. This is especially a concern in areas with a mosaic of ownership boundaries, which would decrease available habitat for				

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	GRSG that inhabit rangeland outside of BLM-administered lands. In the long term, removing grazing permits on federal land could cause ranches to be converted to residential or agricultural use, leading to a loss of GRSG habitat on adjacent private lands. Additionally, under Alternative C the BLM would lose the current or potential treatment of existing or new infestations of noxious weeds because these weeds are currently treated through agreements with permittees to spray, under the terms and conditions of grazing permits or leases. Under Alternative A, grazing would be managed to achieve the standards of rangeland health, which would address GRSG habitat requirements under most scenarios. However, the potential for project infrastructure up to 0.25 mile of leks under Alternative A could cause fragmentation, raptor perches, and inappropriate fence locations and designs. Alternatives B and D would also manage grazing to achieve the standards of rangeland health. Under the Proposed Plan Amendment, grazing permits in SFAs would be prioritized for review to benefit GRSG habitat. These alternatives also put specific focus on GRSG habitat requirements in PHMA to minimize adverse impacts from livestock and project infrastructure. (An example would be implementing a rest-rotation grazing system to increase residual grass heights, but additional fencing would be required to implement the rotation. Proper sighting and marking the fences reduces, but does not eliminate, impacts on GRSG. The assumption is that GRSG would benefit more from taller grasses in a rest-rotation grazing system than they would from being harmed by additional fencing.) Because Alternative C closes PHMA and GHMA to grazing, fine fuels could increase and weed control would be reduced. In addition, potential actions taken on private land to compensate for loss of public grazing might affect GRSG habitat and could be substantial (for example, hundreds of miles of new fencing could be constructed to hold livestock on private lands). Alternatives B, C, and D and the Proposed Plan Amendment would respond to the COT report objectives of meeting ecological conditions to maintain or restore healthy sagebrush shrub and native perennial grass and forb communities, and to conserve the essential habitat components for GRSG, including nesting cover and shrub cover. Alternatives B and D and the Proposed Plan Amendment would also respond to the COT objective of minimizing impacts on GRSG from fences and sagebrush conversion to agriculture. However, Alternative C (no grazing) would require additional fencing to restrict no-grazing areas in GRSG habitat and thus would not meet this objective. As a result of removal of grazing from PHMA and GHMA in Alternative C, there is the potential for increased conflicts between grazing and other land uses on adjacent non-federal lands. For example, under this				

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	alternative, if permittees and lessees were to lose forage currently provided on BLM-administered lands, ranchers may try to increase forage production on their private or other leased lands, potentially accelerating loss of GRSG habitat on those lands.				
Invasive Species*					
Weed control	Analysis of the impacts from weeds includes impacts from lands and realty, fluid minerals, wildfire suppression, fuels management and fire rehabilitation. *For all alternatives, integrated vegetation management would be used to control, suppress, and eradicate, where possible, noxious and invasive species, in accordance with BLM Handbook H-1740-2.*				
Structural range improvements and livestock management tools	Potential for invasive species to become established or to increase following construction would be considered in the project planning process and monitored and treated post-construction.				
RDFs for GRSG habitat	No RDFs specifically for GRSG under Alternative A. Various RDFs under Alternatives B, C, and D and the Proposed Plan Amendment described in **Appendices C and D** would be applied at the time an authorized use is granted.				
Summary of Impacts on GRSG from Invasive Species	Due to climate conditions, annual grasses do not currently threaten the planning area, unlike the current situation in the Great Basin. Under all alternatives and the Proposed Plan Amendment, the spread of weeds would be managed using integrated vegetation management as resources allow. The action alternatives respond to the COT report objective of implementing actions to maintain and restore healthy sagebrush communities. Alternative C prioritizes restoration of infestations but limits treatments for addressing weeds by eliminating grazing; currently, the BLM treats noxious weeds through agreements with grazing permittees. Eliminating grazing in Alternative C would also increase fine fuels, which would increase the probability of wildfire and associated weeds.				
Disease					
Alternatives to reduce impacts from West Nile virus on GRSG are considered under Water Development below. See RDFs in **Appendix C** for Alternatives B and C, and in **Appendix D** for Alternative D and the Proposed Plan Amendment, for a description of RDFs to reduce the threat of West Nile virus.					
Coal Mining					
There is no coal potential in the planning area.					
Weather					
There is no resource program in an RMP for addressing this threat to GRSG and its habitat.					

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Predation					
See RDFs in **Appendix C** for Alternatives B and C, and in **Appendix D** for Alternative D and the Proposed Plan Amendment, for a description of features designed to reduce the threat of predation.					
Wildfire/Fuels Treatment					
Areas suitable for prescribed fire use and fuels treatments.	Intensive suppression would be applied to areas with high resource values, structures, improvements, oil and gas developments, commercial forest values, sagebrush and juniper areas, fire-sensitive woody riparian areas (soil subgroups 6 and 17), and cultural values that require aggressive suppression. Controlled burning in conifer and sagebrush types would be done on an individual basis to improve wildlife habitat. Prescribed	In GHMA, prioritize suppression where wildfires threaten PHMA and follow RDFs (**Appendix C**). In PHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in PHMA. Allow no treatments in known winter range unless the treatments are designed to strategically reduce	In PHMA and GHMA, follow RDFs (**Appendix C**). In PHMA and GHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present. Allow no fuels treatments in known winter range, unless the treatments are designed to	In GHMA, prioritize suppression where wildfires threaten PHMA and follow RDFs (**Appendix D**). In PHMA and GHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems. Sites should not be burned unless a) biological and physical limitations of the site and impact on GRSG are identified and determined to be neutral or beneficial to PHMA; b) management objectives for the site, including those for wildlife, are	Same as Alternative D; in addition, prescribed fire would be allowed as a vegetation or fuels treatment (e.g., to create fuel breaks) in such cases, the burn plan would clearly indicate how COT objectives would be addressed and met, and why alternative techniques are not applicable.

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	burning would be administered on an individual basis in grassland, sagebrush, and conifer types to improve wildlife habitat and vegetation production. Burning would be done on a limited basis to improve wildlife and livestock forage in dense pine-juniper stands throughout the Missouri Breaks and to improve vegetation productivity on other upland sites, including sagebrush.	wildfire risk around or in the winter range and would maintain winter range habitat quality.	strategically reduce wildfire risk around or in the winter range and would maintain winter range habitat quality.	clearly defined; c) potential for weed invasion and successional trends are well understood; and d) capability exists to manage the post-burn site properly. Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in PHMA. Allow no fuels treatments in known GRSG winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and would maintain winter range habitat quality.	

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Summary of Impacts on GRSG from Wildfire and Fuels Treatment	Alternative A manages wildfire effectively, but Alternatives B, C, and D and the Proposed Plan Amendment would provide additional protection to sagebrush habitat during fire management. Under all alternatives, except Alternative C, and the Proposed Plan Amendment, anticipated threats from wildfire remain constant (estimated 2,000 acres burned over a decade). Alternative C would have slightly increased threats from wildfire relative to the other alternatives due to the increase in fine fuel loading resulting from reduced grazing. All alternatives and the Proposed Plan Amendment would respond to the COT report objective of retaining and restoring healthy native sagebrush plant communities by limiting prescribed fire and prioritizing wildlife suppression in GRSG habitat areas.				
Water Development					
Identify number and type of range water developments (location of developments not verified at this time).	• Nonhabitat - 2,919 dams/pits • PH or PHMA - 2,420 dams/pits • PH or PHMA - 3,699 other • GH or GHMA - 838 dams/pits • GH or GHMA - 3,816 other	RDFs would be applied to new water developments or the reconstruction of existing water developments (pits/reservoirs/dams/holding ponds).			
Common to all alternatives, the Montana/Dakotas BLM requires the installation of wildlife escape ramps in all water developments on public lands (excluding pits and reservoirs), per Montana/Dakotas IM No. MT-2007-077. Under the action alternatives, the risk of West Nile virus would be reduced by requiring RDFs on new water developments in GRSG habitat.					
Solid Mineral Development					
Locatable minerals	Analyze proposed action in Plan of Operations and apply mitigating measures needed to prevent unnecessary or undue degradation. Before	In PHMA, recommend withdrawal from mineral entry based on risk to the GRSG and its habitat from conflicting locatable mineral potential and	Same as Alternative B, except applies to both PHMA and GHMA (639,927 acres). RDFs (**Appendix C**) would apply to locatables to the	Analyze proposed action in Plan of Operations and apply mitigating measures needed to prevent unnecessary or undue degradation.	Same as Alternative D; in addition, acreage in SFAs recommended for withdrawal

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	the BLM approves a Plan of Operations on existing mining claims in areas withdrawn, it would conduct validity examinations. If the claims did not contain a discovery, within the meaning of the mining laws, the claims would be declared null and void and the Plan of Operations would be denied. The BLM would consider purchasing valid claims where activities threaten the resource values protected by the withdrawal. Analyze proposed action in Plan of Operations and apply mitigating measures needed to prevent unnecessary or undue degradation.	development (284,975 acres). Make any existing mining claims within the withdrawal area subject to validity exams or buyout. Require Plan of Operations before any proposed surface-disturbing activities. Consider seasonal restrictions if deemed effective. RDFs (**Appendix C**) would apply to locatables to the extent consistent with applicable law.	extent consistent with applicable law.	Locatable minerals exploration and development under the mining laws are not authorized under the discretion of the field manager but are reviewed (Notice and Plan of Operations) and approved (Plan of Operations) to prevent unnecessary or undue degradation. Proposed actions under Plan of Operations and Notices would be analyzed on a case-by-case basis in coordinating with MTDEQ. RDFs (**Appendix D**) would apply to locatables to the extent consistent with applicable law.	

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Nonenergy leasable minerals	Prospecting permits would be issued after appropriate environmental review to assess impacts and develop mitigating measures.	Close PHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine (233,219 acres). For existing nonenergy leasable mineral leases in PHMA, in addition to the solid minerals RDFs (**Appendix C**), follow the same RDFs applied to fluid minerals (**Appendix C**) when wells are used for solution mining.	Close PHMA and GHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine (345,560 acres).	In PHMA, prospecting permits may be issued after appropriate environmental review to assess impacts and to develop RDFs set forth in **Appendix D**.	Same as Alternative B.
Salable minerals	2,437 acres within GH and 101 acres within PH are closed to salable minerals disposal. The BLM would issue sales contracts for salable minerals where disposal is	Close PHMA to salable minerals disposal (284,975 acres). In PHMA, restore salable mineral pits no longer in use to meet GRSG habitat objectives. 100 acres of BLM-administered	Close PHMA and GHMA to salable minerals disposal (639,927 acres). In PHMA and GHMA, restore salable mineral pits no longer in use to meet GRSG habitat objectives. 300	2,437 acres within GHMA and 101 acres within PHMA are closed to salable minerals disposal. In PHMA, the BLM would issue permits for salable minerals where disposal is deemed to be in the	Same as Alternative B.

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	deemed to be in the public interest, while providing for reclamation of mined lands and preventing unnecessary or undue impact on nonmineral resources. Salable minerals permits are considered on a case-by-case basis and are issued at the discretion of the area manager (639,927 acres open for sale of minerals). Surface occupancy within MZ IV generally would be prohibited within public road corridors, ROWs, floodplains, and key wildlife areas.	lands within PHMA are currently salable mineral disposal sites.	acres of BLM-administered lands within PHMA and GHMA are currently salable mineral disposal sites.	public interest, while providing for reclamation of mined lands and preventing unnecessary or undue degradation (**Appendix D**). Salable minerals material permits are considered on a case-by-case basis and are issued at the discretion of the field manager (639,927 acres open for sale of minerals). Surface occupancy within MZ IV, generally would be prohibited within public road corridors, ROWs, floodplains, and key wildlife areas. In PHMA, restore salable mineral pits no longer in use to meet GRSG habitat objectives.	

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Summary of Impacts on GRSG from Solid Mineral Development	All the action alternatives respond to the COT report objective to maintain GRSG populations with no net loss of GRSG habitat in areas affected by mining. Alternatives B and C and the Proposed Plan Amendment would be more protective of GRSG and habitat than Alternatives A and D, though Alternative D has reclamation actions in common with Alternative B. Effective mitigation for existing mining claims and salable mineral sites is similar across Alternatives B, C, and D and the Proposed Plan Amendment. Alternative D and the Proposed Plan Amendment provide a greater number of RDFs to be considered as necessary and appropriate to mitigate impacts. The Proposed Plan Amendment would provide additional protections to GRSG and habitat by implementing density and disturbance caps, adaptive management, lek buffers, and regional mitigation, which would further support the COT report objectives.				
Climate Change					
There is no specific resource program in this RMPA for addressing this threat to GRSG and its habitat. However, actions under several resources listed below do address climate change and drought impacts on GRSG habitat. Furthermore, BLM grazing regulations 43 CFR, Part 4110.3-2, Decreasing Permitted Use, states: (a) Permitted use may be suspended in whole or in part on a temporary basis due to drought, fire, or other natural causes, or to facilitate installation, maintenance, or modification of range improvements.					
Implementing management actions after land health evaluations	Efforts to manage public rangeland under drought conditions would be directed first to allotments with resource concerns such as "I" category allotments. Specific allotments in the "M" and "C" categories could also be considered high priority when resource values or conditions so require.	During droughts, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Since there is a lag in vegetation recovery following drought, ensure that post-drought management allows for vegetation recovery that meets GRSG needs in PHMA.	During droughts, prioritize evaluating effects of the drought in PHMA and GHMA relative to their needs for food and cover. Since there is a lag in vegetation recovery following drought, ensure that post-drought management allows for vegetation recovery that meets GRSG needs in PHMA.	During droughts, prioritize evaluating effects of the drought in PHMA, relative to their needs for food and cover. Drought management would continue to be in accordance with the Montana/Dakotas drought policy (**Appendix I**). Since there is a lag in vegetation recovery following drought, post-	Same as Alternative D

Table 4-3
Comparison of Alleviated Threats to GRSG in the Lewistown Field Office by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
				drought management would be implemented to allow for vegetation recovery that meets GRSG needs in PHMA.	
ES&R and habitat restoration and vegetation management		In PHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collecting from the warmer component of the species' current range when selecting native seed.	In PHMA and GHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collecting from the warmer component of the species' current range when selecting native seed.	In PHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collecting from the warmer component of the species' current range when selecting native seed. Develop an appropriate seed mix for the location, based on current climatic data as well as soils/ecological site descriptions.	Same as Alternative D
Contaminants					
There are no management actions in this RMPA for addressing this threat to GRSG and its habitat. RDFs, when applicable and appropriate, would be applied to use authorizations (**Appendix C** for actions under Alternatives B and C and **Appendix D** for actions under Alternative D and the Proposed Plan Amendment) to prevent the potential threat of contaminants.					

4.4 LANDS AND REALTY

4.4.1 Methods and Assumptions

Indicators

Table 4-4 provides a summary of the indicators that were used to analyze the effects on lands and realty under each alternative.

Table 4-4
Comparison of Lands and Realty Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres of surface ownership in the planning area	No change	No change	No change	No change	No change
Acres of land tenure adjustments (i.e., lands identified for disposal, withdrawal, or acquisition)	N/A	233,219 for mineral withdrawal	345,560 for mineral withdrawal	0	53,440 for mineral withdrawal
Number, acres/miles, and types of surface-disturbing ROWs and leases, including communication sites	909 acres	Short-term increase, long-term decrease if buried or removed	Short-term increase, long-term decrease if buried or removed	Short-term increase, long-term decrease if buried or removed	Short-term increase, long-term decrease if buried or removed

Assumptions

The analysis includes the following assumptions:

- Existing ROWs, designated utility corridors, and communication sites would be managed to protect valid existing rights.
- On renewal, assignment, or amendment of existing ROWs, additional stipulations could be included in the land use authorization.
- ROW holders may continue their authorized use as long as they are in compliance with the terms and conditions of their grant.
- The BLM would continue to process land use authorizations and land tenure adjustments as workforce and workload allow.
- The demand for all types of ROWs (including communication sites, utilities, and renewable energy projects) would gradually increase over time.
- Maintaining and upgrading utilities, communication sites, and other ROWs is preferred (as provided within the terms and conditions of the ROW) before the construction of new facilities in the decision

area, but only if the upgrading can be accommodated in the existing ROW.

- Demand for small distribution facilities to extend and upgrade services, such as communication sites and utilities, would increase as rural development occurs on the dispersed private parcels within the planning area.
- Demand for both regional and interstate transmission lines would increase as population and urban areas grow.
- Demand for new ROWs is expected to increase as demand for new communication technology, such as fiber optic cable, grows.
- Retention areas include all decision area lands (the BLM-administered lands within the planning area), with the exception of lands identified, or under consideration for disposal.
- In accordance with the Omnibus Act, the BLM would continue to manage all previously withdrawn BLM-administered lands as withdrawn from entry, appropriation, or disposal under the public land laws. Withdrawals would be reviewed, as needed, and recommended for extensions, modifications, revocations, or terminations. All existing withdrawals initiated by other agencies, such as the US Bureau of Reclamation or the Department of Energy, would be continued unless the initiating agency or BLM requests that the withdrawal be revoked.

4.4.2 Nature and Type of Effects

Resources and resource uses affect the lands and realty program by prescribing stipulations and mitigation to protect resources within ROW areas. A ROW exclusion area is one that is not available for new ROW location under any conditions. A ROW avoidance area may be available for ROW location but may require special stipulations. ROW applications could be submitted in ROW avoidance areas; however, a project proposed in these areas may be subject to additional requirements, such as resource surveys and reports, construction and reclamation engineering, long-term monitoring, special design features, special siting requirements, timing limitations, rerouting, and off-site mitigation. Such requirements could restrict project location or they could delay availability of energy supply (by delaying or restricting pipelines, transmission lines or renewable energy projects) or they could delay or restrict communications service availability. As a result of special surveys and reports, alternative routes may need to be identified and selected to protect sensitive resources, such as GRSG habitat. Designating ROW exclusion and avoidance areas and applying special stipulations would result in increased application processing time and costs due to the potential need to relocate facilities or due to greater design, mitigation, and siting requirements.

Collocating transmission and mineral development infrastructure in existing ROWs, and existing disturbed areas, reduces land use conflicts and additional land disturbance. Collocation policies also clarify the preferred locations for utilities and simplify processing on BLM-administered lands. However, collocating can limit options for mineral development and selection of more-preferable locations for ROWs.

Travel management actions can involve closing areas or specific routes to motorized or mechanized travel, thereby creating areas that are impractical for some types of land uses, such as transmission lines or communication sites.

Land tenure adjustments are intended to maintain or improve the efficiency of BLM management, including management of GRSG habitat. Land disposal can result in a more contiguous decision area, thus increasing BLM-administered lands management efficiency. However, while consolidation may be beneficial for certain resources and uses, it may not necessarily reduce effects on GRSG habitat.

The following resources or resource uses would have negligible or no impact on land use authorizations and land tenure and are, therefore, not discussed in detail: range management, fluid and solid minerals, mineral split estate, fire and fuels management, and habitat restoration/vegetation management.

4.4.3 Impacts Common to All Alternatives

Impacts from Lands and Realty

Under all alternatives, the BLM would continue to process a pending land exchange within PHMA. The exchange would transfer 240-acres of private land to BLM ownership in exchange for disposing 240 acres of BLM-administered land to private ownership. The lands to be transferred into public ownership contain a lek site. The exchange would benefit GRSG under all alternatives; however, each alternative would result in greater or lesser levels of protection depending on the specific management actions proposed.

Impacts from Recreation

Within the decision area, there is one SRMA and 11 ERMAs. BLM management goals and objectives are to preserve a desired setting and recreation experience for users within these areas. Land uses in the SRMAs and ERMAs should not conflict with recreation uses. In all alternatives, the BLM would continue to evaluate land use authorizations on a case-by-case basis in the special recreation areas so as to avoid conflicting uses.

4.4.4 Alternative A

Impacts from Travel and Transportation Management

Under Alternative A, travel would continue to be allowed on 595 miles of existing roads and trails in the decision area. Existing transportation routes

would continue to provide motorized access to ROW infrastructure and communication sites for construction and maintenance. Planning area habitat would remain closed to cross-country vehicle use. Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could affect the convenience of access for ROW holders to existing ROW infrastructure, as described above under *Nature and Type of Effects*.

Impacts from Lands and Realty

Under Alternative A, 215 total miles of existing ROWs in the decision area, including 162 miles in PH and 53 miles in GH, would continue to provide opportunities for collocation of new infrastructure. A total of 2,601 acres associated with the Acid Shale-Pine Forest ACEC and Judith River Canyon would continue to be managed as ROW avoidance areas. All lands within the decision area would continue to be open for ROW development (subject to NEPA analysis).

BLM-administered lands would continue to be available for ROWs on a case-by-case basis, in accordance with Title V of FLPMA and 43 CFR, Part 2800. All ROW applications would be reviewed using the criteria of following existing corridors wherever practical and avoiding the proliferation of separate ROWs.

Wind facilities would be authorized through the ROW authorization process. See **Section 4.21**, Renewable Energy, for impacts on wind energy development.

Under Alternative A, the BLM would continue to manage 593,995 surface acres. There would continue to be six withdrawals in the decision area amounting to 2,538 acres (101 acres in PH and 2,437 acres in GH). Land tenure and adjustments would be subject to the disposal and acquisition criteria in the existing RMPs.

Impacts from ACECs

Under Alternative A, the Acid Shale-Pine Forest ACEC would continue to be a ROW avoidance area, continuing to affect ROW authorization application processing times and design standards for proposed ROWs within the 2,463-acre ACEC boundary.

4.4.5 Alternative B

Impacts from Travel and Transportation Management

BLM would evaluate the need for permanent or seasonal road closures under Alternative B. Should the BLM determine during a future site-specific evaluation that there is a need to close certain routes, those closures could affect the convenience of access for ROW holders to existing ROW infrastructure, as described above under *Nature and Type of Effects*.

Under Alternative B, the BLM would only allow new roads where access to valid existing rights is necessary and does not currently exist. This would limit new ROW authorizations and new road construction as compared to Alternative A. Limitations on new road construction could make certain areas impractical for new ROW authorizations, particularly in areas not readily accessible via existing roadways.

Impacts from Lands and Realty

Under Alternative B, 233,219 acres of the decision area associated with PHMA (39 percent of BLM-administered land within the planning area) would be designated as ROW exclusion area for new ROW authorizations. GHMA in the decision area (112,341 acres) would be designated ROW avoidance area. However, 843 total acres of unitized lease areas (301 acres of PHMA and 542 acres of GHMA) would be exempt from ROW limitations related to oil and gas development.

As noted above in *Nature and Types of Effects*, limitations on new ROWs and aboveground linear features, such as transmission lines and pipelines, could restrict the availability of energy or service availability and reliability for communication systems. ROW exclusion and avoidance areas could extend processing time for renewals of existing ROW authorizations. The designations could make siting new linear or block ROWs more difficult than under Alternative A.

Additionally, under Alternative B, the BLM would take advantage of opportunities to remove, bury, or modify 42 miles of existing power lines within PHMA. As noted above in *Nature and Types of Effects*, limitations on new ROWs and above-ground linear features, such as transmission lines and pipelines, could restrict the availability of energy or service availability and reliability for communication systems.

The BLM would retain public ownership in PHMA except where land exchanges would result in more contiguous federal ownership patterns or where disposal accompanied by a habitat mitigation agreement or conservation easement would result in more effective management of GRSG habitat. If the BLM were to proceed with land tenure adjustments, those actions would enhance BLM management of GRSG habitat but could affect existing authorizations and leases, as described in *Nature and Type of Effects*.

Impacts from ACECs

Under Alternative B, the Acid Shale-Pine Forest would become a ROW exclusion area. Impacts on the lands and realty program from limitations on new ROW authorizations would be the same within and outside the ACEC and consistent with the *Nature and Types of Effects*.

4.4.6 Alternative C

Impacts from Travel and Transportation Management

Impacts on the lands and realty program under Alternative C would be the same as those described above under Alternative B, with the exception that Alternative C would prohibit new road construction within four miles of active leks. Because of the density of active lek sites, new road construction on BLM-administered land in the planning area would be limited to 21 percent of the decision area (13,340 acres in PHMA and 57,785 acres in GHMA), which is a reduction in areas available for new road construction and ROWs as compared to Alternative A. This reduction would increase those effects described in *Nature and Type of Effects*, including delays in application processing time and costs, increase siting limitations, and delay delivery of energy supplies as compared to Alternative A.

Impacts from Lands and Realty

Under Alternative C, PHMA and GHMA (345,560 acres) would be designated as ROW exclusion area for new ROW authorizations. However, 843 acres would be located inside a unitized area. Lands within the unitized area would be exempt from the ROW exclusion area provisions related to oil and gas development. Impacts on ROW authorizations are the same as under Alternative B and are consistent with effects described in *Nature and Types of Effects*.

The BLM would retain public ownership in PHMA with no exceptions and seek to acquire private lands when offered in ACECs. Impacts from land withdrawals would be the same as Alternative B.

Impacts from ACECs

Under Alternative C, the BLM would designate 96,246 acres of GRSG habitat as a new ACEC with management tailored to protect the GRSG habitat. BLM management of lands and realty would be the same outside the ACEC boundary as it would be inside. PHMA and GHMA would be managed as a ROW exclusion area. Designation of ROW exclusion and avoidance areas could affect the number and type of ROW authorizations depending on the location and nature of any proposed ROW.

4.4.7 Alternative D

Impacts from Travel and Transportation Management

Under Alternative D, the BLM would complete a travel and transportation management plan, designating certain roads, primitive roads and trails as open, closed or limited to OHV use. Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. The BLM would also consider permanently closing certain existing user-created roads and trails where off-road vehicle use would cause adverse effects on

habitat. The BLM would close any new user-created routes. Those closures could affect the convenience of access for ROW holders to existing ROW infrastructure, as described above under *Nature and Type of Effects*.

Impacts from Lands and Realty

Under Alternative D, PHMA (233,219 acres) would be managed as ROW avoidance area for new ROW authorizations. PHMA and GHMA would be designated as wind energy ROW avoidance (345,560 acres). New ROW development would continue to be allowed in GHMA, within existing ROWs, and within the 843 acres of unitized lease areas, including 301 acres of unitized acres in PHMA. The designation of PHMA as ROW avoidance could limit the placement of new above ground infrastructure, resulting in an increase of effects on the lands and realty actions as compared to Alternative A. The extent of the effects would be based on the location and type of any proposed new ROW.

Impacts from land tenure adjustments would be the same as Alternative B.

Impacts from ACECs

Impacts would be the same as those described above under Alternatives A and B.

4.4.8 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including adaptive management, density and disturbance caps, regional mitigation, and lek buffers that could limit future authorizations in certain areas. If an adaptive management hard trigger was met, the size of new transmission lines in corridors would be kept the same as existing structures, or not larger than 100 kV. As noted above in *Nature and Types of Effects*, limitations on new ROWs and aboveground linear features, such as transmission lines and pipelines, could restrict the availability of energy or service availability and reliability for communication systems.

Impacts from Travel and Transportation Management

Impacts would be the same as Alternative D.

Impacts from Lands and Realty

Under the Proposed Plan Amendment, the BLM would manage 345,560 acres (PHMA and GHMA) as ROW avoidance area for new major ROW authorizations, while GHMA would be open to new minor ROWs (112,341 acres). The BLM would also manage PHMA as avoidance for permits and leases. PHMA (233,219 acres) would be designated as wind and solar energy ROW exclusion, while GHMA would be avoidance for wind and solar (see additional analysis for wind and solar energy in **Section 4.21**). The designation of GRSG habitat as ROW avoidance for major ROWs could limit the placement of new above ground infrastructure (e.g., transmission lines), resulting in additional

costs and processing times for lands and realty actions as compared to Alternative A. Management of PHMA as avoidance and GHMA as open for minor ROWs could concentrate new ROW development in GHMA and non-habitat areas. RDFs could further discourage development in GRSG habitat if more inexpensive opportunities exist outside GRSG habitat. Limitations on permits and leases could limit authorizations (e.g., communication site leases) typically approved via those mechanisms. The extent of the effects would be based on the location and type of any proposed new ROW.

Under the Proposed Plan Amendment, the BLM could only approve land tenure adjustments that result in a net conservation gain for GRSG. Accordingly, the BLM would have limited opportunities for land tenure actions that increase land management efficiency through a more consolidated land ownership pattern. Mineral withdrawal of 53,440 acres, mostly in SFAs, would reduce land use authorizations in those areas associated with any mineral development activity.

Impacts from ACECs

Impacts would be the same as those described above under Alternatives A and B.

4.5 VEGETATION (INCLUDING NOXIOUS WEEDS; RIPARIAN AND WETLANDS)

4.5.1 Methods and Assumptions

Impacts were determined by assessing which actions, if any, would change the upland vegetation, riparian and wetland vegetation, and weed indicators described below. Some impacts are direct, while others are indirect and affect vegetation through a change in another resource. Direct impacts on vegetation include disrupting, damaging, or removing vegetation, thereby reducing area, amount, or condition of native vegetation. Included among these are actions that reduce total numbers of plant species and actions that reduce or cause the loss of diversity, vigor, or structure of vegetation, or that degrade its function as habitat for GRSG or other wildlife.

Indirect impacts are those that may occur later in time, such as decreased plant vigor or health from dust or reduced water quality. Other indirect impacts include loss of habitat suitable for vegetation colonization due to surface disturbance; introduction of weeds that compete with desirable, native vegetation; conditions that enhance the spread of weeds; and general loss of potential habitat due to surface occupancy or soil compaction.

Indicators

Table 4-5 provides a summary of the indicators that were used to analyze the effects on vegetation under each alternative.

Table 4-5
Comparison of Vegetation Indicators by Alternative

Indicator	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Acres meeting Rangeland Health standards	Increase	Increase	Stable/ possible decrease	Increase	Possible increase
Acres of sagebrush (PHMA/GHMA[1])	345,660	Possible increase	Increase	Possible increase	Possible increase
Extent of fragmentation	Increasing	Stable or decreasing	Decreasing	Stable or decreasing	Stable or decreasing
Percentage of riparian areas in PFC	Increase	Increase	Increase	Increase	Increase
Acres of riparian/wetland vegetation	6,937	Stable or increasing	Stable or increasing	Stable or increasing	Stable or increasing
Change in spread of noxious weeds	Stable	Stable	Stable or increasing	Stable	Stable

[1]PH and GH for Alternative A (no PHMA or GHMA is presently designated).

Assumptions

The analysis includes the following assumptions:

- All plant communities would be managed toward achieving a mix of species composition, cover, and age classes across the landscape, except in site-specific situations where introduced grass plantings (crested wheatgrass) are used to defer livestock use of native pasture.
- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors, including location in GRSG habitat; the type, time, and degree of disturbance; existing vegetation; precipitation; and mitigating actions applied to the disturbance.
- Noxious and invasive weeds would continue to be introduced and spread as a result of ongoing vehicle traffic in and out of the planning area, recreational activities, wildland fire, wildlife and livestock grazing and movements, and surface-disturbing activities.
- Activities that would disturb soils could cause erosion, loss of topsoil, and soil compaction, which could affect the ability of vegetation to regenerate. Further, surface-disturbing activities could increase dust, which could cover existing vegetation and impair plant photosynthesis and respiration. Resulting impacts could include lowered plant vigor and growth rate, altered or disrupted pollination, and increased susceptibility to disease.

- Ecological health and ecosystem functioning depend on a number of factors, including vegetative cover, species diversity, nutrient cycling and availability, water infiltration and availability, and percent cover of weeds.
- Climatic fluctuation would continue to influence the health and productivity of plant communities on an annual basis.
- Short-term effects would occur over a timeframe of two years or less and long-term effects would occur beyond two years.
- Removal of livestock grazing from BLM-administered land would eliminate the opportunity to initiate weed control cooperative range improvement agreements for noxious weed control on affected lands.

4.5.2 Nature and Type of Effects

GRSG rely on sagebrush ecosystems for all aspects of their life cycle. Typically, a range of sagebrush community composition within the landscape (including variations in sub-species composition, co-dominant vegetation, shrub cover, herbaceous cover, stand age) are needed to meet seasonal, and inter-seasonal, requirements for food, cover, nesting, and wintering habitats. The landscape required for GRSG may range from up to 40 square miles. Thus, conserving and managing GRSG is as much about the ecology, management and conservation of large, intact sagebrush ecosystems as it is about the dynamics and behaviors of the populations themselves (Manier et al. 2013).

Historically, sagebrush-dominated vegetation was one of the most widespread habitats in the country, but its expanse has been fragmented, lost, or altered by invasive plants and anthropogenic disturbance (NTT 2011, p. 4). Protection of GRSG habitat would involve restrictions and limitations on activities that contribute to the spread of invasive species, fire, and other surface disturbance, and management of vegetation to promote healthy sagebrush and understory vegetation to support GRSG.

Vegetation Management and Habitat Protection

In addition to landscapes with large, intact patches of sagebrush (i.e., those with limited habitat fragmentation), GRSG require high-quality habitat conditions. These are a diversity of herbaceous species, vegetative and reproductive health of native grasses, and an abundance of sagebrush, making management for high condition important in seasonally important habitats (Connelly et al. 2004). Given the limited distribution of suitable sagebrush habitats and the cost of habitat restoration, management plans that protect intact sagebrush acreage and restore impacted areas strategically to improve habitat connectivity have the best chance of increasing the amount and quality of sagebrush cover (Manier et al. 2013). Sagebrush-promoting vegetation treatments would protect native vegetation and overall ecosystem productivity, while reducing the distribution of invasive weeds and woody conifer species.

Invasive plants can alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude native plant populations. Invasive plant spread may result in habitat loss and fragmentation, and may also increase the risk of wildfire. The spread of invasive plants such as cheatgrass has increased the frequency and intensity of fires in some areas (Balch et al. 2012), though the LFO currently has cheatgrass dominant in isolated patches only, due to climatic conditions. An assortment of nonnative annuals and perennials and native conifers are currently invading sagebrush ecosystems, notably juniper species.

Expansion of conifer woodlands present a threat to GRSG because they do not provide suitable habitat, and mature trees displace shrubs, grasses and forbs through direct competition for resources; conifer expansion is also associated with increased bare ground and erosion potential. Mature trees may offer perch sites for raptors and increase predation threats (Petersen et al. 2009; Bradley 2010). Current treatments and active vegetation management typically focus on vegetation composition and structure for fuels management, habitat management and/or productivity manipulation for improving the habitat and forage conditions for ungulates and other grazers. Vegetation management techniques increase productivity by stabilizing soil surfaces or by removing invasive plants (Knick et al. 2011). Vegetation treatments would cause short-term disturbance to vegetation from removal but would result in long-term improvements to habitat quality.

Treatments designed to prevent encroachment of shrubs, nonnative species or woody vegetation would alter the condition of native vegetation communities by changing the density, composition, and frequency of species within plant communities. The intent of these management programs is to improve rangeland condition and enhance sagebrush ecosystems.

Vegetation manipulations in the riparian zone, such as weed treatments, native plantings, and erosion control in the channel, improve the condition of the riparian vegetation community, individual riparian species, and hydrologic functionality to attain PFC. Habitat connectivity for GRSG could be increased through vegetation manipulation designed to restore vegetation, or transition of an area to better match the surrounding vegetation.

Direct protection of sagebrush habitat to support GRSG would limit or modify uses in this habitat type. Use restrictions would reduce damage to native vegetation communities and individual native plant species in areas that are important for regional vegetation diversity and quality. Likewise, use restrictions would minimize loss of connectivity and would be more likely to retain existing age class distribution within these specific areas. Use restrictions could also minimize the spread of invasive species by limiting human activities that cause soil disturbance or seed introductions.

Wildland Fire

While wildfires likely played an important role historically in creating a mosaic of herbaceous-dominated areas (recently disturbed), and mature sagebrush (less-frequently disturbed), current land-use patterns have restricted the system's ability to support natural wildfire regimes. Slow rates of re-growth and recovery of vegetation after disturbances (driven by low water availability and other constraints) have contributed to the accumulating displacement and degradation of the sagebrush ecosystem (Beck et al. 2009). Thus, preservation of sagebrush against wildfire and limiting use of prescribed burning is important to preserving GRSG habitat.

Big sagebrush does not re-sprout after a fire, but is replenished by wind-dispersed seed from adjacent unburned stands or seeds in the soil. Depending on the species and the size of a burn, sagebrush can reestablish within five years of a burn, but a return to a full pre-burn community cover can take 13 to 100 years (Connelly et al. 2004). Fire suppression may be used to maintain habitat for GRSG (NTT 2011). When management reduces wildland fire frequency by controlling natural ignitions, the indirect impact is that vegetation ages across the landscape and early successional vegetation communities are diminished. Fire suppression may preserve condition of some vegetation communities, as well as habitat connectivity. This is particularly important in areas where fire frequency has increased as a result of weed invasion, or where landscapes are highly fragmented. Fire suppression can also lead to increased fuel loads, which can lead to more damaging or larger-scale fires in the long term. Fire also increases opportunities for invasive species, such as cheatgrass, to expand (Balch et al. 2012), so fire suppression can indirectly limit this expansion.

Controlled burning may be prescribed to treat fuel buildup and can assist in the recovery of sagebrush habitat in some vegetation types. Re-seeding with native plants and long-term monitoring to ensure the production of GRSG cover and forage plants, would assist vegetation recovery (NTT 2011).

Lands and Realty

Construction of utility ROWs often involves vegetation removal, which would disturb native vegetation communities and individual native plant species, alter age class distribution, reduce connectivity, and encourage the spread of invasive species. ROWs may extend for many miles, fragmenting habitat and increasing the potential for weeds to be spread (NTT 2011). ROW corridors would be managed to concentrate placement of large linear facilities and other ROW development in less-sensitive areas and to minimize the loss of connectivity and total acreage of vegetation that would be disturbed.

The holder of a ROW is responsible for weed control on disturbed areas within the limits of the ROW. The holder is responsible for invasive weed control for the life of the ROW plus three years. The holder is responsible for consultation

with the authorized officer or local authorities for acceptable weed control methods.

ROW exclusion areas would prohibit all development of ROWs in PHMA, with the exceptions provided, while ROW avoidance areas would consider on a case-by-case basis whether an ROW should be allowed. This flexibility may be advantageous where federal and private land-ownership areas are mixed, while ROW exclusion areas could result in more widespread development on private lands.

Mineral Resources

Many sagebrush ecosystems overlay major oil and gas reserves, and various solid mineral deposits, which has created a long history of mining and exploration, particularly on eastern portions of the range, which include the planning area. Energy development requires construction of roads, well pads, wells, and other infrastructure, and associated noise, traffic, and lights, that alter, degrade, or entirely displace native ecosystems and disturb wildlife (Patricelli et al. 2012; Manier et al. 2013). Surface disturbance associated with solid mineral development is similar as described above and often removes vegetation, reduces the condition of native vegetation communities and the connectivity of habitat, and encourages the spread of invasive species (NTT 2011).

Despite lease nomination deferrals of public lands to oil and gas leasing within PHMA and GHMA, many valid leases remain across GRSG ranges, including the LFO (Manier et al. 2013). Local governments and commercial operations are in regular need of mineral materials for road construction and maintenance needs. Prices for other minerals affect demand, which could result in increased interest in prospecting for solid mineral resources. If mineral development is shifted away from sagebrush habitat to other areas to protect GRSG, impacts on vegetation in GRSG habitat would be reduced.

Recreation

Recreational use of GRSG habitat can be benign, but excessive use may cause degradation of sagebrush vegetation. Potential impacts from recreational use include trampling, soil compaction, erosion, spread of invasive plants, and generation of fugitive dust (NTT 2011; Bradley 2010). Recreational use can also increase the potential for wildfire caused by humans or influenced by spread of invasive annual grasses (Knick et al. 2011). Most impacts occur in easily accessible areas from OHV use. Restrictions on recreational use of GRSG habitat would limit damage to the vegetation communities that comprise this habitat, by directly reducing disturbance to vegetation from trampling, OHVs, dust, and spread of invasive species. Such restrictions could involve seasonal area closures or limitations on the number of users or types of uses permitted.

Travel and Transportation

Road construction divides and fragments GRSG habitat, and causes erosion and nutrient leaching. The use of roads and trails creates soil compaction, and allows

the spread of human disturbance, including wildfire and invasive plant species (Knick and Connelly 2011; Wisdom et al. 2011). Invasive species can out-compete sagebrush and other vegetation essential for GRSG survival. Invasive species also increase wildfire frequencies, further contributing to loss of habitat (Balch et al. 2012).

For protection of GRSG, some roads, primitive roads and trails may be seasonally or permanently closed, OHVs would be restricted to designated routes, and new route construction avoided in PHMA to the maximum extent possible (NTT 2011).

Livestock Grazing

Livestock grazing is the most widespread land use across the sagebrush biome (Connelly et al. 2004). Livestock grazing can affect soils, vegetation health, species composition, water, and nutrient availability by consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly et al. 2004; NTT 2011). Livestock grazing is a "diffuse" form of biotic disturbance that exerts repeated pressure over many years on a system; thus, effects of grazing are not likely to be detected as disruptions, but as differences in the processes and functioning of the sagebrush system. Grazing effects are not distributed evenly because historic practices, management plans and agreements, and animal behavior all lead to differential use of the range (Knick 2011). Livestock often use riparian and wetland areas for water and shade, and may trample riparian vegetation, which could reduce riparian community condition and contribute to erosion.

Livestock grazing may have both beneficial and detrimental aspects, depending on site-specific management (Connelly et al. 2004). At unsustainable levels, grazing can lead to loss of vegetative cover, decreased plant litter, increased soil erosion, and reduced habitat quality for wildlife, including GRSG (Knick 2011; Connelly et al. 2004).

Properly managed grazing can be used as a tool to reduce fuel load, to protect intact sagebrush habitat, and to increase habitat extent and continuity (Adams et al. 2004). Grazing can also have beneficial effects on vegetation, by reducing litter removing annual grasses, facilitating growth of native species and increasing vegetation community diversity. Land health evaluations are used to assess rangeland condition and help to identify where changes in grazing management would be beneficial. In areas meeting Rangeland Health Standards, grazing practices co-exist with healthy vegetation communities providing wildlife habitat.

Grazing systems that provide for closer management of allotments in GRSG habitat and aim to protect sagebrush and riparian ecosystems would protect vegetation, by allowing more plant growth and reducing trampling and introduction of exotic species. Reducing or removing grazing in habitat areas would also reduce these effects but could have unintended consequences of increasing fuel building or degrading vegetation quality over the long term.

4.5.3 Impacts Common to All Alternatives

There are no known coal resources located in the planning area; therefore, associated management actions related to coal would not impact vegetation under any of the alternatives.

4.5.4 Alternative A

Impacts from Travel and Transportation Management

Under Alternative A, BLM-administered lands would continue to permit limited yearlong use for motorized wheeled vehicles, restricted to existing roads and trails. Continuation of this policy would allow for invasive plants introduction, wildfire, soil compaction, fragmentation, and other effects discussed under *Nature and Type of Effects*. Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. These temporary closures could reduce disturbance or loss of vegetation.

Impacts from Recreation

Alternative A includes no specific recreation management related to GRSG or their habitat and thus current impacts from recreation on vegetation as described under *Nature and Type of Effects* would continue. Potential impacts include vegetation trampling, soil compaction, erosion, invasive plant spread, and fugitive dust generation.

Impacts from Lands and Realty

Under Alternative A, ROWs would be considered on a case-by-case basis outside of ROW exclusion and avoidance areas, and ROWs would be collocated when possible, which would reduce surface disturbance and vegetation removal. There are no ROW exclusion areas within the planning area; however, there are two ROW avoidance areas, Acid Shale Pine Forest ACEC and Judith River Canyon. Vegetation disturbance and removal would be reduced in avoidance areas, as described under *Nature and Type of Effects*. **Table 4-6** shows ReGAP habitat types within ROW avoidance and exclusion areas, including lands not administered by the BLM. The table shows that more sagebrush habitat is located on land not administered by the BLM (863,565 acres compared to 256,052 acres), suggesting that development restrictions on BLM-administered land could push ROW construction onto private lands and may not result in any benefit to sagebrush habitat.

Land tenure adjustments would be subject to current disposal and acquisition criteria, which include retaining important wildlife habitat and nesting habitat for game animals. Retention would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove vegetation in these areas. Currently, there are no areas identified for withdrawal in the planning area.

Table 4-6
ReGAP Habitat Type including Non-BLM Acreage in PHMA and GHMA within Right-of-way Avoidance and Exclusion Areas by Alternative (Acres)

Habitat Type	Non-BLM[1]		Alternative A		Alternative B		Alternative C	Alternative D		Proposed Plan Amendment	
	GHMA	PHMA	Avoidance[2]	Undesignated[3]	Avoidance[4]	Exclusion[5]	Exclusion[6]	Avoidance[7]	Undesignated[3]	Avoidance	Exclusion[8]
Cultivated cropland	90,147	70,077	8	3,916	1,623	2,301	3,924	2,301	1,623	3,924	2,301
Developed, Low Intensity	1,673	1,858	0	143	29	114	144	114	29	143	114
Developed, Medium Intensity	18	3	0	2	2	0	2	0	2	2	0
Developed, Open Space	9,318	2,906	0	242	69	173	242	173	69	242	173
InterMountain Basins Big Sagebrush Steppe	286,096	523,109	2,942	211,354	44,698	169,598	214,297	169,598	44,698	214,296	169,598
InterMountain Basins Greasewood Flat	7,336	6,513	253	3,839	1,747	2,345	4,093	2,345	1,747	4,092	2,345
InterMountain Basins Montane Sagebrush Steppe	54,272	0	0	135	135	0	135	0	135	135	0
Introduced Upland Vegetation Perennial Grassland and Forbland	79,759	119,309	6	6,558	1,757	4,807	6,564	4,807	1,757	6,564	4,807
Middle Rocky Mountain Montane Douglas fir Forest and Woodland	8,473	0	0	31	31	0	31	0	31	31	0
North American Arid West Emergent Marsh	257	1,155	0	204	4	200	204	200	4	204	200
Northern Rocky Mountain Dry Mesic Montane Mixed Conifer Forest	-0	0	0	26	26	0	26	0	26	26	0
Northern Rocky Mountain Foothill Conifer Wooded Steppe	21,326	10,619	1,324	11,514	9,423	3,415	12,839	3,415	9,423	12,838	3,415

Table 4-6
ReGAP Habitat Type including Non-BLM Acreage in PHMA and GHMA within Right-of-way Avoidance and Exclusion Areas by Alternative (Acres)

Habitat Type	Non-BLM[1]		Alternative A		Alternative B		Alternative C	Alternative D		Proposed Plan Amendment	
	GHMA	PHMA	Avoidance[2]	Undesignated[3]	Avoidance[4]	Exclusion[5]	Exclusion[6]	Avoidance[7]	Undesignated[3]	Avoidance	Exclusion[8]
Northern Rocky Mountain Lower Montane, Foothill and Valley Grassland	41,098	0	0	219	120	99	219	99	120	219	99
Northern Rocky Mountain Montane Foothill Deciduous Shrubland	818	0	0	2	2	0	2	0	2	2	0
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	1,908	13,885	0	2	2	0	2	0	2	2	0
Northwestern Great Plains Black Hills Ponderosa Pine Woodland and Savanna	32,673	118	2,482	18,429	14,360	6,551	20,912	6,551	14,360	20,911	6,551
Northwestern Great Plains Floodplain	2,318	76	34	177	195	16	211	16	195	211	16
Northwestern Great Plains Mixed-grass Prairie	105,251	150,819	298	38,918	8,377	30,839	39,216	30,839	8,377	39,216	30,839
Northwestern Great Plains Riparian	28,361	42,259	15	8,097	1,811	6,301	8,112	6,301	1,811	8,112	6,301
Northwestern Great Plains Shrubland	5,255	409	78	1,526	1,529	75	1,603	75	1,529	1,604	75
Open Water Fresh	1,610	1,166	28	307	132	203	335	203	132	335	203
Pasture/Hay	25,694	739	2	10	8	4	12	4	8	12	4
Rocky Mountain Alpine Montane Wet Meadow	1,152	0	0	1	1	0	1	0	1	1	0
Rocky Mountain Cliff, Canyon and Massive Bedrock	35	0	0	104	99	5	103	5	99	104	5

Table 4-6
ReGAP Habitat Type including Non-BLM Acreage in PHMA and GHMA within Right-of-way Avoidance and Exclusion Areas by Alternative (Acres)

Habitat Type	Non-BLM[1]		Alternative A		Alternative B		Alternative C	Alternative D		Proposed Plan Amendment	
	GHMA	PHMA	Avoidance[2]	Undesignated[3]	Avoidance[4]	Exclusion[5]	Exclusion[6]	Avoidance[7]	Undesignated[3]	Avoidance	Exclusion[8]
Rocky Mountain Lodge pole Pine Forest	1,058	0	0	4	4	0	4	0	4	4	0
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	6,125	0	0	4	4	0	4	0	4	4	0
Rocky Mountain Subalpine Dry Mesic Spruce-Fir Forest and Woodland	62	0	0	1	1	0	1	0	1	1	0
Rocky Mountain Subalpine Montane Mesic Meadow	25,156	0	0	21	21	0	21	0	21	21	0
Western Great Plains Badland	32,142	4,986	2,412	22,808	22,427	2,793	25,220	2,793	22,427	25,220	2,793
Western Great Plains Cliff and Outcrop	208	17	3	110	72	41	112	41	72	113	41
Western Great Plains Closed Depression Wetland	109	105	0	21	3	18	21	18	3	21	18
Western Great Plains Open Freshwater Depression Wetland	68	54	0	43	0	43	43	43	(0)	43	43
Western Great Plains Saline Depression Wetland	203	2,920	0	392	17	375	392	375	17	392	375
Western Great Plains Sand Prairie	26,780	19,605	5	5,535	2,992	2,548	5,539	2,548	2,992	5,540	2,548
Western Great Plains Wooded Draw and Ravine	2,812	2,028	30	931	606	355	961	355	606	961	355

Table 4-6
ReGAP Habitat Type including Non-BLM Acreage in PHMA and GHMA within Right-of-way Avoidance and Exclusion Areas by Alternative (Acres)

Habitat Type	Non-BLM[1]		Alternative A		Alternative B		Alternative C	Alternative D		Proposed Plan Amendment	
	GHMA	PHMA	Avoidance[2]	Undesignated[3]	Avoidance[4]	Exclusion[5]	Exclusion[6]	Avoidance[7]	Undesignated[3]	Avoidance	Exclusion[8]
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	88	0	0	0	0	0	0	0	0	0	0
Grand Total	**902,694**	**974,775**	**9,920**	**335,626**	**112,329**	**233,217**	**345,547**	**233,217**	**112,329**	**345,546**	**233,219**

[1]Non-BLM acreage includes state lands, privately owned land, and other lands not managed.
[2]Alternative A avoidance acreage is existing protective habitat within BLM-administered lands.
[3]Neither is BLM-administered land outside of the ROW avoidance and exclusion areas that is not protective of GRSG habitat.
[4]Alternative B avoidance acreage is equal to BLM GHMA.
[5]Alternative B exclusion acreage is equal to BLM PHMA.
[6]Alternative C exclusion acreage is equal to BLM GHMA + BLM PHMA.
[7]Alternative D avoidance acreage is equal to BLM PHMA.
[8]The Proposed Plan Amendment would establish wind and solar ROW exclusion area and high voltage (>100kV) and large pipeline (>24") ROW avoidance areas in PHMA and GHMA.

Impacts from Range Management

As shown in **Table 2-3**, 570,112 acres in the planning area are open for livestock grazing, with 103,806 available AUMs. Livestock grazing would remain closed on 6,781 acres.

Livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing RMPs followed. Continuation of these policies could indirectly preserve existing sagebrush habitat through consideration of vegetation potential, and adjustments to livestock use when necessary. This is in accordance with BLM grazing regulations 43 CFR, Part 4180, Fundamentals of Rangeland Health, which require appropriate action be implemented when current livestock grazing management is a significant factor in failing to achieve standards. Appropriate action would result in the significant progress toward fulfilling the standards and significant progress toward conforming to the guidelines. As discussed above under *Nature and Type of Effects*, grazing practices may have negative, neutral, or positive effects on vegetation; land health assessments and other management evaluations would be intended to identify areas of concern to maintain or improve rangeland health, which would improve vegetation condition.

Noxious weed control would be the responsibility of the affected permittee or lessee under weed control cooperative range improvement agreements. Each year, they would provide the BLM with records and maps of treatment areas.

Riparian habitats would be managed to achieve PFC and the desired plant community. Livestock management would be compatible with achieving these conditions. Together, these management actions would help to enhance riparian vegetation health and reduce impacts caused by livestock, such as trampling and overuse of riparian areas.

Range improvements would be designed to meet both wildlife habitat objectives and land health standards (**Appendix F**). Development of range improvements on erodible soils would be avoided in springs. These approaches would help protect sagebrush ecosystems by supporting rangeland health and reducing the likelihood of surface disturbance in sensitive areas.

Impacts from Fluid Minerals

Under Alternative A, fluid mineral development could occur on currently leased lands. Development in these areas would continue to cause impacts on vegetation as described under impacts described under *Nature and Type of Effects*, including removal or degradation of vegetation and potential spread of invasive species.

Impacts from Solid Minerals

No lands would be closed to solid mineral leasing, closed to mineral material sale, or recommended for withdrawal from locatable mineral entry under

Alternative A (**Table 4-7**). However, mitigation measures to prevent unnecessary degradation would be applied, which would reduce impacts on vegetation from surface disturbance, including those described under *Nature and Type of Effects*.

Table 4-7
Withdrawal from Locatable Mineral Entry in Decision Area

Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Acres proposed for withdrawal from locatable mineral entry	0	233,219	345,560	0	53,440

Note: Acres for withdrawal in PHMA/GHMA for Alternatives B, C, and D; no PHMA or GHMA is designated under Alternative A.

Impacts from Fire and Fuels Management

Fire and fuels management under Alternative A would not specifically protect sagebrush vegetation, although prescribed burning may be used in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, or increasing age-class variety. As a result, vegetation condition and desired species composition would be improved in certain areas. Further, chemical weed treatments applied following prescribed burns would limit the expansion of weeds or invasive species in the burned area and facilitate revegetation of native species.

Intensive wildfire suppression in high-value areas, such as sagebrush, fire-sensitive woody riparian areas, and commercial forests, would protect mature vegetation in these areas, but could also increase fuel load. Impacts from fire, including those described under *Nature and Type of Effects*, would continue under Alternative A.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative A, BLM would continue to incorporate habitat restoration and vegetation objectives in management actions, which would improve vegetation conditions and increase the extent of native vegetation in areas where they are applied. In particular, BLM would manage for the benefit of vegetation that provides wildlife forage, forbs, and big and silver sage. Use of native species would be used when possible, but not required, allowing for some introduced species in areas where they are necessary for site stabilization.

Impacts from ACECs

BLM would continue to manage 2,463 acres as the Acid Shale-Pine Forest ACEC to protect its unique pine forest and shale landscape.

4.5.5 Impacts Common to Alternatives B-D and the Proposed Plan Amendment

Adoption of a Monitoring Framework (see **Section 2.7.2**) to oversee the implementation and effectiveness of GRSG habitat improvement efforts could result in improvement of vegetation conditions.

4.5.6 Alternative B

Impacts from Travel and Transportation Management

Travel and transportation management under Alternative B would likely reduce impacts on vegetation from travel routes and OHVs by limiting OHVs to existing roads, primitive roads and trails, evaluating the need to permanently or seasonally close routes or areas to OHVs or other authorized users in PHMA and restoring routes by re-seeding with appropriate seed mixes and considering the use of transplanted sagebrush.

Impacts from Recreation

Management proposed under Alternative B would reduce impacts on vegetation from recreation as described under *Nature and Type of Effects* by limiting issuance of SRPs in PHMA. Such management would restrict potentially damaging recreational uses of these areas associated with SRPs, although impacts from dispersed recreation, such as hiking, biking, or equestrian activities, would continue to disturb vegetation in areas where they occur.

Impacts from Lands and Realty

Establishing ROW exclusion and avoidance areas would protect vegetation in areas where they are applied as described above under *Nature and Type of Effects*. Under Alternative B, BLM would manage PHMA as ROW exclusion areas (233,219 acres). GHMA would be ROW avoidance areas (112,341 acres). ROW exclusion areas would protect vegetation from disturbance and fragmentation, but could also have the effect of pushing development onto adjacent private lands with less management oversight. **Table 4-6** shows ROW avoidance and exclusion areas for sagebrush by ReGAP vegetation type. Measures under Alternative B would protect nearly 73 times more BLM sagebrush acreage than Alternative A in ROW avoidance or exclusion areas. In addition, reclamation of out-of-use ROWs would increase the extent and connectivity of vegetation communities.

Retention of BLM-administered lands in PHMA with limited exceptions would reduce the likelihood of vegetation removal or fragmentation associated with agricultural or urban development that could occur on state or private lands.

Impacts from Range Management

Under Alternative B, there would be 337,165 acres open for grazing and 69,408 available AUMs, as shown in **Table 4-8**. BLM would implement a number of management actions in PHMA to incorporate GRSG habitat objectives and

Table 4-8
AUMs and Acres Available for Grazing in Decision Area

Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Available AUMs	N/A	69,408	0	69,408	69,408
Acres open to grazing in planning area	N/A	337,165	0	337,165	337,165

management considerations into livestock grazing management. Appropriate action would result in the possible increase in the number of acres meeting Rangeland Health Standards. Together, these efforts would reduce, but would not eliminate, impacts from grazing on vegetation communities described under *Nature and Type of Effects*. In addition, such management would promote the health of GRSG habitats, including sagebrush steppe, riparian areas, and wet meadows. Impacts from noxious weed control are the same as under Alternative A.

Impacts from Fluid Minerals

Additional restrictions on fluid mineral development proposed under Alternative B would reduce the impacts on vegetation compared to Alternative A. Exploration within PHMA would be permitted to obtain information for adjacent areas. RDFs and conservation measures would be applied as COAs to existing leases within PHMA in order to protect GRSG habitat from loss of sagebrush acreage and fragmentation of habitat. These restrictions on fluid mineral development would protect more acres of vegetation from associated activities compared to Alternative A, and would reduce the impacts from fluid mineral exploration and development described under *Nature and Type of Effects*.

Impacts from Solid Minerals

Alternative B would reduce impacts on vegetation associated with solid mineral exploration and extraction activities compared with Alternative A (see **Table 4-7**). All PHMA would be recommended for withdrawal from mineral entry and closed to nonenergy leasable mineral leasing and to salable mineral disposal. RDFs would be applied to existing leases and locatable mineral claims to the extent consistent with applicable law. These policies would decrease the number of acres of vegetation potentially impacted by solid mineral development compared to Alternative A, and a reduction in the likelihood of impacts from solid mineral exploration and extraction described under *Nature and Type of Effects*.

Impacts from Fire and Fuels Management

Fire and fuel management policies proposed under Alternative B would be designed to protect sagebrush ecosystems by maintaining sagebrush cover,

applying seasonal restrictions, protecting winter range, and requiring use of native seeds. Post-fuels treatments and ES&R management would be designed to ensure long-term persistence of seeded areas and native plants. These proposed modifications to fire and fuel management would result in an increase in the protection of sagebrush vegetation compared to Alternative A, and a reduction in the likelihood of impacts from fire and fuels management described under *Nature and Type of Effects*.

Prioritizing fire suppression in PHMA and GHMA would protect mature vegetation from the destructive effects of wildfire but could result in increased fuel load and spread of noxious weeds, which lead to larger and more severe wildfires in the long term.

Impacts from Habitat Restoration and Vegetation Management

Habitat restoration and vegetation management actions under Alternative B would aim to improve vegetation conditions and prioritize restoration efforts to benefit sagebrush vegetation. As a result, the restoration and vegetation management actions would enhance vegetation extent and condition relative to Alternative A by requiring the use of native seeds, designing post-restoration management to ensure the long-term persistence of the restoration efforts, considering changes in climate, and monitoring and controlling invasive species.

Impacts from ACECs

Impacts on vegetation in the Acid Shale-Pine Forest ACEC would be similar to Alternative A. Additional RDFs and conservation measures in PHMA would further reduce impacts on vegetation, as described under the *Nature and Type of Effects*.

4.5.7 Alternative C

Impacts from Travel and Transportation Management

Impacts from travel and transportation management would be similar to Alternative B, although impacts on vegetation (as described under the *Nature and Type of Effects*) would be further reduced since protections would apply to both PHMA and GHMA, and the BLM would apply additional mitigation requirements. Prohibiting road construction within four miles of a lek would reduce the amount of land available for future road construction and would help prevent fragmentation of vegetative communities.

Impacts from Recreation

Impacts are the same as under Alternative A.

Impacts from Lands and Realty

Similar to Alternative B, the measures proposed under Alternative C would reduce the impacts of ROWs on vegetation. PHMA and GHMA would be ROW exclusion areas (345,560 acres). ROW exclusion areas would protect vegetation on BLM-administered land, as described above under *Nature and Type of Effects*,

but could have the unintended consequence of pushing development onto adjacent private lands. **Table 4-6** shows vegetation type in ROW avoidance and exclusion areas by ReGAP vegetation type. Measures under Alternative C would protect both PHMA and GHMA sagebrush acreage (214,297 acres) as ROW exclusion areas, and since more GRSG habitat is located on land not administered by the BLM, ROW exclusion areas on BLM-administered land could push ROW construction onto adjacent private lands with less management oversight. This may result in fewer protections for vegetation and increased removal and fragmentation of sagebrush.

As under Alternative B, public ownership would be maintained in PHMA, but without the exceptions provided under that alternative. Private lands, when offered, may be acquired in ACECs to enhance the GRSG conservation value of existing lands. Although it is uncertain how much private land would be acquired to enhance GRSG habitat under Alternative C, this policy would increase the acreage where vegetation condition would be improved compared Alternative A, as no such measures have been provided under Alternative A.

Impacts from Range Management

Under Alternative C, grazing would be removed on allotments within PHMA and GHMA, resulting in 232,947 acres and 34,398 AUMs available in the decision area (as shown in **Table 4-8**). Removal of permitted grazing uses would reduce the impacts on GRSG and their habitat, such as loss of herbaceous cover, discussed under *Nature and Type of Effects*. However, grazing can be used to reduce fuel load and maintain vegetation health and diversity. Thus, removing grazing may diminish rangeland health and wildlife habitat quality in the long term. Action may result in the number of acres meeting Rangeland Health Standards being stable of potentially decreasing. Removing livestock grazing from BLM-administered land would also eliminate the opportunity to initiate weed control cooperative range improvement agreements for noxious weed control on affected lands. All noxious weed control efforts would be done by BLM personnel, which may increase weed distribution and patch sizes. Other impacts would be similar to those described under Alternative B.

Impacts from Fluid Minerals

Fluid minerals management under Alternative C would be similar to that described for Alternative B, but would include several more restrictive RDFs and conservation measures that would be applied to existing leases as COAs, thereby enhancing vegetation protection. In addition, actions would be applied to both PHMA and GHMA, which would increase the area of vegetation that would be protected. These measures would reduce habitat degradation and fragmentation associated with mineral extraction, including those impacts described under *Nature and Type of Effects*.

Impacts from Solid Minerals

Impacts from solid minerals management would be the same as Alternative B, but would be applied to a larger area (PHMA and GHMA), and would thus provide greater protection for vegetation over the long term.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to those described for Alternative B, but would be applied to a larger area (PHMA and GHMA), and would thus provide greater protection for vegetation over the long term.

Impacts from Habitat Restoration and Vegetation Management

Impacts from habitat restoration and vegetation management would be similar to those described for Alternative B, but would be applied to a larger area (PHMA and GHMA), and would thus provide greater protection for vegetation over the long term.

Impacts from ACECs

ACECs to protect GRSG would be designated as sagebrush reserves on 96,246 acres. Vegetation within areas designated as ACECs would be protected from surface disturbance by increased management focus and restrictions on surface-disturbing activities in these areas.

4.5.8 Alternative D

Impacts from Travel and Transportation Management

Measures proposed under Alternative D would reduce impacts on GRSG habitat compared to Alternative A. Many management actions would be similar to Alternative B, with increased management flexibility incorporated to improve management and target those areas that need most protection. Overall, management under Alternative D would reduce impacts on vegetation from activities associated with travel and transportation in the planning area, including those described under *Nature and Type of Effects*, compared to Alternative A.

Impacts from Recreation

Impacts would be the same as Alternative B.

Impacts from Lands and Realty

Lands and realty management proposed under Alternative D would provide increased protection of vegetation compared to Alternative A. PHMA would be ROW avoidance areas (233,219 acres) and ROWs would be allowed in GHMA with appropriate mitigation measures (112,341 acres). **Table 4-6** shows acres of land in ROW avoidance and exclusion areas by ReGAP vegetation type. Measures under Alternative D would protect the same amount of PHMA as Alternative B (169,598 acres) but in ROW avoidance areas, rather than ROW exclusion areas. These measures would protect vegetation, while providing more management flexibility to site ROWs in less sensitive locations. Mitigation

measures applied in GHMA would reduce, but would not eliminate, impacts associated with ROW development described under *Nature and Type of Effects*.

Impacts from land tenure decisions would be the same as Alternative B.

Impacts from Range Management

Under Alternative D, the acreage open for grazing or available AUMs would be the same as Alternative B as shown in **Table 4-8**. Management under Alternative D would be similar to that described for Alternative B, with increased collaboration with stakeholders, guidance for prioritization of efforts, and increased tools available to improve flexibility in management. Appropriate action would result in the possible increase in the number of acres meeting Rangeland Health Standards. As such, impacts would likely be similar to Alternative B, though increased management flexibility may improve management and target those areas that need most protection. Impacts from noxious weed control are the same as under Alternative B.

Impacts from Fluid Minerals

Under Alternative D, impacts would be reduced in comparison to Alternative A by applying RDFs and conservation measures as COAs to existing leases. The conservation measures would be designed to reduce surface disturbances associated with mineral extraction and would provide guidance for mitigation. Such management would reduce disturbance to vegetation associated with fluid mineral development described under *Nature and Type of Effects*.

Impacts from Solid Minerals

Impacts under Alternative D would be similar to those described for Alternative B. However, proposed actions for locatable mineral development would be analyzed on a case-by-case basis in cooperation with the State of Montana and reviewed to prevent unnecessary or undue degradation of GRSG habitat. These actions and the application of RDFs (**Appendix D**) to the extent consistent with applicable law would reduce, but not completely eliminate, impacts from locatable mineral development on vegetation as described under *Nature and Type of Effects*.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to those described for Alternative B. In addition, fuels management projects in PHMA would be designed to incorporate greater flexibility to maximize the acreage protected and ES&R treatments would be monitored. These proposed modifications to fire and fuel management would result in an increase in the protection of sagebrush vegetation compared to Alternative A, and a reduction in the likelihood of impacts from fire and fuels management described under *Nature and Type of Effects*.

Impacts from Habitat Restoration and Vegetation Management
Impacts from habitat restoration and vegetation management under Alternative D would be similar to those described for Alternative B. However, this alternative includes consideration of other threatened, endangered, or sensitive species, which may change the proportions of vegetation communities that would be protected in certain instances.

Impacts from ACECs
Impacts would be the same as under Alternative B.

4.5.9 Proposed Plan Amendment

Impacts from GRSG Management
The Proposed Plan Amendment would incorporate additional GRSG management, including adaptive management, a regional mitigation strategy, density and disturbance caps, and lek buffers. If an adaptive management hard trigger response was met, PHMA would be the top priority for regional mitigation, habitat restoration, and fuels reduction treatments. These actions could offer incidental protection for vegetation by maintaining or restoring habitat and by limiting habitat disturbance in certain areas.

Impacts from Travel and Transportation Management
Impacts would be the same as under Alternative D.

Impacts from Recreation
Impacts would be similar to those described under Alternative B. The Proposed Plan Amendment would provide additional incidental protection to vegetation by limiting construction of new recreation facilities.

Impacts from Lands and Realty
Impacts from ROW management would be similar to those described under Alternative D. However, under the Proposed Plan Amendment, both PHMA and GHMA would be ROW avoidance areas for high-voltage transmission lines and large pipelines (366,045 acres) with limited exceptions, while PHMA would also be minor ROW avoidance areas for minor ROWs. In addition, PHMA would be ROW exclusion areas, and GHMA would be ROW avoidance areas for wind and solar energy. RDFs would be applied to further reduce impacts. These measures could offer an increased level of protection from disturbance and habitat loss compared to Alternative A.

Land tenure adjustments would have impacts similar to Alternative C. Under the Proposed Plan Amendment, public ownership would be maintained in both PHMA and GHMA, except where land exchange would provide a net conservation gain to GRSG or if there would be no direct or indirect adverse impact on conservation of the GRSG. SFAs would be recommended for withdrawal from the General Mining Act of 1872. Since GRSG rely on

undisturbed vegetation, these measures would provide increased incidental protection to vegetation in the planning area.

Impacts from Range Management

Impacts from range management would be similar to those described for Alternative D. In addition, under the Proposed Plan Amendment, the BLM would prioritize the review and processing of grazing permits/leases in PHMA, particularly in areas not meeting Land Health Standards. RDFs would be implemented to reduce impacts when developing or modifying water developments in GRSG habitat. Together, these measures would help to improve and protect habitat quality throughout the planning area and therefore would have a beneficial incidental impact on vegetation.

Impacts from Fluid Minerals

Impacts from fluid minerals management would be similar to those described for Alternative D. However, additional restrictions on geophysical exploration within PHMA would be proposed. Therefore, these measures would have a beneficial incidental impact on vegetation in the planning area.

Impacts from Solid Minerals

The BLM would determine coal suitability on a case-by-case basis as leases or lease modifications are submitted. Currently, there is no coal potential in the planning area. Therefore, no impacts on vegetation are expected from coal management.

The Proposed Plan Amendment would provide additional protections in the planning area by recommending 53,440 acres of SFAs for withdrawal from locatable mineral entry. Additionally, 281,487 acres of PHMA would be closed to nonenergy solid mineral leasing and to new mineral material disposals. RDFs (**Appendix D**) would be applied to mineral material disposals and nonenergy solid mineral leasing within GHMA. RDFs (**Appendix D**) would be applied to locatable mineral development to the extent consistent with applicable law outside SFA. These actions would beneficially impact vegetation in the planning area.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to those described for Alternative D. In addition, Burn Plans would be required to meet the required criteria under the Proposed Plan Amendment if prescribed fire is used in GRSG habitat. This would provide additional incidental protections to vegetation by reducing risks to GRSG habitat from use of prescribed fire.

Impacts from Habitat Restoration and Vegetation Management

Impacts from habitat restoration and vegetation management under the Proposed Plan Amendment would be similar to those described for Alternative D. However, the Proposed Plan Amendment includes consideration of desired vegetation conditions within SFAs and PHMA, and proposes conifer treatment

where it encroaches into sagebrush habitat. Though these treatments may change the proportions of vegetation communities that would be protected in certain instances (e.g., conifer habitats are negatively impacted near GRSG leks), overall management would represent a beneficial impact on vegetation.

Impacts from ACECs

Impacts would be the same as under Alternative B.

4.6 WILDLAND FIRE MANAGEMENT AND ECOLOGY

4.6.1 Methods and Assumptions

Indicators

Table 4-9 provides a summary of the indicators that were used to analyze the effects on wildland fire management and ecology under each alternative.

Table 4-9
Comparison of Wildland Fire Management and Ecology Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Change in percent departure from Historic Reference Conditions (FRCC) across the planning area	No change	Minor increased percent departure	Minor increased percent departure	Minor increased percent departure	Minor increased percent departure
A substantial change in the likelihood or severity of wildland fire (based on level of restrictions on uses that may introduce sources of ignition)	Fires more likely to occur, due to few restrictions	Fires less likely to occur, due to restrictions that reduce risk of fire	Fires are more likely as a result of increased fine fuels from removing grazing	Fires are less likely due to restrictions that reduce risk of fire	Fires are less likely due to restrictions that reduce risk of fire
Management actions that substantially inhibit a response to wildland fire or appropriate treatments to prevent wildland fire	No change	No change	Increase	No change	No change

Assumptions

The analysis includes the following assumptions:

- Fire is an important functional, natural disturbance in many of the ecological systems found in the planning area.
- A direct relationship exists between fuel loading and potential fire intensity and severity.
- Demand for fuels treatments would likely increase over the life of this plan.

4.6.2 Nature and Type of Effects

Impacts on wildland fire management result from changes in fire frequency and intensity, and the ability to employ fire-suppression methods, all of which would affect management of fire and related costs within the planning area. As discussed in **Section 3.7** the majority of lands in the decision area have moderate to high level of departure from historic conditions and related fire risk. Actions which change condition class from highly altered ecosystems to one closer to historical conditions could reduce the risk of losing key ecosystems as well as decrease fire risk and management costs in the long term.

Many different resource uses may introduce additional ignition sources into the planning area, which increase the probability of wildland fire occurrence and the need for fire-suppression activities. Fire intensity can be affected by activities that decrease fuel loading, such as vegetation treatments and harvesting of timber products, and activities that alter the composition and structure of vegetation communities. High-intensity fires generally result in a greater loss of vegetation cover, changes to soil chemistry, damage to root structures, and a greater ability for nonnative species to become established (Verma and Jayakumar 2012).

Transportation and travel management can impact fire frequency by changing the level of risk of human caused ignitions. The risk of ignition is increased where travel is less restrictive, particularly where motorized vehicles travel cross-country. All forms of travel encourage the spread of invasive weeds (CEC 2012), particularly cheat grass, which can shift fire regimes and increase fire behavior potential. Conversely, if management restricts access, wildfire risk may be decreased. In addition, transportation management may impact fire suppression efforts; when routes are closed and rehabilitated, they become unavailable for response to wildfires, limiting access opportunities.

Similarly, the level and type of recreation permitted can impact fire risk. Increased recreational use may increase the probability of unintentional fire starts from human caused ignitions and the need for fire suppression. Recreation management may reduce this risk by providing targeted activities and outcomes.

Surface disturbance caused by development would generally contribute to the modification of the composition and structure of vegetation communities (including increases in noxious weed proliferation) in the vicinity of developed areas, which could then be more likely to fuel high-intensity fires. This could cause an increase in program costs because of the increased potential for fire.

Lands and realty actions may indirectly result in development and associated fire risk. For example, issuance of land use authorizations can result in indirect impacts by increasing the risk of human-caused ignition should construction of transmission lines, renewable energy projects, or other development occur.

Likewise, the development of energy and minerals resources could increase the risk of wildfires by introducing new ignition sources (Shlisky et al. 2007). Associated facilities, infrastructure and transmission lines can increase fire and fuels program costs while decreasing fire management flexibility with regards to suppression options. Energy development also poses hazards to firefighters, including unknown toxins, facility protection, evacuation of industry personnel, and dangerous overhead power lines. Fire programs could incur additional costs to train firefighting personnel for emergency situations associated with energy development.

Limitations on mineral development would have an indirect effect of decreased fire but only when additional leasing would otherwise be likely to occur. This would be due to less development, fewer vehicles, and less construction equipment, all of which would decrease the chance of human ignition. In areas with limited potential for development, changes to mineral management are likely to have negligible impacts on fire management.

The potential for invasive species establishment or increase may follow construction and could impact fire management actions through increased risk of fire and need for fire management.

Grazing management can impact the ability to manage fire as a natural process through changes in fine fuels availability (e.g., grasses). Livestock grazing reduces fuel loads; the voluntarily relinquishment of grazing allotments and allocation of those lands to other uses may lead to increased fuels in site-specific locations. Conversely, increasing AUMs could reduce fuel loads.

Vegetation and weed treatments that decrease standing vegetation could decrease the intensity of wildland fires and allow fires to be more easily controlled. For example, efforts to reduce incursion of nonnative annual grasses (primarily cheatgrass), and proliferation of other noxious and invasive weeds, would promote healthy plant communities and an associated lower risk of high-intensity wildfire (USGS 2006). Used appropriately, prescribed fire would be compatible with noxious weed control; however, the presence of noxious weeds and the potential of weeds to spread after a prescribed fire would need to be monitored on a site-specific basis. Conversely, management actions that retain shrub and cover may result in increased fuel loading and increase the likelihood and intensity of wildland fire.

Management actions that are intended to improve, create, or re-establish healthy ecological conditions in various vegetation types benefit the fire and fuels program in the long term by promoting the most efficient use of fire and fuels fire management program resources. Conversely, prioritizing fire suppression can limit management options and increase costs for fire management programs.

Special designations, such as ACECs, and the management of sensitive resources can restrict fuels treatments on a site-specific basis. For example, in areas where preservation of particular species or habitats is emphasized, management options and fuels treatments may be limited.

Impacts from mineral split estate are covered under the discussions of impacts from fluid and solid minerals. As such, there is no further discussion of mineral split estate in this section.

4.6.3 Impacts Common to All Alternatives

Impacts from Travel and Transportation Management

As all alternatives would limit motorized and mechanized travel to existing routes, fire risk would be minimized due to lack of off-road motorized travel. In addition, site-specific travel management would be implemented with designation of roads as well as seasonal and permanent closures, where appropriate. Due to these management actions, impacts across all alternatives would have similarities, although the areas prioritized for travel designation planning would vary by alternative. Administrative access would be maintained for fire suppression and fire management activity except in the case of road closure and rehabilitation; therefore, the impacts on access would be minimal.

Impacts from Solid Minerals

There is currently no coal development in the planning area, but any coal development within the planning area would require a plan amendment EIS. Due to this, impacts on fire management from coal would be negligible across all alternatives.

4.6.4 Alternative A

Impacts from Travel and Transportation Management

As described under *Impacts Common to all Alternatives*, travel would be limited to existing routes and site specific travel management plans would be completed slightly decreasing the likelihood of human caused ignition due to site-specific restrictions on access. Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. This could also reduce the risk of fire. Overall, fire risk from human-caused ignitions would be minimized due to lack of off-road motorized travel.

Impacts from Recreation

Under Alternative A, there are no recreation management actions that would result in impacts on fire management.

Impacts from Lands and Realty

Alternative A places the fewest restrictions on ROW development; restrictions would be imposed on a case-by-case basis. Under this alternative, two areas in

the decision area (30,193 acres) continue to be managed as ROW avoidance areas, with no land managed as a ROW exclusion area. As discussed under *Nature and Type of Effects*, fire risk could be increased as a result of development from ROW authorizations; therefore, this alternative would have a high potential for impacts from lands and realty on fire management.

Impacts from Range Management

Under Alternative A, grazing of all classes of livestock would be open on 570,112 acres of BLM-administered land in the decision area. Additionally, Alternative A would allocate up to 103,806 AUMs in the decision area. Allowing grazing throughout the majority of the planning area may decrease the risk of wildfire due to the reduction in fuel load caused by livestock grazing. Land treatments for livestock forage would be conducted as needed to effectively manage livestock, treatments could reduce fuels and the risk of wildland fire as described under *Nature and Type of Effects*.

Impacts from Fluid Minerals

Under Alternative A, fluid mineral could be developed on currently leased lands. Alternative A places the fewest restrictions on fluid minerals. Due to this, the chance of human ignition under this alternative would be the highest and could indirectly effect fire management through increased fire risk as discussed under *Nature and Types of Impacts*.

Impacts from Solid Minerals

Alternative A has the greatest number of acres open to mineral development for salable minerals, nonenergy leasables, and new locatable mineral development. This increases the risk of human-ignited fire. Alternative A could impact fire management through increased human-caused ignition where development occurred. There is currently no coal development in the planning area. Under Alternative A, the planning area would continue to be available for coal exploration licenses; however, any coal development within the planning area would require a plan amendment EIS, so impacts would be minimal.

Impacts from Fire and Fuels Management

Alternative A would place few restrictions on fire and fuels management, and therefore would have the fewest impacts on fire management. Alternative A would allow for the continued use of prescribed burning in support of resource management objectives and would allow for the continued use of mechanical and chemical treatments. Intensive fire suppression would be applied to protect public safety and property an areas with high resource value.

Due to the flexibility in management of prescribed and wildland fires, fire suppression costs are likely to be the lower under Alternative A as compared to all action alternatives.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative A, surface disturbing activities greater than a 1/4 acre would require rehabilitation and re-vegetation using primarily native plants. The use of native plants under this alternative could contribute to healthy plant communities and an associated lower risk of high-intensity wildfire. Vegetation could be managed to alter fuel loads and management activities could be conducted as appropriate to meet resource needs under this alternative. Impacts on fire management would therefore be lower under Alternative A than under all action alternatives.

Impacts from ACECs

Under this alternative no new ACECs would be designated to protect GRSG habitat; therefore, there would be no new restrictions on fire management from ACECs. This flexibility in GRSG habitat could allow fire and fuels management to function at greater efficiency and lower costs.

4.6.5 Impacts Common to Alternatives B-D and the Proposed Plan Amendment

Under all Alternatives B-D and the Proposed Plan Amendment, the BLM would implement a defined monitoring strategy tracking and documenting the implementation of land use plan decisions as defined in **Section 2.7.2** and **Appendix B**. Should changes be detected in sagebrush availability, additional changes may be required to fire management actions, which could change the time, cost, or effectiveness for management.

4.6.6 Alternative B

Impacts from Travel and Transportation Management

As described under *Impacts Common to all Alternatives*, travel would be limited to existing routes. Under Alternative B, route construction would be limited in PHMA, and the use of existing roads would be emphasized. Additional restrictions would be placed on upgrades, route construction, and realignment. This would further limit the risk of human-caused ignition in PHMA by reducing exposure to machinery, vehicles, and personnel. However, closing roads could have some impacts on the ability to respond to fire due to reduced access. Like Alternative A, temporary closures could reduce the risk of fire from vehicle use.

Impacts from Recreation

Alternative B would only allow SRPs in PHMA that have neutral or beneficial effects on PHMA. SRPs that have neutral or beneficial effects on PHMA would likely not include recreation involving motorized vehicles. As such, this management action would likely decrease the risk of human-caused ignitions and the subsequent strain on fire management.

Impacts from Lands and Realty

Alternative B would manage 233,219 acres as ROW exclusion areas and 112,341 acres as ROW avoidance areas (102,633 acres more than under

Alternative A). Managing PHMA as an exclusion area for new ROW authorizations would reduce the potential for development and the associated fire risk and suppression costs on BLM-administered lands. However, there could be increased development on private lands with associated fire risks.

Impacts from Range Management

Alternative B allows for the same number of AUMs as Alternative A; however, management actions may impact fire management.

Under Alternative B, retirement of permitted grazing uses could lead to increased fuels in those site-specific locations, as discussed under *Nature and Type of Effects*. In addition, only forage treatments which would also enhance GRSG habitat would be permitted, with additional potential for increase in fuels. However, management focused on achieving ecological site potential would likely reduce invasive species and increase habitat health, and could decrease the risk of fire and consequently reduce the need to respond to human-fueled ignitions in the area in the long term.

Assessment of land health and changes to grazing systems to achieve land health standards would be prioritized in PHMA; therefore, the impacts of range management actions in Alternative B would be focused on these areas.

Impacts from Fluid Minerals

Under Alternative B, fluid mineral development could occur on currently leased lands. RDFs and conservation measures would be applied to existing leases as COAs in PHMA. These measures would limit surface occupancy on federal leases as well as impose seasonal limits on exploratory drilling. These measures would place restrictions on development in PHMA with a related decrease in fire risk in this portion of the planning area.

Impacts from Solid Minerals

Under Alternative B, surface mining of coal would be prohibited in PHMA and new mining leases would also be prohibited, unless all surface disturbances were placed outside of PHMA. PHMA would be closed to salable mineral disposal as well as nonenergy leasable and the area would be proposed for withdrawal from new locatable mineral development. These actions would reduce the impact from solid minerals on fire management within PHMA because development that could increase the risk of human-caused ignition would not occur in PHMA.

Impacts from Fire and Fuels Management

Under Alternative B, fuel treatments would be allowed on a limited basis with an emphasis on protecting existing sagebrush ecosystems in PHMA. Management options for fuels treatments in PHMA would be limited in this alternative. In addition, suppression of wildland fire to protect GRSG habitat would be emphasized along with public safety and property. Restrictions placed on fire and fuels management under this alternative, such as seasonal closures, no treatments in known winter range, and restrictions on the use of fire to

treat sagebrush in low precipitation zones, could impact the ability to efficiently manage fuels and could increase costs of vegetation management and fire suppression.

Under this alternative the use of livestock to reduce fuel loads would be evaluated. This could provide one option to decrease the risk of wildfire and consequently reduce strain on fire management, particularly in PHMA.

Impacts from Habitat Restoration and Vegetation Management
Under Alternative B, many of the management actions focus on the use of native plants in order to create landscapes that most benefit the GRSG. The emphasis of native plants under this alternative could contribute to healthy plant communities and an associated lower risk of high-intensity wildfire. However, habitat parameters could also limit the options for fuels treatment and could therefore increase costs of treatment compared to Alternative A.

Specifically, fire and fuels management may be impacted by the requirement to use native seeds whenever possible for restoration. Since the introduction and establishment of exotic plants species can contribute to a departure from historic fire regimes, a focus on native plants can create a habitat that is less susceptible to wildfires; therefore, places less burden on fire management programs (Hann and Bunnell 2001).

Impacts from ACECs
Impacts would be the same as under Alternative A.

4.6.7 Alternative C

Impacts from Travel and Transportation Management
Travel management actions would be similar to that described in Alternative B, but would be applied to both PHMA and GHMA. Risk of human-caused ignition would slightly decrease for both PHMA and GHMA, as compared to Alternative A. Due to limitations on new roads in most PHMA, access for fire management may be reduced, resulting in increased time or cost for suppression compared to Alternative A.

Impacts from Recreation
Impacts would be the same as under Alternative A.

Impacts from Lands and Realty
Alternative C would manage 345,560 acres as ROW exclusion area, which is more than under any other alternative. Under this alternative, zero acres would be managed as ROW avoidance area. The restrictions placed on ROWs under this alternative would likely restrict the amount of construction and motorized travel to and from construction sites that would occur on GRSG habitat. Due to the restrictions on ROW development in PHMA and GHMA under this

alternative, potential fire risks from lands and realty actions would be the least of any alternative.

Impacts from Range Management

Due to the reduced number of AUMs in PHMA and GHMA (0 AUMs permitted, 100 percent less than Alternative A) and the large number of areas closed to livestock grazing under this alternative (337,165 acres), the fuel load in PHMA an GHMA would be higher and the risk of fire would be greater under this alternative than the others. In addition, grazing management actions to improve forage for livestock may indirectly reduce fuels on BLM-administered lands as well as adjacent private lands where grazing occurs. Leases/permittees can also act as important partners in fire suppression activities.

Impacts from Fluid Minerals

Under Alternative C, fluid minerals could be developed on currently leased lands. Restrictions on fluid minerals would be similar to that described under Alternative B but would be applied to PHMA and GHMA. Seasonal restrictions would be further expanded, further decreasing the potential for human-related fire ignition from development.

Impacts from Solid Minerals

Management actions under Alternative C would be similar to those described under Alternative B, except would extend to both PHMA and GHMA. This would result in a further reduced risk of human-caused ignition, which would result in an even lower risk of impacting fire management.

Impacts from Fire and Fuels Management

Under Alternative C, impacts would be similar to those applied under Alternative B, but would be applied to both PHMA and GHMA. The restrictions placed on fire management would be more stringent under this alternative, which would result in greatest impacts on the fire and fuels management program. Increases in restrictions on fire management could result in increased program costs. Costs of suppression are likely to be highest under Alternative C due to the emphasis of suppression within both PHMA and GHMA.

Impacts from Habitat Restoration and Vegetation Management

Impacts under Alternative C would be similar to those under Alternative B, except that management actions under Alternative C would apply to both GHMA and PHMA; therefore, the potential for long-term benefits to ecosystem health could be slightly increased, but the costs for treatments also would increase.

Impacts from ACECs

Under Alternative C, an ACEC covering 96,246 acres would be designated to protect GRSG habitat. There could be reduced flexibility for hazardous fuels treatments on the 96,246 acres managed as an ACEC. The reduction in

flexibility could result in higher program costs and could reduce the programs ability to efficiently suppress fires within the ACEC.

4.6.8 Alternative D

Impacts from Travel and Transportation Management
Impacts would be similar to those described under Alternatives B and C. However, under Alternative D, new routes could be built if criteria are met. This would reduce the risk of human-caused ignitions because travel would be on designated routes rather than potentially as cross-country travel. Additionally, construction of new roads may increase access for fire management, resulting in decreased time or cost for suppression.

Impacts from Recreation
Impacts would be the same as under Alternative B.

Impacts from Lands and Realty
Under Alternative D, 256,167 acres would be managed as ROW avoidance area, which is 225,974 acres more than under Alternative A. ROWs would be allowed in GHMA with measures to minimize surface-disturbing and disruptive activities. Similar to Alternative A, no land would be managed as ROW exclusion areas, and no land would be identified for withdrawal. Development could still occur, resulting in the potential for human-related ignitions. Having only avoidance areas would allow for infrastructure in areas with the least impact on coordination with adjacent private lands.

Impacts from Range Management
Impacts under Alternative D would be similar to those under Alternative B, but with additional measures taking into account local conditions and resources and working with state and federal agencies. As a result, impacts on fire management would be similar to those described under Alternative B, but they may be more suited to site-specific conditions, resulting in improved ecological conditions and decreased fire risk. Costs and time for fire management activities may also be reduced.

Impacts from Fluid Minerals
Conservation measures specific to GRSG management would be applied to existing leases as COAs, but with greater flexibility for site-specific modifications. There would be potential for fire risk from development activities, but risk should be decreased compared to Alternative A.

Impacts from Solid Minerals
Impacts would be similar to those described under Alternative A.

Impacts from Fire and Fuels Management
Under Alternative D, impacts would be similar to those described in Alternative C, with restrictions on fuels treatment options in both PHMA and GHMA. In

Alternative D, the emphasis would also be placed on tailoring management objectives to local site conditions and monitoring sites to ensure treatments are helping to meet habitat objectives; therefore, habitat may be further improved in the long term. Fire suppression actions and related impacts would be the same as described under Alternative B.

Impacts from Habitat Restoration and Vegetation Management
Impacts under Alternative D would be similar to those under Alternative B, but would include provisions to restore habitat for other priority species in the project area and to consult with local landowners to coordinate management. As a result, actions may be undertaken in a manner consistent with local site conditions, improving the habitat and decreasing fire risk and costs in the long term.

Impacts from ACECs
Impacts would be the same as under Alternative A.

4.6.9 Proposed Plan Amendment

Impacts from Travel and Transportation Management
Impacts would be the same as Alternative B.

Impacts from Recreation
Impacts would be similar to those under Alternative D. The Proposed Plan Amendment restricts the construction of recreation facilities unless a net conservation gain would result. Restrictions on construction of new facilities could have the potential to reduce the risk of human-caused ignitions as compared to Alternative A. As a result, development and related risk of ignition would be reduced in GRSG habitat but potentially shift to areas outside of GRSG habitat if a cap is reached.

Impacts from Lands and Realty
Under the Proposed Plan Amendment, 366,045 acres would be managed as ROW avoidance and 233,219 acres would be managed as ROW exclusion for wind and solar energy only, compared to Alternative A, which would not manage any acres as ROW exclusion and manages less than 10,000 acres as ROW avoidance. Additionally, under the Proposed Plan Amendment 53,440 acres would be proposed for withdrawal from locatable mineral entry, compared with no acres under Alternative A. The BLM would also enact density and disturbance caps on development in GRSG habitat. All these actions could reduce the potential for human related ignitions as compared with Alternative A by decreasing the human presence in GRSG habitat as well as the presence of construction equipment and vehicles, as discussed under *Nature and Type of Impacts*.

Impacts from Range Management
Impacts under the Proposed Plan Amendment would be similar to those under Alternative D. In addition, the BLM would prioritize the review and processing

of grazing permits/leases in PHMA, particularly in areas not meeting Land Health Standards. These measures would help to improve and protect habitat quality in PHMA, likely reducing the fire risk in the long term.

As in Alternatives B, C, and D, the Proposed Plan Amendment would allow for review of voluntarily relinquished allotments to determine whether they should remain available for grazing. Conversion of voluntarily relinquished allotments to other land uses could lead to increased fuels in those site-specific locations, and potentially result in a slightly higher risk of fire in site-specific areas.

Impacts from Fluid Minerals

Impacts under the Proposed Plan Amendment would be similar to those under Alternative D. Addition of the density and disturbance caps would further reduce the level of development and related risk of ignition. Additional limitations on disturbance near GRSG known lek sites (**Appendix M**) would also further limit ignition risk in these specific areas.

Impacts from Solid Minerals

Under the Proposed Plan Amendment, more acres would be withdrawn and proposed for withdrawal from locatable mineral entry than under Alternative A. Additionally, more acres would be closed to nonenergy solid mineral leasing than under Alternative A (281,487 acres under the Proposed Plan Amendment compared to 0 acres under Alternative A). This could result in a lower amount of risk of human-caused ignition under the Proposed Plan Amendment than under Alternative A due to decreased use of construction equipment, vehicles, and development.

Impacts from Fire and Fuels Management

Impacts under the Proposed Plan Amendment would be similar to those under Alternative D. In addition, Burn Plans that meet the four criteria would be required under the Proposed Plan Amendment if prescribed fire is used in GRSG habitat. Prescribed fires would only be used in PHMA if the COT objectives are addressed and met; this could impact the ability to efficiently manage fuels. However, prescribed fire has historically had only a minor role in vegetation management; therefore, impacts on overall costs and vegetation management strategies would be minimal.

Implementation of the management actions in the Proposed Plan Amendment would vary based on site-specific conditions. The GRSG Wildfire and Invasive Species Habitat Assessment (as described in **Appendix K**) would help the wildland fire management program direct its efforts and resources efficiently, especially when combined with the variety of fuels treatment options available under the Proposed Plan Amendment.

Impacts from Habitat Restoration and Vegetation Management

Impacts under the Proposed Plan Amendment would be similar to those under Alternative D but would set specific goals for sagebrush canopy cover. Retaining

cover could increase fuel loads and the likelihood and intensity of wildland fire. However, removal of conifers near sagebrush habitats would be extended under the Proposed Plan Amendment, and this could potentially reduce the intensity of fires by reducing fuel loads.

Under the Proposed Plan Amendment, the adaptive management strategy (**Section 2.7.1**) dictates that should specific "hard triggers" for GRSG habitat conditions be met, GRSG habitat needs would be reassessed to determine if priorities for fuels and fire management have changed. This adaptive management strategy may result in additional changes to fire management actions to increase management effectiveness.

Impacts from ACECs

Impacts would be the same as under Alternative D.

4.7 FLUID MINERALS

4.7.1 Methods and Assumptions

Analysis of impacts on fluid minerals from this RMPA focuses on the impacts of RDFs and conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on fluid minerals would result from application of COAs on existing leases. An indirect impact would result from removal of a road, which would change the economic feasibility of developing a site. Additional actions or conditions that might cause direct or indirect impacts on fluid minerals are described under *Indicators*, below.

Indicators

Indicators were developed and used to analyze impacts of the management actions under each alternative on fluid minerals. **Table 4-10** illustrates how the indicators vary under each alternative.

Table 4-10
Comparison of Fluid Minerals Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Application of COAs on fluid mineral development activities on leased parcels for the protection of GRSG	No change	Increase	Increase	Increase	Increase
Restrictions on geophysical exploration in GRSG habitat	No change	Increase	Increase	Increase	Increase

Assumptions

The analysis includes the following assumptions:

- Oil and gas operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer. The BLM can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease.
- Valid existing leases would be managed under the stipulations in effect when the leases were issued.
- Management actions and conservation measures also apply to fluid mineral leasing on lands overlying federal fluid mineral estate. This includes federal mineral estate underlying BLM-administered lands, private lands, and state lands.
- New information may lead to changes in delineated GRSG habitat. New habitat areas, or areas that are no longer habitat, may be identified. This adjustment would typically result in small changes to areas requiring the stipulations or management actions stated in this plan. Modifications to GRSG habitat would be updated in the existing data inventory through plan maintenance.
- If an area has been leased, it could be developed; however, not all leases would be developed within the life of this RMPA.
- As the demand for energy increases, so would the demand for extracting energy resources.
- As discussed in **Section 3.8** the primary oil and gas fields within the planning area are largely played out. The level of oil and gas activity in the planning area is likely to remain relatively stable for the life of the Judith Resource Area (BLM 1994) and Headwaters (BLM 1984) RMPs with the possible exception of the Heath Shale play. Activity in the vicinity of the Heath Shale play could dramatically increase if this play proved to be economic.

4.7.2 Nature and Type of Effects

The following analysis describes the nature and type of impacts that could affect fluid minerals in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area. Details on how the occurrence of each impact would vary by alternative are described under the various subheadings.

Buying out or cancelling leases in occupied habitat would prevent future development of existing oil and gas leases. However, in accordance with 43 CFR, Part 3108.3, leases may only be cancelled by the Secretary of the Interior when 1) the lessee has a nonproducing well and fails to comply with the provisions of the law, regulations, or lease; or 2) the lease was improperly

issued. Cancellation of a lease with a producing well requires a judicial proceeding.

Applying COAs, which include RDFs (per **Appendices C** and **D**) and conservation measures outlined in **Chapter 2**, to existing leases would directly impact fluid mineral leasing. These RDFs and conservation measures would include standards such as noise restrictions, height limitations on structures, design requirements, water development standards, remote monitoring requirements, and reclamation standards. Application of these requirements through COAs would impact fluid mineral development by increasing its costs if it resulted in the application of additional requirements and/or use of more expensive technology (such as remote monitoring systems) than would otherwise have been used by operators. Impacts of these COAs would be mitigated where exceptions limit their application. This would occur where a COA was not applicable (e.g., a resource is not present on a given site) or where site-specific consideration merited slight variation.

Placing limits on geophysical exploration could reduce the availability of data on fluid mineral resources and could increase costs of fluid mineral development if the limits required use of more expensive technology. Timing limitations on geophysical exploration would delay development activities and could cause equipment shortages because all exploration would be occurring during the same time period.

Requiring master development plans and unitization could cause direct impacts on fluid minerals through increased costs of fluid mineral extraction by delaying the permit approval process until such additional site-specific planning efforts are completed. However, unitization typically has been initiated at the operator's discretion.

Requiring bonds in the amount necessary to cover full reclamation upon completion of the project could deter fluid mineral exploration and development by increasing up-front costs when these costs could have previously occurred after economic resources had already been recovered.

Identification of areas in which to acquire additional surface or mineral estate containing GRSG habitat would have no impacts on fluid minerals because it would not result in application of management actions to additional acres of surface or fluid mineral estate. If areas for acquisition were identified, acquisition would occur only in areas containing existing federal mineral leases, which are already subject to BLM management actions applicable to both the surface and the mineral estate through the fluid minerals program.

Implementing management for the following resources would have negligible or no impact on fluid minerals and are therefore not discussed in detail: travel and transportation management, recreation, lands and realty, range management,

solid minerals, fire and fuels management, habitat restoration and vegetation management, and ACECs.

4.7.3 Impacts Common to All Alternatives

Impacts from Fluid Minerals (Including Mineral Split Estate)
Under all alternatives, the BLM would continue to require a bond in accordance with 43 CFR, Part 3104. The amount of the bond would have to be at least the minimum amount described in the regulations to "ensure…reclamation of the lease area(s) and the restoration of any lands or surface waters adversely affected by lease operations after the abandonment or cessation of oil and gas operations on the lease(s)."

4.7.4 Alternative A

Impacts from Fluid Minerals (Including Mineral Split Estate)
Under Alternative A, existing oil and gas leases would continue to be developed according to their lease terms. BMPs and COAs could be applied to mitigate or prevent impacts on BLM-administered lands or other resources. If COAs were applied, impacts would be the same type as those described under *Nature and Type of Effects*.

Geophysical exploration would continue to be allowed within the decision area under Alternative A.

4.7.5 Alternative B

Impacts from Fluid Minerals (Including Mineral Split Estate)
Under Alternative B, RDFs and conservation measures would be applied as COAs to existing leases on 12,851 acres of PHMA with federal mineral estate (31 percent of the 42,063 acres of existing leases in the decision area). These actions would increase impacts on fluid minerals in comparison with Alternative A by requiring additional standards that could increase time and costs related to development. In addition to limitations on surface disturbance and timing of exploratory drilling (and mitigation measures for when surface disturbance does occur), the COAs would require unitization when necessary to minimize harm to GRSG and may require the completion of Master Development Plans instead of processing individual APDs. Cost impacts of these required actions would be the same type as those described under *Nature and Type of Effects*. The BLM would not apply COAs that would eliminate reasonable opportunities to develop the lease.

Additionally, existing leases within habitat with important wildlife values, including PHMA or GHMA (for Alternatives B–D and Proposed Plan Amendment), that expire could be renominated for leasing. However, reissuance of those leases would be deferred according to the protest resolution decision.

Geophysical exploration would be allowed within the 385,693 acres of PHMA with federal mineral estate but would be subject to timing limitations (TLs) and other restrictions. Impacts would increase compared with Alternative A and would be the same type as those described under *Nature and Type of Effects*, including delays on development activities and the potential for equipment shortages.

4.7.6 Alternative C

Impacts from Fluid Minerals (Including Mineral Split Estate)

Management actions under Alternative C would be similar to those under Alternative B, but they would apply to existing leases on 32,753 acres of PHMA and GHMA with federal mineral estate (78 percent of the 42,063 acres of existing leases in the decision area). Management of geophysical exploration would be the same as under Alternative B but would apply to 639,927 acres of PHMA and GHMA. In addition to applying the restrictive management to more acres, Alternative C would call for COAs implementing seasonal restrictions on vehicle traffic and human presence associated with exploratory drilling. This alternative also would limit new surface disturbance on existing leases to three percent per section, with some exceptions where effective mitigation could offset the loss of GRSG. Additionally, the BLM would explore amendment, cancellation, and buyout of leases. Impacts of requiring RDFs and conservation measures are similar to Alternative B. Possible cancellation or buyout of leases would prevent future development of existing oil and gas leases in those areas.

4.7.7 Alternative D

Impacts from Fluid Minerals (Including Mineral Split Estate)

Under Alternative D, the BLM would apply the same RDFs to the same acreage as under Alternative B. However, the conservation measures applied would differ. No quantitative percentage limit, surface occupancy buffers, or TL would apply to surface disturbance; rather, surface disturbance would avoid or minimize disturbance to GRSG and their habitat. Off-site mitigation would be considered to offset habitat losses. Operation costs could increase as described under *Nature and Types of Impacts* from application of conservation measures, but operators would be able to extract resources throughout the year and would maintain flexibility in siting options for ancillary facilities on their lease. Unitization would occur on a case-by-case basis in the same manner as described under Alternative A.

In addition to RDFs and limitations on disturbance, noise limitations and structure height restrictions would be applied as COAs under Alternative D. This would require additional standards that could increase time and costs related to development.

Impacts related to geophysical exploration would be the same as those under Alternative B.

4.7.8 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including regional mitigation that could limit future oil and gas activates in certain areas. As noted above in *Nature and Types of Effects*, placing limits on oil and gas activities could impact fluid mineral development by increasing its costs if it resulted in the application of additional requirements and/or use of more expensive technology than would otherwise have been used by operators.

Impacts from Fluid Minerals (Including Mineral Split Estate)

Under the Proposed Plan Amendment, the BLM would apply the same RDFs to the same acreage as under Alternative D. However, the only conservation measures applied would be restrictions on permanent structures that create movement and mitigation requirements for habitat losses. These restrictions would apply in both PHMA and GHMA, and mitigation measures would have to provide a net conservation gain for the species rather than simply offsetting losses. Operation costs could increase as described under *Nature and Types of Impacts* from application of conservation measures, but operators would be able to extract resources throughout the year. Unitization would occur on a case-by-case basis in the same manner as described under Alternative A.

Application of the density and disturbance caps in PHMA and lek buffers in PHMA and GHMA could impact existing oil and gas activities by preventing new surface development. New surface development on existing leases could be restricted if the cap were exceeded. However, the BLM would not apply the density and disturbance caps in a manner that would eliminate reasonable opportunities to develop an existing lease. If a project that would exceed the degradation cap or density cap cannot be deferred due to valid existing rights or other existing laws and regulations, the BLM would fully disclose the local and regional impacts of the proposed action in the associated NEPA document. Applying lek buffer distances when approving actions could also restrict development of infrastructure-related fluid mineral development.

Impacts related to geophysical exploration would be the same as those under Alternative B.

4.8 SOLID LEASABLE MINERALS

4.8.1 Methods and Assumptions

Solid leasable minerals in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area are coal and hardrock minerals underlying acquired lands (see **Section 3.9**).

Analysis of impacts on solid leasable minerals from this RMPA focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on solid leasable minerals would result from managing an area as unacceptable for coal leasing or closed to nonenergy solid mineral leasing. An indirect impact would result from removal of a road, which would change the economic feasibility of developing a site. Additional actions or conditions that might cause direct or indirect impacts on solid leasable minerals are described under *Indicators*, below.

Indicators

Table 4-11 provides a summary of the indicators that were used to analyze the effects on solid leasable minerals under each alternative.

Table 4-11
Comparison of Solid Leasable Minerals Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
The amount of land closed to nonenergy solid mineral leasing	0	284,659	457,744	0	279,097
Application of RDFs that can be placed on solid minerals	No change	Increase	Increase	Increase	Increase

Where information is available, consideration is given to the potential for solid leasable mineral resources on lands unacceptable for or closed to leasing. For example, an indicator of an impact on solid leasable minerals is if there were substantial reductions in federal leasing and development of solid mineral resources in high potential areas.

In areas that are acceptable or available for solid mineral leasing, factors that affect solid leasable mineral extraction include permitting, regulatory policy, public perception and concerns, travel management, transportation, proximity to sensitive areas, low commodity prices, taxes, and housing and other necessities for workers.

The amount of area that would fall under restrictions outlined in **Chapter 2**, and the impact of those restrictions on solid leasable mineral development, are considered below in the analysis of each alternative.

Assumptions

The analysis includes the following assumptions:

- There are no existing coal leases in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area and no known coal potential in GRSG habitat.

- If an area is leased, it could be developed; however, not all leases would be developed within the life of this RMPA.
- As demand for energy increases, so would the demand for energy resources.
- Management actions and conservation measures also apply to solid mineral leasing on lands overlying federal solid mineral estate, which includes federal mineral estate underlying BLM-administered lands, privately owned lands, and state-owned lands. There are 453,969 acres of federal solid mineral estate within the decision area (345,560 acres of BLM-administered surface with federal solid minerals and 108,409 acres of non-BLM administered surface with federal solid minerals).

4.8.2 Nature and Type of Effects

As discussed in **Section 3.9** there has been no coal development within the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area, and there is no known coal development potential within GRSG habitat. As a result, coal resources in the planning area are not expected to be impacted by management actions proposed in this RMPA and are not discussed further in this section.

Management actions that close areas to nonenergy solid mineral leasing would directly impact nonenergy solid leasable minerals by reducing the area available for leasing. If the most lucrative resources were closed to leasing, prospectors may have to prospect and extract resources that are not as lucrative, thus decreasing profit. Prospecting and extraction operations may also move to nearby private minerals within GRSG habitat, where the BLM could not impose measures to protect GRSG.

Application of RDFs would increase the cost of nonenergy solid leasable mineral development if it resulted in increased reclamation and mitigation expense, siting operations in less economical locations, or delays of operations.

Implementing management for the following resources would have negligible or no impact on solid leasable minerals and are therefore not discussed in detail: travel and transportation management, recreation, lands and realty, range management, fluid minerals, mineral split estate, fire and fuels management, habitat restoration and vegetation management, and ACECs.

4.8.3 Alternative A

Impacts from Solid Minerals

Approximately 2,538 acres (less than one percent) of the federal solid mineral estate would remain closed to solid minerals, precluding future leasing in these areas. The types of impacts from these closures are the same as those discussed under the *Nature and Type of Effects*, reducing the area available to leasing and extraction.

Under Alternative A, prospecting permits would continue to be issued within the decision area on a case-by-case basis. Site-specific environmental review would continue to assess impacts and develop mitigating measures, which could result in increased restrictions.

4.8.4 Alternative B

Impacts from Solid Minerals

Under Alternative B, all PHMA (279,097 acres, or 61 percent of the solid minerals decision area) would be closed to nonenergy solid mineral leasing. Once current prospecting permits expired, they would not be able to be renewed. Current prospecting permits could not lead to lease issuance. This would close all areas where nonenergy solid mineral prospecting has occurred within the planning area in the past 20 years. Impacts on the nonenergy solid minerals program would increase compared with those under Alternative A and would be the same type as described under *Nature and Type of Effects,* reducing the area available to leasing and extraction.

RDFs outlined in **Appendix C** would apply to existing nonenergy solid mineral leases in PHMA. These RDFs would place limitations on road design, construction, and use; would restrict operations to minimize surface disturbance; would limit construction; would maximize reclamation efforts to meet GRSG habitat needs; and would place other standards and restrictions on solid mineral operations. Impacts would be the same type as those discussed under *Nature and Type of Effects* and could increase extraction costs

4.8.5 Alternative C

Impacts from Solid Minerals

Impacts under Alternative C are similar to those under Alternative B, except that more acres (453,969 acres, or 100 percent of the solid minerals decision area) would be closed to nonenergy solid mineral leasing. Also, more acres with existing leases would be subject to the mandatory application of the solid mineral RDFs outlined in **Appendix C**. Impacts would increase compared with those under Alternative A and would be the same type as described under *Nature and Type of Effects*. This includes fewer areas available for leasing and extraction and other standards and restrictions on solid mineral operations; these could also increase costs.

4.8.6 Alternative D

Impacts from Solid Minerals

Management of solid leasable minerals under Alternative D would be similar to that under Alternative A except that, under Alternative D, new prospecting permits would be subject to the RDFs outlined in **Appendix D**. These RDFs would place limitations on surface disturbing activities and human presence, require mitigation actions for habitat losses, limit siting options for facilities, and

place other standards and restrictions on solid mineral operations. Impacts and costs would increase compared with those under Alternative A and would be the same type as described under *Nature and Type of Effects*.

4.8.7 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including regional mitigation that could limit future solid leasable mineral development in certain areas. As noted above in *Nature and Types of Effects*, placing limits on development could increase the cost of solid leasable mineral development if it resulted in increased reclamation and mitigation expense, siting operations in less economical locations, or delays of operations.

Impacts from Solid Minerals

Impacts of closing PHMA to nonenergy solid mineral leasing under the Proposed Plan Amendment would be the same as those under Alternative B. The same RDFs described under Alternative D would be applied, but they would apply to existing leases rather than new prospecting permits. Impacts and costs would increase compared with those under Alternative A and would be the same type as described under *Nature and Type of Effects*.

Application of the density and disturbance caps in PHMA and lek buffers in PHMA and GHMA could impact nonenergy solid leasable mineral activities by preventing new surface development. New surface development on existing leases in PHMA could be restricted if the cap were exceeded. However, the BLM would not apply the density and disturbance caps in a manner that would eliminate reasonable opportunities to develop an existing lease. If a project that would exceed the degradation cap or density cap cannot be deferred due to valid existing rights or other existing laws and regulations, the BLM would fully disclose the local and regional impacts of the proposed action in the associated NEPA document. In cases where development was allowed for existing leases, mitigation requirements would increase the cost of development. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to nonenergy solid leasable mineral development.

4.9 SOLID MINERALS (LOCATABLE MINERALS)

4.9.1 Methods and Assumptions

Analysis of impacts on locatable minerals from this RMPA focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on locatable minerals would result from withdrawal of an area from locatable mineral entry. An indirect impact would result from removal of a road, which would change the economic feasibility of developing a site. Additional actions or conditions that might cause direct or indirect impacts on locatable minerals are described under *Indicators*, below.

Indicators

Table 4-12 provides a summary of the indicators that were used to analyze the effects on locatable minerals under each alternative.

Table 4-12
Comparison of Solid Minerals (Locatables) Indicators by Alternative

Indicator	Alternative				
	A	**B**	**C**	**D**	**Proposed Plan Amendment**
The amount of land *withdrawn* from locatable mineral entry	4,298	4,298	4,298	4,298	4,298
The amount of land *recommended for withdrawal*	0	281,900	457,774	0	53,440
Application of restrictions, such as RDFs, to the extent consistent with applicable law, and conservation measures, that can be placed on locatable mineral development activities to prevent unnecessary or undue degradation of GRSG habitat	No change	Increase	Increase	Increase	Increase

Where information is available, consideration is given to the potential for locatable mineral resources on lands recommended for withdrawal from entry. For example, an indicator of an impact on locatable minerals is if there were substantial withdrawals of locatable mineral resources in high potential areas.

In areas that are open to locatable mineral entry, factors that affect locatable mineral extraction include permitting, regulatory policy, public perception and concerns, travel management, transportation, proximity to sensitive areas, low commodity prices, taxes, and housing and other necessities for workers.

The amount of area that would fall under restrictions outlined in **Chapter 2**, and the impact of those restrictions on locatable mineral development, are considered below in the analysis of each alternative.

Assumptions

The analysis includes the following assumptions:

- There is no known locatable mineral potential within occupied habitat in the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area.
- Management actions and conservation measures also apply to locatable mineral development on lands overlying federal mineral

estate, which includes federal mineral estate underlying BLM-administered lands, privately owned lands, and state-owned lands. There are 453,969 acres of federal solid mineral estate within the decision area (345,560 acres of BLM-administered surface with federal minerals and 108,409 acres of surface with federal solid minerals not administered by the BLM).

4.9.2 Nature and Type of Effects

As discussed in **Section 3.10** no locatable mineral development potential has been identified within GRSG habitat in the current RMPs (BLM 1992, Appendix C [as amended]). As a result, locatable minerals in the planning area are not expected to be impacted by management actions proposed in this RMPA.

Withdrawal or closure of an area to mining development removes the mineral resources in that area from being able to be accessed and extracted. This represents an impact on the potential discovery, development, and use of those resources by decreasing the availability of mineral resources. Because there is no known locatable mineral development potential in GRSG habitat, withdrawing lands is not expected to impact the locatable minerals program.

Implementing management for the following resources would have negligible or no impact on locatable minerals and are therefore not discussed in detail: travel and transportation management, recreation, lands and realty, range management, fluid minerals, mineral split estate, fire and fuels management, habitat restoration and vegetation management, and ACECs.

4.9.3 Alternative A

Impacts from Solid Minerals

Under Alternative A, approximately 4,298acres (less than one-percent of the total federal solid mineral estate for locatable minerals) would remain withdrawn to the location of mining claims. New exploration and mining would be precluded in these areas, as discussed under *Nature and Type of Effects*.

Under Alternative A, locatable mineral development within the decision area would be reviewed on a case-by-case basis to prevent undue or unnecessary degradation. Site-specific environmental review would continue to assess impacts and develop mitigation measures.

4.9.4 Alternative B

Impacts from Solid Minerals

Under Alternative B, approximately 101 acres of PHMA and 2,437 acres of GHMA (2,538 acres total, same as Alternative A) would remain withdrawn to locatable mineral entry, precluding new exploration and mining. New exploration and mining would be precluded in these areas as discussed under *Nature and Type of Effects*.

To restrict locatable mineral development, the BLM must petition the Secretary of the Interior for withdrawal actions, with subsequent valid existing rights reviews for existing claims. Under Alternative B, 279,097 acres of PHMA would be recommended for withdrawal. As discussed under *Nature and Type of Effects*, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

In accordance with the FLPMA, it is the BLM's responsibility to prevent "unnecessary or undue degradation of the lands." In addition to performance standards (described under Alternative A), BLM would apply RDFs to the extent consistent with applicable law (per **Appendix C**) and conservation measures outlined in **Chapter 2** to any Notice or Plan of Operations on a case-by-case basis. As discussed under *Nature and Type of Effects*, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

4.9.5 Alternative C

Impacts from Solid Minerals

Under Alternative C, approximately 101 acres of PHMA and 2,437 acres of GHMA (2,538 acres total, same as Alternative A) would remain withdrawn to locatable mineral entry, precluding new exploration and mining. New exploration and mining would be precluded in these areas, as discussed under *Nature and Type of Effects*.

To restrict locatable mineral development, the BLM must petition the Secretary of the Interior for withdrawal actions, with subsequent valid existing rights reviews for existing claims. Under Alternative C, 453,969 acres of PHMA and GHMA would be recommended for withdrawal. As discussed under *Nature and Type of Effects*, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

Similar to Alternative B, RDFs would be applied to locatables to the extent consistent with applicable law and conservation measures would be applied to any Notice or Plan of Operations; however, these measures would apply to more acres under Alternative C. As discussed under *Nature and Type of Effects*, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

4.9.6 Alternative D

Impacts from Solid Minerals

Under Alternative D, approximately 101 acres of PHMA and 2,437 acres of GHMA (2,538 acres total, same as Alternative A) would remain withdrawn to the location of mining claims, precluding new exploration and mining. New exploration and mining would be precluded in these areas, as discussed under *Nature and Type of Effects*.

Similar to Alternative A, no additional lands within PHMA or GHMA would be recommended for withdrawal.

RDFs and conservation measures would be applied to any Notice or Plan of Operations in a manner similar to that described under Alternative B. However, additional RDFs would be applied to the extent consistent with applicable law where possible (see **Appendix D**). As discussed under *Nature and Type of Effects*, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

4.9.7 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including regional mitigation that could limit future locatable mineral development in certain areas. If a project that would exceed the degradation cap or density cap cannot be deferred due to valid existing rights or other existing laws and regulations, the BLM would fully disclose the local and regional impacts of the proposed action in the associated NEPA document. As discussed under *Nature and Type of Effects*, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

Impacts from Solid Minerals

Under the Proposed Plan Amendment, approximately 101 acres of PHMA and 2,437 acres of GHMA (2,538 acres total, same as Alternative A) would remain withdrawn to the location of mining claims, precluding new exploration and mining. New exploration and mining would be precluded in these areas as discussed, under *Nature and Type of Effects*.

To restrict locatable mineral development, the BLM must petition the Secretary of the Interior for withdrawal actions, with subsequent valid existing rights reviews for existing claims. Under the Proposed Plan Amendment, 53,440 acres within the SFA (PHMA) would be recommended for withdrawal. As discussed under *Nature and Type of Effects*, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

RDFs would be applied to the extent consistent with applicable law (see **Appendix D**) and conservation measures would be applied to any Notice or Plan of Operations (as described under Alternative D). As discussed under *Nature and Type of Effects*, there is no known locatable mineral potential in GRSG habitat, so no effect on locatable minerals is anticipated.

4.10 SOLID MINERALS (SALABLE MINERALS)

4.10.1 Methods and Assumptions

Analysis of impacts on salable minerals from this RMPA focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or

indirect. For example, a direct impact on salable minerals would result from closure of an area to salable mineral sales. An indirect impact would result from removal of a road, which would change the economic feasibility of and demand for developing a site. Additional actions or conditions that might cause direct or indirect impacts on salable minerals are described under *Indicators*, below.

Indicators

Table 4-13 provides a summary of the indicators that were used to analyze the effects on salable minerals under each alternative.

Table 4-13
Comparison of Solid Minerals (Salable Minerals) Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres closed to salable mineral disposal	2,538	284,659	457,774	2,538	2,538[1]
Acres managed as ROW avoidance areas	30,403	132,826	0	260,949	366,045
Acres managed as ROW exclusion areas	0	233,219	345,560	0	233,219[2]
Application of RDFs that can be placed on salable minerals	No change	No change	No change	Increase	Increase
Restrictions on salable mineral pits no longer in use	No change	Increase	Increase	Increase	Increase

[1]All acres would remain open to free use permits and expansion of existing pits except the 2,538 acres closed under all alternatives
[2]Exclusion applies to wind and solar only

Where information is available, consideration is given to the potential for salable minerals on lands closed to salable mineral disposal. For example, an indicator of an impact on salable minerals is if there were substantial closures to salable mineral disposal in high potential areas.

In areas that are open to salable mineral disposal, factors that affect salable mineral development include permitting, regulatory policy, public perception and concerns, travel management, transportation, proximity to sensitive areas, low commodity prices, taxes, and housing and other necessities for workers.

The amount of area that would fall under restrictions outlined in **Chapter 2**, and the impact of those restrictions on salable mineral development, are considered below in the analysis of each alternative.

Assumptions

The analysis includes the following assumptions:

- Existing salable mineral permits would not be affected by the closures proposed under this RMPA.
- Management actions also apply to salable mineral development on lands overlying federal mineral estate, which includes federal mineral estate underlying BLM-administered lands and land not administered by the BLM. There are 453,969 acres of federal mineral estate within the decision area (345,560 acres of BLM-administered surface with federal minerals and 108,409 acres of split estate).

4.10.2 Nature and Type of Effects

The predominant mining method for salable minerals is surface mining; therefore, any restrictions on surface-disturbing activities effectively close the subject areas to salable mineral mining.

Demand for salable minerals is generated primarily from road maintenance needs. Closure of areas to salable mineral sales would result in pits relocating nearby. If demand for salable minerals cannot be met by pits operated on federal lands, pits could move onto private lands where the BLM would lose the ability to implement mitigation measures.

Application of RDFs would increase the cost of salable mineral development if it were to increase reclamation and mitigation expense, site pits in less economical locations, or delay operations.

Requiring reclamation of salable mineral pits no longer in use could increase costs on developers.

Managing areas as ROW avoidance or exclusion could result in impacts on salable minerals because construction of new roads in these areas would likely decrease. As a result, demand for salable minerals needed for construction and maintenance would also decrease.

Implementing management for the following resources would have negligible or no impact on salable minerals and are therefore not discussed in detail: travel and transportation management, recreation, range management, fluid minerals, mineral split estate, fire and fuels management, habitat restoration and vegetation management, and ACECs.

4.10.3 Alternative A

Impacts from Lands and Realty

Under Alternative A, 9,708 acres would continue to be managed as ROW avoidance area. All other BLM-administered surface in the decision area would continue to be open to ROW authorization. The types of impacts from these closures would be the same as those discussed under *Nature and Type of Effects,* whereas construction of new roads in these areas would likely decrease thereby

decreasing demand for salable minerals needed for construction and maintenance.

Impacts from Solid Minerals

Approximately 2,538 acres (less than one percent) of the federal solid mineral estate in the decision area would remain closed to the salable minerals disposal, precluding future mining in these areas. The types of impacts from these closures would be the same as those discussed under *Nature and Type of Effects*, reducing the area available for access and extraction.

4.10.4 Alternative B

Impacts from Lands and Realty

Under Alternative B, 112,341 acres would be managed as ROW avoidance area and 233,219 acres would be managed as ROW exclusion area. The types of impacts from these closures would be the same as those discussed under *Nature and Type of Effects,* whereas construction of new roads in these areas would likely decrease thereby decreasing demand for salable minerals needed for construction and maintenance.

Impacts from Solid Minerals

Under Alternative B, approximately 279,097 acres of federal mineral estate in PHMA (61 percent of the solid minerals decision area) would be closed to the salable mineral disposal. The types of impacts from these closures would be the same as those discussed under *Nature and Type of Effects*, reducing the area available for access and extraction. If demand for salable minerals cannot be met by pits operated on BLM-administered lands, pits could move onto private lands where the BLM would lose the ability to implement mitigation measures.

Solid mineral RDFs outlined in **Appendix C** would apply to existing salable mineral operations in PHMA. These RDFs would limit road design, construction, and use; would restrict operations to minimize surface disturbance; would limit construction; would maximize reclamation to meet GRSG habitat needs; and would place other standards and restrictions on salable mineral operations. Impacts would be the same type as those discussed under *Nature and Type of Effects*.

In PHMA, salable mineral pits no longer in use would be restored to meet GRSG habitat conservation objectives. As described under *Nature and Type of Effects*, restoring pits could increase costs on developers for reclamation.

4.10.5 Alternative C

Impacts from Lands and Realty

Approximately 345,560 acres in PHMA and GHMA (100 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas under Alternative C. However, because all PHMA and GHMA would be

closed to salable minerals disposal under this alternative, the ROW exclusion areas would not impact the salable minerals program.

Impacts from Solid Minerals

Under Alternative C, approximately 453,969 acres of federal mineral estate in PHMA and GHMA (100 percent of the solid minerals decision area) would be closed to salable mineral disposal, the most of any alternative. The types of impacts from these closures would be the same as those discussed under *Nature and Type of Effects*, reducing the area available for access and extraction.

Similar to Alternative B, RDFs outlined in **Appendix C** would be applied to salable mineral operations in PHMA. Because more acres would be within PHMA and GHMA under Alternative C, the impacts of applying these RDFs would increase.

Similar to Alternative B, salable mineral pits no longer in use would be restored to meet GRSG habitat objectives; however, under this alternative this measure would apply to both PHMA and GHMA, thereby increasing the area of impact. The types of impacts from restoring pits no longer in use would be the same as those described under Alternative B; however, they may be greater because of larger area.

4.10.6 Alternative D

Impacts from Lands and Realty

Under Alternative D, 233,219 acres in PHMA (67 percent of BLM-administered surface in the decision area) would be managed as an ROW avoidance area. The types of impacts from these closures would be the same as those discussed under *Nature and Type of Effects,* whereas construction of new roads in these areas would likely decrease thereby decreasing demand for salable minerals needed for construction and maintenance.

Impacts from Solid Minerals

Management under Alternative D would be similar to that under Alternative A except that RDFs outlined in **Appendix D** would be applied to new salable mineral operations. These RDFs would limit surface disturbance and human presence, require mitigation actions for habitat losses, limit siting options for facilities, and place other standards and restrictions on salable mineral operations. Impacts would increase compared with Alternative A and would be the same type as those described under *Nature and Type of Effects.*

Similar to Alternative B, salable mineral pits no longer in use would be restored to meet GRSG habitat objectives. The types of impacts from restoring pits no longer in use would be the same as those described under *Nature and Type of Effects*, restoring pits could increase costs on developers for reclamation.

4.10.7 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including regional mitigation, application of the density and disturbance caps in PHMA, and lek buffers in PHMA and GHMA. This could impact mineral activities by preventing new surface development. New free use development or expansion of existing pits in PHMA could be restricted if the caps were exceeded, which could limit future salable mineral development in certain areas. As noted above in *Nature and Types of Effects*, placing limits on development could increase the cost of salable mineral development if it resulted in increased reclamation and mitigation expense, siting operations in less economical locations, or delays of operations.

Impacts from Lands and Realty

Similar to Alternative D, under the Proposed Plan Amendment, 233,219 acres in PHMA (67 percent of BLM-administered surface in the decision area) would be managed as an ROW avoidance area (ROW exclusion for wind and solar). As described under *Nature and Type of Effects*, this management could reduce road and infrastructure construction and thereby decrease demand for salable minerals needed for construction and maintenance. However, because PHMA would be closed to new salable mineral disposal, salable mineral activity in PHMA would already be decreased. ROW avoidance areas would have less of an independent impact on salable minerals.

Under the Proposed Plan Amendment, 112,341 acres in GHMA (33 percent of BLM-administered surface in the decision area) would be managed as an ROW avoidance area for high-voltage transmission lines, large pipelines, and wind and solar energy. As described under *Nature and Type of Effects*, this management could reduce road and infrastructure construction and thereby decrease demand for salable minerals needed for construction and maintenance.

Impacts from Solid Minerals

Management of PHMA under the Proposed Plan Amendment would be similar to that under Alternative B except that PHMA would be open to free use permits and expansion of existing active pits. Impacts would increase compared with Alternative A and would be the same type as those described under *Nature and Type of Effects*. However, impacts would be mitigated because some new pits and expansion of existing pits would be allowed. The same RDFs described under Alternative D would be applied to free use permits and expansion of existing pits in PHMA (see **Appendix D**). Impacts would increase compared with Alternative A and would be the same type as those described under *Nature and Type of Effects.*

Application of the density and disturbance caps in PHMA and lek buffers in PHMA and GHMA could impact salable mineral activities by preventing new

surface development. New salable mineral pits or expansion of existing pits could be precluded if the cap were exceeded in a BSU or a proposed project analysis area. In cases where development was allowed, mitigation requirements would increase the cost of development. Applying lek buffer distances when approving actions would also restrict salable mineral development.

Similar to Alternative B, salable mineral pits no longer in use would be restored to meet GRSG habitat objectives. The types of impacts from restoring pits no longer in use would be the same as those described under *Nature and Type of Effects*. Restoring pits could increase costs on developers for reclamation.

4.11 COMPREHENSIVE TRAVEL AND TRANSPORTATION MANAGEMENT

4.11.1 Methods and Assumptions

Travel allocations and designations support resource programs and are designed to help achieve their objectives. Therefore, CTTM is not considered to be in conflict with those resource programs. Impacts on travel and transportation from other resource areas include altering the existing transportation system, for instance by removing routes (i.e., reclaiming and revegetating the ROW) or by limiting or closing routes to certain modes of travel (such as designating routes as closed to OHVs).

Where a route closure would protect wildlife habitat, the impacts of the route closure (i.e., improved wildlife habitat) are to the wildlife resource program, not travel and transportation management. As a result, impacts of travel allocations on other resources and resource uses are discussed in the respective resource sections of this chapter. Therefore, while impacts on travel and transportation management from other program areas do occur and are considered as part of travel management planning, this section does not address the impacts on travel and transportation management from other resources and resource uses.

Indicators

Table 4-14 provides a summary of the indicators that were used to analyze the effects on travel and transportation management under each alternative.

Table 4-14
Comparison of Comprehensive Travel and Transportation Management Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Change in the types of transportation activities occurring on routes that may impact GRSG or habitat	No change	No change	No change	No change	No change

Table 4-14
Comparison of Comprehensive Travel and Transportation Management Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Change of designated OHV routes (such as from limited to closed)	No change	No change	No change	No change	No change
Number of acres where new route development would be allowed	No change	No change, with mitigation	Decrease 274,435 acres	No change, with mitigation	No change, with mitigation

Assumptions

The analysis includes the following assumptions:

- In the Lewistown Field Office Greater Sage-Grouse RMPA/EIS planning area (233,219 acres of PHMA and 112,341 acres of GHMA), OHV travel is, and will continue to be limited to existing routes until the BLM is able to complete site-specific travel management planning.
- The demand to increase and maintain travel routes on BLM-administered lands would continue to increase over 20 years, especially near communities and in areas of high-density oil and gas development.
- The BLM has no authority over other federal (non-BLM), state, or county roads on BLM-administered lands, so those routes are not included in the analysis.
- The travel designations would not affect ROW holders, permitted uses, state roads, or other valid existing rights. Travel closures/limitations apply only to public access. The CTTM process would establish ROWs as necessary for management of county roads.
- The incidence of resource damage would increase with the increasing use of BLM-administered lands.
- Administrative use authorizations are granted on a case-by-case basis with approval from the BLM.
- Implementation of a travel management plan would include increased public education, signing, enforcement, and resource monitoring in regard to travel management.

4.11.2 Nature and Type of Effects

Impacts on travel and transportation management are those that restrict or enhance travel (e.g., managing areas as closed or limited to OHVs and seasonal travel limitations). Current BLM management limits OHVs to existing roads and trails within the planning area. New travel and transportation management actions in response to GRSG habitat protection strategies could limit travel route miles and the types of activities allowed on those routes. Seasonal travel restrictions to prevent disruption of GRSG breeding and brood rearing activities would allow travel in defined areas only at specific times of the year. Additionally, management actions that restrict future route construction limit the ability of the travel network to accommodate increased travel demands over time. Conflicts among route users could increase if the existing network becomes congested.

CTTM decisions resulting in the closure or removal of routes in GRSG habitat areas would affect travel and transportation management throughout the entire planning area. Management for all other resources and uses would have negligible or no impact on CTTM and are therefore not discussed in detail.

4.11.3 Alternative A

Table 4-15 provides a comparison of acres open and closed to new road construction by alternative. Closed acres are based on the total area covered by four-mile buffers placed around active lek sites.

Table 4-15
Areas Open/Closed to New Route Construction by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Area open to new construction (acres)	345,560	345,560	71,125	345,560	345,560
Area closed to new construction (acres)	0	0	274,435	0	0

Impacts from Travel and Transportation Management

Under Alternative A, existing travel opportunities would be maintained. The BLM would continue to manage for a total of 695 miles of roads and trails throughout the decision area. Through site-specific planning, the BLM would designate roads and trails for motorized use. Roads and trails would be inventoried, mapped, and analyzed to the degree necessary to evaluate and designate the roads and trails as open, seasonally open, or closed. Until such time, motorized wheeled travel would continue to be limited yearlong to existing roads and trails and no areas would be entirely open to cross-country motorized wheeled travel or entirely closed, resulting in continued existing

impacts, as described above in the *Nature and Types of Effects*, into the foreseeable future.

Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could affect the convenience of access, as described above under *Nature and Type of Effects*.

4.11.4 Alternative B

Impacts from Travel and Transportation Management

Alternative B could result in more restrictions on existing travel and transportation opportunities than Alternative A. For areas within PHMA, the BLM would develop a travel and transportation management plan within five years of the ROD. The new plan would be used to evaluate the existing transportation network and as a basis for amending certain route designations. Access in PHMA could be diminished if the new plan closes or restricts travel on certain routes. Alternative B would also prohibit new route construction unless associated with valid existing rights and would preclude upgrading of existing routes in PHMA where such action would result in loss of GRSG habitat. This would limit future enhancements to travel opportunities.

Like Alternative A, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could affect the convenience of access, as described above under *Nature and Type of Effects.*

4.11.5 Alternative C

Impacts from Travel and Transportation Management

Under Alternative C, the BLM would develop a travel and transportation plan for areas in PHMA and GHMA within five years of the ROD. The four-mile lek buffers cover 274,435 acres (79 percent of the decision area). As a result, new road construction would be limited to 71,125 acres in the decision area. BLM management would also preclude upgrading of existing routes in PHMA and GHMA where such action would damage GRSG habitat. These actions would result in site-specific losses of opportunity for route construction and improved access. They would prevent the construction of new roads where they might otherwise be needed to improve access or functionality of the network.

Like Alternative A, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could affect the convenience of access, as described above under *Nature and Type of Effects.*

4.11.6 Alternative D

Impacts from Travel and Transportation Management

Under Alternative D, the BLM would continue to limit travel to existing roads and trails on 345,560 acres. The BLM would prepare a travel and transportation management plan to address all resource uses that would be completed within five years of the signing of the ROD. This plan would allow for subsequent route evaluation and designation of roads and trails. It would look at a range of alternatives for specific route designations to minimize impacts on GRSG habitat. During route designation and travel planning in PHMA, CTTM would evaluate the need for permanent or seasonal road or area closures where OHV use is causing or would cause considerable adverse effects upon habitat. Road reclamation would be determined on a case-by-case basis depending on whether the route provides specific benefits for public access and the route minimizes impacts on resources.

In PHMA, during site specific travel and transportation management planning, the BLM would limit route construction to realignments of existing routes if that realignment has a minimal impact on GRSG habitat, eliminates the need to construct a new road, or is necessary for motorist safety. All upgrades to existing routes would be evaluated on a case-by-case basis and would be subject to valid existing rights. If valid existing rights cannot be accessed via existing roads, then any new road construction would be built to absolute minimum standard necessary. When reseeding roads, primitive roads and trails in PHMA, appropriate seed mixtures would be used and transplanting sagebrush would be considered. In PHMA, restoration of roads, primitive roads and trails would be conducted if they are not designated in the future travel management plans. Alternative D would minimize impacts on travel and transportation management, while providing mitigation options for the protection of GRSG habitat.

4.11.7 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate an adaptive management approach. If travel management planning has not been completed within GRSG habitat, PHMA where the hard trigger was met would be the highest priority for future travel management planning efforts. If travel management has been completed within GRSG habitat in the BSU where the hard trigger was met, the BLM would re-evaluate designated routes to determine their effects on GRSG. If routes are found to be causing population-level impacts, the BLM would revise their designation status to reduce the effect. As noted above in *Nature and Types of Effects*, this could limit travel route miles and the types of activities allowed on those routes.

Impacts from Travel and Transportation Management

Impacts would be similar to those under Alternative D, except that applying lek buffers and the net conservation gain mitigation requirement in all GRSG habitat may limit long-term opportunities for route construction and upgrades. Similarly, the density and disturbance caps could limit the placement of routes over the long term.

This is not expected to significantly affect access or congestion because of the well-dispersed route network and use patterns. The action outlining BLM's authority to implement emergency closures via the CFRs would not result in additional or different impacts under the Proposed Plan Amendment because this authority is available to the BLM at all times.

4.12 RECREATION

4.12.1 Methods and Assumptions

Impacts on recreation can be direct or indirect. Management actions that alter or prohibit users' opportunities to access recreation areas or participate in recreation would result in a direct impact. Indirect impacts are those that change the physical, social, or administrative setting within which recreation takes place. In SRMAs and ERMAs, where management prescriptions are in place to achieve or maintain desired settings and activities, a change to the setting or availability of recreation opportunities would result in an impact.

Indicators

Table 4-16 provides a summary of the indicators that were used to analyze the effects on recreation under each alternative.

Table 4-16
Comparison of Recreation Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Change in recreation activities and participation rates in the planning and PHMA, especially those within SRMA and ERMA	No change	Opportunity for increase due to restrictions on surface disturbance	Greatest opportunity for increase in nonmechanized activities and greatest opportunity for decrease of motorized activities due to restrictions on surface disturbance	Opportunity for increase due to restrictions on surface disturbance	Opportunity for increase due to restrictions on surface disturbance

Table 4-16
Comparison of Recreation Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Change in the number and type of SRPs issued on an annual basis within the planning area and PHMA	No change	Decrease in SRPs that are not beneficial or neutral	Decrease in SRPs that are not beneficial or neutral	Decrease in SRPs that are not beneficial or neutral	Decrease in SRPs that are not beneficial or neutral
Access	No change	Potential decrease in motorized access	Decrease in motorized access due to a decrease in roads	Potential decrease in motorized access	Potential decrease in motorized access

Assumptions

The analysis includes the following assumptions:

- Traditional recreational uses in the planning area, such as hunting and fishing, would continue as people seek outdoor family-oriented activities; an active retired population spends its disposable time and income on recreation; and as other areas of the country become more urbanized.
- The LFO would continue to manage the Judith River SRMA and 13 ERMAs in accordance with existing policies and management constraints, particularly in the Judith River SRMA, due to non-contiguous land holdings.
- Outdoor recreation would continue to be an important component of the local economy.
- Substantial increases in recreation could negatively impact GRSG habitat.
- The potential for resource impacts and conflicts between all types of users would increase with increasing use.
- Demand for SRPs would remain steady or gradually increase over time.
- The BLM would continue to issue SRPs on a discretionary basis.

4.12.2 Nature and Type of Effects

Impacts on recreation are frequently the result of management actions related to other resources and resource uses (for example, special status species habitat protection) and stipulations placed on resource uses. New management

actions to preserve GRSG habitat would affect a variety of resources and uses, which would in turn affect recreation.

BLM management of areas as unsuitable for public utilities (i.e., ROW exclusion areas) protects recreation opportunities. Managing areas as ROW avoidance can limit development that would be incompatible with nearby recreation uses.

On lands with existing oil and gas leases and facilities, the recreation setting would be altered during construction by equipment, noise, dust, vehicles, night lighting, pipelines, and human activity. Fluid mineral development that requires surface occupancy generally impacts recreation management objectives, opportunities, and activities. Oil and gas development can impact recreation opportunities if the development conflicts with existing recreation activities.

Minerals development and disposal result in short- and long-term impacts during construction and operations by displacing recreation opportunities. Closure of certain areas to mineral development decreases the likelihood for conflict with recreation users and maintains desired recreation settings.

Travel management affects recreation opportunities and the overall recreation experience by managing for access to areas where recreation activities take place. Closure of routes to motorized travel can decrease access to recreation uses, while at the same time reducing conflicts between motorized and non-motorized recreation activities. Travel and transportation management policies that close routes to OHV use directly affect recreation opportunities in the closed area and can increase OHV impacts outside the closure boundary. Management actions that restrict future route construction limit the ability of the travel network to accommodate increased recreational demands, such as increased OHV use, over time. Conflicts among users could increase if the existing network becomes congested.

Where lands are open to livestock grazing, impacts on recreation can result. The intensity of the impact varies based on recreation activity, visitor expectation, and nature of the grazing activity. Range improvements help to reduce conflicts by keeping grazing animals away from popular recreation areas, particularly SRMAs and ERMAs. Structural range improvements may also hinder cross-country movement by hunters, bird watchers, hikers, and other recreationalists.

Development of renewable energy projects, such as wind, could result in the loss of recreation opportunities. Management of areas as ROW exclusion and avoidance areas can minimize impacts from renewable energy projects.

BLM management for ACECs often includes restrictions on surface-disturbing activities within the ACEC boundary, which could directly or indirectly affect recreation opportunities within an ACEC. At the same time, management

prescriptions for ACECs can help maintain the existing physical setting by preserving natural landscapes.

Implementing management for certain resources would have negligible or no impact on recreation and are therefore not discussed in detail. Resources not likely to have an effect on recreation include fire and fuels management, and habitat restoration and vegetation management. Impacts from mineral split estate are covered under the discussions of impacts from fluid and solid minerals. As such, there is no further discussion of mineral split estate in this section.

4.12.3 Impacts Common to All Alternatives

Impacts from Lands and Realty

Under all alternatives, impacts on recreation opportunities from existing ROWs would continue. The restoration of discontinued or abandoned ROWs pursuant to FLPMA guidelines would reduce the potential for long-term impacts. Particularly in situations where the ROW includes a linear obstruction such as a fence; removal of the feature could improve recreation user experiences.

Impacts from Solid Minerals

Although BLM management prescriptions under the alternatives would vary, there is no foreseeable solid leasable (coal) or locatable mineral potential in the decision area which would result in no impacts on recreation across all alternatives.

4.12.4 Alternative A

Impacts from Travel and Transportation Management

Under Alternative A, through site-specific planning, the BLM would designate roads and trails for motorized use. Roads and trails would be inventoried, mapped, and analyzed to the degree necessary to evaluate and designate the roads and trails as open, seasonally open, or closed. As a result, the potential for conflicts among different types of recreation users, such as hikers and OHV operators, would continue under Alternative A.

Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could affect the convenience of OHV use, as described above under *Nature and Type of Effects*.

Impacts from Recreation

BLM management under Alternative A would result in no additional measures to protect GRSG habitat. No new impacts from BLM management actions to recreation would occur.

Impacts from Lands and Realty

Under Alternative A, 215 total miles of existing ROWs, including roads, telephone and power lines, pipelines, and railroads, may (in the case of roads, some may play a part in the recreational experience) continue to impact recreation opportunities. A total of 9,708 acres associated with the Acid Shale-Pine Forest ACEC and Judith River Canyon would continue to be managed as ROW avoidance areas, concurrently protecting existing recreation opportunities in those areas.

BLM-administered lands would continue to be available for ROWs on a case-by-case basis, in accordance with Title V of FLPMA and 43 CFR, Part 2800. All ROW applications would be reviewed using the criteria of following existing corridors wherever practical and avoiding the proliferation of separate ROWs. Recreational opportunities could be diminished where new ROWs are authorized.

Renewable energy projects, such as wind facilities, would be authorized through the ROW authorization process. See **Section 4.21** for impact analysis regarding renewable energy development.

Impacts from Range Management

Under Alternative A, PH and GH would continue to be open to grazing. Impacts on recreationists would be consistent with the *Nature and Types of Effects*, especially where cattle grazing areas overlap prime big game hunting areas. Impacts of grazing on SRPs would continue to be evaluated on a case-by-case basis through the SRP issuance process.

Impacts from Fluid Minerals

Under Alternative A, oil and gas development would continue to impact recreational opportunities on 8,120 leased acres throughout the decision area, including 3,851 acres in GH and 2,786 acres in GH. Refer to *Nature and Types of Effects*, above for the nature of impacts on recreation from fluid mineral development. Impacts on recreationists include activities and disturbance related to exploration, development, and operations.

Impacts from Solid Minerals

There are three existing sand and gravel pits in the decision area, each less than five acres in size. Under Alternative A, salable material disposal is expected to continue to have no impact on SRPs because the sand and gravel pits do not conflict with areas or activities currently experiencing demand for SRPs.

Impacts from ACECs

Under Alternative A, the Acid Shale-Pine Forest ACEC would continue to provide a rural, undeveloped experience for popular recreation activities such as hunting, OHV use, hiking, birding, and nature photography.

4.12.5 Alternative B

Impacts from Travel and Transportation Management

Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. BLM would also evaluate the need for permanent or seasonal road closures during CTTM planning under Alternative B. Should the BLM determine there is a need to close certain routes those closures could restrict route-based recreation opportunities. Areas where routes would be closed could include areas where permitted recreation activities take place.

Under Alternative B, the BLM would only allow new routes where access to valid existing rights is necessary and does not currently exist. While new routes could improve certain recreation experiences such as OHV operation, actions proposed under Alternative B would reduce the potential for new conflicts between motorized travel and existing recreation uses that do not require motorized vehicle operation.

Impacts from Recreation

Under Alternative B, the BLM would consider the effects of SRPs on PHMA. Impacts on the number or types of SRPs would only occur if the BLM determines that a proposed SRP activity negatively affects PHMA. If SRPs are reduced, there would be a corresponding reduction in organized recreation opportunities on BLM-administered lands in the planning area. Because BLM has not identified a conflict between hunting and PHMA, this alternative is anticipated to have little or no impact on big game or upland bird hunting SRPs. Only SRPs that are neutral or beneficial in PHMA would be allowed.

Impacts from Lands and Realty

Under Alternative B, PHMA would be designated as ROW exclusion area and GHMA would be designated ROW avoidance area. Additionally, under Alternative B, the BLM would take advantage of opportunities to remove, bury, or modify existing power lines within PHMA. A long-term reduction in the amount of acres dedicated to ROWs and above-ground linear features, such as transmission lines and pipelines, would improve recreation opportunities as described under *Nature and Types of Effects*, potentially limiting development that would be incompatible with nearby recreation uses.

Impacts from Range Management

Impacts under Alternative B would be the same as those described above under Alternative A.

Impacts from Fluid Minerals

Restrictions such as TLs on fluid mineral development in PHMA under Alternative B would decrease the potential for oil and gas development conflicting with recreation users. The benefits of reduced surface disturbance

and less construction activity associated with oil and gas development would be consistent with the effects described under *Nature and Types of Effects*. Restriction of geophysical exploration to helicopter-portable drilling methods could diminish the quality of certain recreation activities, such as hunting, if helicopter operations are in proximity to key big game or bird hunting areas or existing SRMAs and ERMAs.

Impacts from Solid Minerals

Proposed BLM management actions for Alternative B would include the closure of all PHMA to salable mineral disposal. In addition, mineral pits no longer in use would be restored. Since there are only three small sand and gravel pit operations in the decision area, a reduction in salable mineral disposal would have a neutral effect or slightly enhance recreation opportunities by minimizing salable material extraction and hauling activities that have the potential to conflict with hunting, fishing, birding, camping, and other recreational activities. A change in the amount of salable material disposal under Alternative B would have a neutral effect on SRPs.

Impacts from ACECs

Impacts on recreation under Alternative B for ACECs are the similar to those described under Alternative A. In addition to management actions under Alternative A, Alternative B would include conservation measures consistent with the identified management actions and constraints identified for PHMA. This would provide additional opportunities for an undeveloped experience for popular recreation activities, such as hunting, OHV riding, hiking, birding, and photographing nature.

4.12.6 Alternative C

Impacts from Travel and Transportation Management

Impacts under Alternative C would the same as those described above under Alternative B, with the exception that Alternative C would include additional prohibitions on new road construction within four miles of active leks. Under this alternative, new roads would be allowed on 71,125 acres (21 percent) of the lands within the decision area. Limitations on new construction would limit motorized recreation access to existing roads and trails with resultant impacts consistent with those described under *Nature and Types of Effects*.

Impacts from Recreation

BLM management prescriptions under Alternative C for GRSG habitat protection would not directly affect the permitting criteria for SRPs. Direct and indirect impacts on recreation under Alternative C would result from new management actions for other resources and uses, particularly the designation of 96,246 acres as an ACEC to protect GRSG habitat (see *Impacts from ACECs*, below).

Impacts from Lands and Realty

Under Alternative C, all GRSG habitat, with the exception of 843 acres of unitized areas, would be designated as ROW exclusion area for new ROW authorizations. Any new development would be allowed only if it could be contained within an existing ROW. Consistent with the impacts described under *Nature and Types of Effects*, the designation of the decision area as ROW exclusion area would benefit recreation uses. ROW exclusion area designations would also protect the desired settings in the Judith Valley SRMA and the 11 ERMAs.

Impacts from Range Management

Under Alternative C, 337,165 acres in PHMA and GHMA would be closed to grazing. As such, the potential for conflicts with recreationists would be reduced in those areas. Alternative C could also remove range improvements and prevent the construction of new water developments, which would further minimize potential conflicts with recreationists. However, additional fencing to keep livestock in designated non-GRSG habitat areas could conflict with certain recreation activities, such as hunting.

Impacts from Fluid Minerals

Restrictions on fluid mineral development in PHMA under Alternative C would decrease the potential for oil and gas development conflicting with recreation users. The benefits of reduced surface disturbance and less construction activity associated with oil and gas development would be consistent with the impacts described under *Nature and Types of Effects* and under Alternative B.

Impacts from Solid Minerals

Impacts would be the same as those described under Alternative B.

Impacts from ACECs

Under Alternative C, the BLM would designate 96,246 acres of GRSG habitat as a new ACEC. Designation of the ACEC could affect recreation opportunities by limiting surface disturbing activities within the ACEC boundaries. For example, motorized recreation associated with popular hunting, fishing, camping, and hiking areas could be limited by the designation. The ACEC designation could also limit the number and type of SRPs within the ACEC.

Designation of a new ACEC would at the same time limit ROW development, grazing, and mineral development. Management prescriptions for the ACEC would be to preserve, protect, conserve, restore, and sustain sage-brush populations and the sagebrush ecosystem upon which the GRSG depend. As a result, recreation activities such as hunting, fishing, birding, and nature photography that create little to no surface disturbance and benefit from rural settings would likely be enhanced under Alternative C.

4.12.7 Alternative D

Impacts from Travel and Transportation Management

Under Alternative D, the BLM would complete a CTTM plan in PHMA within five years of the signing of the ROD for the RMP. The plan would identify existing roads and trails and designate certain roads as open, closed or limited to motorized travel. The BLM would also consider permanently closing certain user-created roads and trails. Closure of certain routes could diminish route-based recreational opportunities, but could also reduce user conflict. Administrative off-road use for BLM personnel and BLM-authorized activities would be allowed. BLM-implemented CTTM would not apply to private or state lands within the LFO.

Impacts from Recreation

SRPs in PHMA may be allowed if they are neutral or beneficial for GRSG habitat. Impacts would be similar to Alternative B. This requirement would limit issuing SRPs for certain activities.

Impacts from Lands and Realty

Under Alternative D, PHMA would be managed as ROW avoidance areas for new ROW authorizations and wind energy projects. ROWs would continue to be allowed in GHMA. However, wind energy ROWs would be managed as ROW avoidance areas in GHMA. Any new development would be allowed only if it could be contained within an existing ROW. Consistent with the impacts described under *Nature and Types of Effects*, the designation of PHMA as a ROW avoidance area would benefit recreation activities that take place in undeveloped settings. Limitations on ROW development would also preserve the existing recreation settings in each of the 11 ERMAs in PHMA.

New ROWs in GHMA could conflict with dispersed recreation uses in those areas. The extent of the effects would be based on the location and type of any new ROW.

Impacts from Range Management

Impacts would be the same as those described under Alternative A.

Impacts from Fluid Minerals

Under Alternative D, conservation measures would be applied as COAs to existing federal leases. These measures would limit disturbance, noise, and high profile structures that conflict with popular recreation activities in the planning area.

Impacts from Solid Minerals

Denying salable mineral disposal applications that cannot provide adequate mitigation to prevent unnecessary or undue degradation would further limit potential conflict with recreational activities in the planning area.

Impacts from ACECs
Impacts would be the same as those described under Alternatives A and B.

4.12.8 Proposed Plan Amendment

Impacts from GRSG Management
The Proposed Plan Amendment would incorporate additional GRSG management, including density and disturbance caps, regional mitigation, and lek buffers that could limit future placement of recreation facilities in certain areas. Responses from the adaptive management plan may include limiting access over the short or long term. However, these same actions, along with management responses to adaptive management hard triggers, could limit other types of development that could conflict with recreation opportunities and activities.

Impacts from Travel and Transportation Management
Impacts would be the same as those described above under Alternative B.

Impacts from Recreation
Impacts from recreation management would be similar to those under Alternative B, except that there would be a prohibition on new recreational facilities that do not provide a net conservation gain to GRSG habitat. This could result in a long-term reduction in recreational opportunities and activities in areas where new facilities could not be designed or surface disturbance mitigated to provide for net GRSG habitat conservation gain or required for visitor health and safety or resource protection.

Impacts from Lands and Realty
Impacts would be similar to Alternative D, except that there would be additional restrictions on high-voltage transmission lines and large pipeline ROWs in GHMA. This would provide a greater benefit to recreation activities that take place in undeveloped settings by further limiting the type of development allowed in these areas. Management of GHMA as open to minor ROWs would allow for certain development projects (e.g., electrical distribution lines) with the potential to conflict with recreation activities. Retaining GHMA and PHMA lands unless disposal represents a net conservation gain would likely reduce the amount of land disposed and, as a result, would help maintain long-term recreation opportunities by preserving contiguous blocks of BLM-administered land.

Impacts from Range Management
Impacts on recreation from range management would be similar to those described above under Alternative A, except that the added emphasis on reviewing leases/permits for modification and renewal may indirectly benefit recreation activities and opportunities, especially those that utilize riparian areas and wet meadows.

Impacts from Fluid Minerals
Impacts would be the same as under Alternative D.

Impacts from Solid Minerals
Impacts would be similar to those under Alternative D, except that PHMA would be closed to new commercial mineral material sales. This would provide a slightly greater level of protection for recreation activities and opportunities by limiting surface disturbance in these areas.

Impacts from ACECs
Impacts would be the same as those described under Alternatives A and B.

4.13 RANGE MANAGEMENT

4.13.1 Methods and Assumptions

Indicators
Table 4-17 provides a summary of the indicators that were used to analyze the effects on range management under each alternative.

Table 4-17
Comparison of Range Management Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Permitted AUMs in GRSG habitat	69,408	69,408	0	69,408	69,408
Permitted AUMs in SFAs	N/A	N/A	N/A	N/A	10,946
Permitted AUMs in non-GRSG habitat	34,398	34,398	34,398	34,398	34,398
Prohibitions to the ability to construct or maintain range improvements and conduct treatments (infrastructure and vegetation)	No change	Increase	Increase	Increase	Increase
Acres closed to livestock grazing	0	0	337,165	0	0
Acres open to livestock grazing in GRSG habitat	337,165	337,165	0	337,165	337,165
Acres open to livestock grazing in SFAs	N/A	N/A	N/A	N/A	53,440
Acres open to livestock grazing in non-GRSG habitat	248,435	248,435	248,435	248,435	248,435
Changes to timing, duration or frequency of permitted use	No change	Potential increase	Increase	Potential increase	Potential increase

Assumptions
The analysis includes the following assumptions:

- All new and existing leases and permits would be subject to terms and conditions determined by the authorizing officer to achieve the

management and resource condition objectives for BLM-administered lands and to meet range land health standards, in accordance with BLM grazing regulations.

- Range improvements (e.g., fences, pipeline, water wells, troughs, and reservoirs) could result in a localized loss of vegetation cover throughout the improvements' useful life. Vegetation would be reestablished through reclamation practices along water pipelines within five years to the extent possible, whereas areas with fences, water wells, troughs, and reservoirs could contain a portion of the area disturbed during their useful life and would be revegetated when abandoned.
- The construction and maintenance of range improvements would continue in the decision area as needed. New range improvements could be subject to limitations, as defined in the plan. Range improvements lead to better livestock distribution and management, which would maintain or improve rangeland health and could benefit the forage base.
- Livestock grazing is a "diffuse" form of biotic disturbance that exerts repeated pressure over many years on a system; unlike point sources of disturbance such as fires, livestock grazing exerts repeated pressure across the landscape.
- Vegetation could be treated to allow the current level of AUMs to be maintained.

4.13.2 Nature and Type of Effects

Impacts on livestock grazing are generally the result of activities that affect forage levels, areas open to grazing, the class of livestock, the season of use and timing, the ability to construct range improvements, and human disturbance or harassment of livestock in grazing allotments. Key types of impacts are detailed below.

Protecting GRSG habitat may directly affect livestock grazing if management requires limitations to areas open to grazing or available AUMs, modification of grazing strategies, or changes to season of use, which could result in increased time and cost to leases/permittees. For example, management actions to enhance habitat for GRSG could affect livestock grazing by restricting grazing intensity, retiring permitted grazing uses in some areas, or changing livestock rotation patterns, in order to maintain residual herbaceous cover in sagebrush habitat (NTT 2011).

Management of vegetation resources to benefit GRSG, may, however, indirectly benefit livestock grazing by increasing vegetation productivity and improving forage in the long term, especially in cases where current conditions are not meeting or exceeding land health standards. For example, in allotments with a history of intensive grazing, transitions in the composition of sagebrush

communities may have occurred that have reduced cover or forage for GRSG (Cagney et al. 2010) and grazing livestock. However, when grazing management is put into place to promote health and vigor of the herbaceous community for livestock, this would generally result in sufficient herbaceous cover to meet habitat requirements for breeding GRSG (Objective SS-1.4).

Similarly, vegetation management designed to curb incursion of nonnative annual grasses or encroachment of shrubs, could remove forage in the short term. However, these treatments generally enhance rangeland conditions in the longer term (NTT 2011).

Unregimented livestock grazing can have adverse impacts on riparian ecosystems (Armour et. al 1991); therefore, managing riparian habitat can directly impact livestock grazing through excluding livestock at specific sites, increasing herding, adding range improvements (such as cross fences and water gaps), and adjusting season of use and livestock numbers. Managing riparian habitat to maintain PFC would benefit grazing livestock by indirectly providing cleaner and more reliable water sources and more dependable forage availability.

Protecting water quality and watershed health could require changes in livestock management, such as deferring or shortening grazing periods, adding range improvements, excluding grazing from riparian areas, establishing riparian pastures, and increasing livestock herding. In areas requiring exclusion of livestock or other restrictions on livestock management, these limitations could increase costs to lessees and permittees if changes were to reduce AUMs or result in more livestock movements.

Recreation can affect livestock grazing directly through human disturbance and indirectly through rangeland degradation. Direct disturbance can include undesired animal dispersing or trespassing due to gates left open by recreational users; animal displacement, harassment or injury from collisions or shooting; or damage to range improvements, particularly from the use of recreational vehicles or from recreational shooting. Disturbance could occur during the hunting season due to increased presence of people, vehicles, and noise. In addition, OHV use results in indirect impacts, such as increased dust on forage in high use areas, leading to lower forage palatability. Limitations on recreational use in GRSG habitat could indirectly benefit livestock by reducing direct disturbances.

Other direct long-term recreation impacts include disturbance caused by increased levels of human activities. The degree of impacts would vary with the intensity of recreation (that is, large numbers of people for SRP use would likely have a higher level of disturbance, as compared to frequent use by a small number of visitors), the timing of recreation activities (livestock could be more susceptible to disturbance during the spring when young are present), and location of recreation in the allotment (a higher level of disturbance could occur

near areas frequented by livestock such as water sources or salt licks). As stated above, limitations on recreational use in GRSG habitat could indirectly benefit livestock by reducing direct disturbances.

Limits on construction or use of transportation routes may affect livestock grazing practices. Road construction may cause loss of forage, harassment, and displacement; therefore, reduction of these activities may benefit livestock by reducing disturbances. Closing roads or trails not leading to range improvements would also increase forage availability when the area is rehabilitated or when natural rehabilitation occurs. Administrative cross-country travel would continue to be granted to grazing lessees and permittees to access grazing allotments and range improvement projects. Travel management actions for GRSG protection generally involve increased limitations or restrictions on travel management.

Wildland fire alters sagebrush habitat due to the long time required for sagebrush to regenerate, which may allow for invasion of invasive species (NTT 2011). Wildland fire would remove vegetation and forage over the short term but can result in short-term increases in forage post-fire. Impacts on livestock operations could also occur when BLM guidelines require a rest period following rehabilitation before grazing is reestablished. Changes in wildland fire suppression and fuels management to protect GRSG habitat would have varying effects on livestock grazing. Measures to protect sagebrush habitat might reduce the spread of wildland fire and the associated disruption to livestock. The management of habitat for GRSG using natural disturbance regimes, such as fire, and using vegetative treatments to accomplish biodiversity objectives to improve plant community resilience, could also benefit livestock grazing in the long term by maintaining a balance of seral stages. In general, selectively thinning woodland species benefits livestock grazing by creating a healthier grass, forb, and shrub community.

Restrictions on ROWs or land transfers may indirectly impact grazing by reducing construction impacts from development of these ROWs (such as dust, displacement and introduction of noxious weeds). In addition, such restrictions can also inhibit the development of water sources for livestock use where power may be required. Lands and realty actions taken to protect GRSG habitat would involve avoiding or excluding ROWs (e.g., for power lines, pipelines, and other structures) or land transfers in PHMA or GHMA. This could result in placement of such developments outside of GRSG habitat to which ROWs are relocated may see an increase in construction-related.

Energy and mineral development could impact grazing as follows: During the exploration and testing phase of mineral development, the footprint of disturbance is usually small and localized; therefore, minimal acres available for grazing would be directly impacted. However, during the exploration phase impacts on livestock dispersal and trespass could occur, increasing time and cost

to permittees and lessees. Outside of the exploration and testing phase, surface-disturbing mineral development directly affects areas of grazing in the short term during construction of well pads, roads, pipelines, and other facilities. Potential impacts include changes in available forage, reduced forage palatability because of dust on vegetation, limitations on livestock movement, harassment, temporary displacement of livestock, and an increased potential for the introduction and proliferation of noxious weeds that lack the nutritional value needed for productive grazing practices. In the long term, a smaller amount of grazing acreage is permanently lost from mining operations following rehabilitation. Improving roads associated with mineral development could facilitate livestock management operations by maintaining or improving access to remote locations within allotments. Properly implemented RDFs and reclamation mitigation measures would help maintain rangeland health and forage levels for livestock.

Management for energy and mineral development on split estate lands would not impact lessees and permittees with BLM-administered land leases; however, impacts could occur to livestock grazing on private, state or lands of other ownership as stated above.

Changes in livestock grazing management could impact grazing opportunities in a variety of ways. For example, implementing particular livestock grazing management requirements to benefit GRSG could affect livestock grazing by increasing operators' costs or changing required management actions. Some management requirements may result in short-term and long-term costs to lessees and permittees, or AUMs could decrease for some lessees and permittees due to the following:

- Implementation of a grazing strategy
- Change in season-of-use or livestock class
- Modification to grazing systems
- Construction or modification of range improvements
- Voluntary relinquishment of authorized grazing use

These management requirements could result in economic impacts on individuals and the community at large, both direct and indirect.

Some management changes may require a short-term output of cost for lessees and permittees, but would result in long-term benefits. For example, construction of range improvements to improve livestock distribution and allow use of a larger portion of the rangeland would generally enhance rangeland health in the long term; however, it would have short-term costs. Constructing off-site water sources and fencing riparian and spring sources could keep livestock away from sensitive riparian areas and provide a cleaner more reliable source of water for livestock but would similarly represent an increased cost for

lessees and permittees. See **Section 4.22**, Social and Economic Conditions, for a discussion of socioeconomic impacts from grazing.

ACECs may be designated to protect sensitive habitat for the benefit of GRSG. Grazing availability would depend on the designated ACEC management objectives. Restrictions can include total exclusion of grazing from the ACEC, limitations on the class of livestock animal, or the season, duration, or location that livestock are allowed to graze.

4.13.3 Impacts Common to All Alternatives

Impacts from Travel and Transportation Management

Under all alternatives, OHVs would be designated as limited to existing roads, primitive roads, and trails, thereby limiting the impacts on livestock grazing from dispersed travel as discussed under *Nature and Type of Effects*. Impacts, such as loss of forage, harassment, or displacement, from motorized and mechanized travel could occur, as described in *Nature and Type of Effects*. Access to authorized BLM uses, such as grazing allotments, would not be impacted in any alternatives. Site specific travel management planning could, when completed, reduce the potential for conflicts between range management and travel management.

Impacts from Fluid Minerals

There are 43,408 acres of existing leases in the decision area; this acreage would be consistent across all alternatives. Conflicts between livestock grazing and existing leases could be present as described in *Nature and Type of Effects*. Potential impacts include changes in available forage, reduced forage palatability because of dust on vegetation, limitations on livestock movement, harassment, temporary displacement of livestock, and an increased potential for the introduction and proliferation of noxious weeds that lack the nutritional value needed for productive grazing.

Impacts from Solid Minerals

Across all alternatives, impacts from coal management on livestock grazing would be minimal due to the lack of coal development in the planning area.

Impacts from Fire and Fuels Management

Objectives for all alternatives for fire management set target sage-brush canopy forage cover at no less than 15 percent cover, which is not necessarily optimal for range management as cover for livestock forage depends on a variety of site specific conditions.

Impacts from Habitat Restoration and Vegetation Management

Restoration of native plants under all alternatives has the potential to impact grazing management. In many cases, replacement of nonnative plants with native plants would increase suitable forage for livestock and reduce the risk of wildland fire which has the potential to disrupt grazing should it occur.

Restoration of crested wheatgrass (*Agropyron cristatum*) has the potential to impact the season of livestock grazing.

4.13.4 Alternative A

Impacts from Travel and Transportation Management
Impacts would be as described under *Impacts Common to All Alternatives*.

Impacts from Recreation
Direct impacts, such as human disturbance, and indirect impacts through rangeland degradation under Alternative A would be as described under *Nature and Type of Effects*. Under this Alternative there would be no new restrictions on SRPs in the decision area; therefore; livestock could be disturbed by recreational activities or groups in the planning area.

Impacts from Lands and Realty
Under Alternative A, 0 acres of ROW avoidance areas would be present in the decision area in areas open to livestock grazing (see **Table 4-18**). As discussed under *Nature and Type of Effects*, disturbance of livestock could be decreased in this area from construction and operation of infrastructure within the ROW. No ROW exclusion areas or lands proposed for withdrawal are present in this alternative.

Table 4-18
Impacts on Livestock Grazing from Lands and Realty Actions

Management Action	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ROW avoidance areas within PHMA and open to livestock grazing	0	0	0	232,964	233,219
ROW avoidance areas within GHMA and open to livestock grazing	0	106,508	0	7,123	112,341
ROW exclusion areas within GHMA and open to livestock grazing	0	0	0	0	0
ROW exclusion areas within PHMA and open to livestock grazing	0	230,716	0	0	230,716[1]

[1]PHMA would be exclusion for wind and solar energy only.
Note: PHMA and GHMA for Alternatives B, C, and D, PH and GH for Alternative A (no PHMA or GHMA is presently designated).

Impacts from Range Management
Grazing would be permitted within PH or GH, totaling 314 allotments with 337,165 acres and 69,408 AUMs (**Table 4-17**). An additional 34,398 AUMS would be available on 248,435 acres open to grazing in non-GRSG habitat. Lands

would be maintained and restored to maintain healthy ecological conditions, and BLM-administered rangeland management would be directed first to allotments not meeting rangeland health standards due to current livestock; therefore, impacts on grazing management options or permitted AUMs would most likely change in these areas (approximately 105,437 acres).

Livestock grazing would continue to be managed through development and monitoring of AMPs or similar grazing plans and adjustment to grazing systems, with modification to the kind or class of livestock grazing on an allotment, the season of use, the stocking rate, or the pattern of grazing made as needed based on site-specific conditions and monitoring results. Permitted use levels would normally be reviewed and adjusted when permits and leases are renewed.

Vegetative manipulation projects would be designed to minimize impact on wildlife habitat and to improve it whenever possible, which could result in some costs for lessees and permittees, or limitations on manipulation for livestock forage. Long-term benefits to rangeland conditions could also result from these vegetation manipulation projects.

Noxious weed control would be the responsibility of the affected permittee or lessee under weed control cooperative range improvement agreements. Each year, permittees and lessees would submit records and maps of treatment areas to the BLM; therefore, tracking annual treatments may help to improve or maintain rangeland conditions.

The focus in riparian areas and wetlands would be to improve functioning-at-risk and non-functioning riparian areas and wetlands towards PFC; therefore, there is potential for some impacts on grazing management options and related costs and time required for lessees and permittees in these areas.

Range improvements would be designed to achieve wildlife, GRGS objectives, and rangeland health standards; however, no specific actions apply to modification for improvements for GRSG. Therefore, impacts on costs for modification of range improvements would likely be the lowest under this alternative.

Impacts from Fluid Minerals

Under Alternative A, COAs may be applied to existing fluid mineral leases on a case-by-case basis. Approximately 45,012 acres of existing leases are located in areas open to livestock grazing; therefore, conflicts between grazing and mineral development would be more likely to occur in this area (see **Table 4-19**).

Impacts from Solid Minerals

Under Alternative A, development of locatable minerals, nonenergy leasable minerals, and salable minerals could be permitted after environmental review. Some restrictions may be put in place, such as requirements in Plan of

Table 4-19
Fluid Mineral Impacts on Range Management by Alternative

Management Action	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Acres of existing fluid mineral leases within areas open to grazing	45,012	29,778	0	29,778	24,250

Operations for locatable minerals, but this alternative would generally be the least restrictive on mineral development, with the highest potential for conflicts with range management. Impacts on livestock grazing would be as described in *Nature and Type of Effects*; however, the intensity would vary by site-specific conditions and restrictions. Potential impacts are changes in available forage, reduced forage palatability because of dust on vegetation, limits on livestock movement, harassment, temporary displacement of livestock, and an increased potential for the introduction and proliferation of noxious weeds.

Impacts from Mineral Split Estate

Across all alternatives, federal lessees and permittees would not be impacted by split-estate lands; however, there is the potential for impacts on range management on other lands. Under Alternative A, some minimal regulations are in place for mineral development on nonfederal surface lands, including permitting and reclamation requirements.

Impacts from Fire and Fuels Management

Under Alternative A, treatment for fuels management would allow for some burning to improve wildlife and livestock forage, allowing for management options of lessees and permittees. Impacts would vary based on site-specific management actions, but fire could be utilized to maintain optimal forage for livestock in the long term.

A minimum rest period from livestock grazing of two growing seasons would be required after any major vegetative disturbance, including wildfire. Specific timing and the type of rest would be determined at the site-specific EA phase. As a result, livestock grazing would typically be excluded from areas following a fire, impacts on and costs and time for lessees and permittees would depend on location of fire in relation to grazing allotments.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative A, grazing methods would be designed and monitored to accomplish rangeland health standards and meet wildlife habitat needs, as determined in coordination with MFWP. Where objectives for wildlife did not correspond with needs for livestock forage, there is the potential for impacts on range management, specifically ability of lessees and permittees to effectively distribute livestock or fully utilize permitted AUMs.

Impacts from ACECs

No new ACECs would be designated under Alternative A; therefore, there would be no additional impacts on range management.

4.13.5 Impacts Common to Alternatives B-D and the Proposed Plan Amendment

Under Alternatives B-D and the Proposed Plan Amendment, the BLM would implement a defined monitoring strategy, tracking and documenting the implementation of land use plan decisions as defined in **Section 2.7.2** and **Appendix B**. Should changes be detected in sagebrush availability or sagebrush habitat degradation, additional changes may be required to the level of permitted grazing, grazing strategies, or physical range improvements at the site-specific level, at potential increased time and cost for permittees/lessees.

4.13.6 Alternative B

Impacts from Travel and Transportation Management

Under Alternative B, future travel plans would analyze PHMA for the need for routes closures and limitations would be put in place on development of new routes. Some reduction in routes and limitations on new routes as well as upgrades to existing routes would be in place compared to Alternative A, which could result in indirect reduction in disturbance to livestock in PHMA.

Impacts from Recreation

Direct impacts, such as from human disturbance, and indirect impacts through rangeland degradation under Alternative B are similar to those described under *Nature and Type of Effects*. SRPs in PHMA would be limited when they were found to have negative impacts on GRSG; therefore, overall SRPs may be reduced with potential benefits to livestock grazing due to decreased disturbance.

Impacts from Lands and Realty

Under Alternative B, approximately 106,508 acres of ROW avoidance areas and 230,501 of ROW exclusion areas would be present in the decision area in areas open to grazing (see **Table 4-18**). As discussed under *Nature and Type of Effects*, disturbance of livestock from construction and operation of infrastructure could be decreased in this area as a result of these management actions.

Impacts from Range Management

Under Alternative B, acres open to grazing and permitted AUMs would be the same as Alternative A (**Table 4-17**). All GRSG habitat objectives and management would be incorporated into AMPs and permit/lease renewals; therefore, impacts would occur at a site-specific level during the renewal process. Completion of land health assessments and permits/leases would be prioritized within PHMA. As a result, impacts on range management would be most likely to occur in these areas.

Retirement of permitted grazing uses would be an option in PHMA, resulting in potential reductions in AUMs in the planning area. Compensation for authorized range improvements would be provided as appropriate.

Vegetation treatments that benefit livestock forage could only be completed if these treatments would also conserve, enhance or improve GRSG habitat; therefore, the management options in PHMA could be reduced and the ability to fully utilize permitted AUMs could be impacted. Land health assessment utilizing ecological site descriptions would be required to determine if standards of rangeland health as well as GRSG habitat objectives were being met. Impacts from noxious weed control would be the same as those described under Alternative A.

Under Alternative B, riparian areas and wet meadows would be managed for PFC within PHMA, with potential limitations on grazing within these areas or increased use of fencing/herding, seasonal limitations on grazing, creation of water developments or other measures to manage distribution of livestock so that pressure on these systems is limited; this could result in increased costs or time by lessees and permittees.

Under Alternative B, structural range improvements, such as fences and exclosures, would be allowed in PHMA, but they must be developed to conserve or enhance GRSG habitat. In addition, fences would require flagging to lessen risk for GRSG strike impacts; therefore, the cost of building or maintaining these structures may be increased as compared to Alternative A. Similarly, new water developments from diversion of spring or seeps would be permitted only when it also would benefit GRSG habitat. Therefore, lessees and permittees may not be able to fully use permitted AUMs if water were limited on a given allotment.

Impacts from Fluid Minerals

Under Alternative B, additional RDFs and conservation measures would be applied as COAs in PHMA to existing leases. These measures would limit surface occupancy on federal leases in PHMA as well as impose seasonal limits on exploratory drilling, resulting in a decrease in conflicts between livestock grazing and fluid mineral extraction, as described in *Nature and Type of Effects*. Approximately 29,778 acres of existing leases are open to livestock grazing (33 percent less than Alternative A), reducing the disturbance from mineral development under this alternative (see **Table 4-19**).

Impacts from Solid Minerals

Under Alternative B, additional restriction would be put in place on mineral development as compared to Alternative A. PHMA would be closed to nonenergy leasable mineral leasing as well as salable mineral disposal. In addition, lands in PHMA would be recommended for withdrawal from mineral entry. As a result, disturbance of range management from mineral development on would decrease.

Impacts from Mineral Split Estate

As described under Alternative A, there would be no impact on BLM permittees from mineral development of these lands. Impacts on private range management would likely decrease in PHMA due to the application of the same conservation measures as applied on BLM-administered lands.

Impacts from Fire and Fuels Management

Under Alternative B, suppression of fire would be prioritized when PHMA was threatened. As a result, disturbance to grazing could decrease because fewer wildfires require fewer post-fire rest periods. However, in the long term vegetative condition may become less than ideal for grazing as cover and sagebrush density would likely increase and available forage decrease.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative B, vegetation treatments would still occur, given special consideration for the protection and maintenance of sagebrush ecosystems. Projects would be prioritized in areas thought to be limiting GRSG abundance based on defined habitat parameters. Impacts could occur to range management when objectives for range management did not match with those for GRSG habitat. Post restoration management requirements could also result in changes to grazing systems, AUM levels or other range management changes, with resulting potential for an increase in costs and time for lessees and permittees.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.13.7 Alternative C

Impacts from Travel and Transportation Management

Due to the removal of grazing from PHMA and GHMA, impacts from travel management would be limited. However, the type of impacts described under Alternative A would still occur in areas that are PHMA or GHMA in the decision area.

Impacts from Recreation

Impacts from recreation on grazing would be limited due to removal of grazing from all allotments in PHMA and GHMA under this alternative. However, the type of impacts described under Alternative A would still occur in areas that are not PHMA or GHMA in the decision area.

Impacts from Lands and Realty

Impacts from lands and realty action on livestock grazing would be limited by the removal from grazing on all allotments in PHMA and GHMA. There is potential for indirect impacts on occur on BLM-administered lands outside of GRSG habitat should ROW grants and associated development and/or livestock grazing increase in this area.

Impacts from Range Management

Management under Alternative C would remove livestock grazing from all allotments in PHMA and GHMA, for a total of 337,165 acres closed to grazing in the decision area, on 305 allotments with 69,408 removed AUMs (see **Table 4-17**). Like Alternative A, 34,398 AUMS would be available on 248,435 acres open to grazing in non-GRSG habitat.

Removal of grazing from all PHMA and GHMA would result in economic impacts on lessees and permittees. As discussed under *Nature and Type of Effects*, lessees and permittees would be faced with reducing AUMs for their operations or locating replacement forage, often at higher costs than that currently obtained from BLM-administered lands, with potential impacts on individual leases/permits as well as the local community. Closures would also impact ability of lessees and permittees current seasonal rotations or other management strategies that utilize both BLM-administered and private lands.

Existing structural range improvements under Alternative C would require modifications or removal when determined to have a high risk of GRSG strike. In addition, management actions would allow no new water developments and could dismantle existing developments. Lessees/permittees who have investments on BLM-administered lands in PHMA and GHMA would be impacted and could be subject to compensation. In addition, the substantial range infrastructure installed by the BLM would fall into disrepair and the investments would be lost. Furthermore, approximately 3,400 additional miles of fencing may be required to exclude livestock from BLM-administered lands where grazing is excluded, representing potential additional costs. Removal of livestock grazing from BLM-administered land would eliminate the opportunity to initiate weed control cooperative range improvement agreements for noxious weed control on affected lands. All noxious weed control efforts would be BLM personnel based, which may lead to an increase in weed distribution and patch size.

Removal of range improvements and water developments on PHMA and GHMA would also further restrict management options. Lessees and permittees who currently rotate pastures between private and BLM-administered lands may need to construct additional water developments or other structural range improvements on private pastures, resulting in increased time and costs.

As a result of removal of grazing from PHMA and GHMA, there is also the potential for increase conflicts between grazing and other resources and resource uses on lands of other surface ownership should livestock grazing increase in this area. For example, under this alternative, if permittees and lessees were to lose the forage that the BLM currently provides, many of them would try to increase forage production on their private and other leased land. This could accelerate the conversion of private native range, including GRSG habitat, to agricultural or introduced grass production.

Impacts from Fluid Minerals

Under Alternative C, due to the removal of livestock grazing from all PHMA and GHMA, impacts from mineral development on range management in this habitat would be negligible. There is potential for an increase in conflicts between grazing and mineral development in areas outside of PHMA and GHMA, should grazing and mineral development increase in this area.

Impacts from Solid Minerals

Under Alternative C, impacts from solid minerals on grazing would be negligible due to the limitations on mineral development and the removal of livestock grazing from all PHMA and GHMA. There is potential for an increase in conflicts between grazing and mineral development in areas outside of PHMA and GHMA, should grazing and mineral development increase in this area.

Impacts from Mineral Split Estate

As in Alternative A, there is no impact of split estate mineral development on BLM lessees and permittees. It is likely that mineral development on split-estate PHMA and GHMA under this alternative would result in the least disturbance to private range management due to the application of conservation measures to these areas.

Impacts from Fire and Fuels Management

Under this Alternative, impacts on range management would be minimized due to the removal of livestock grazing from PHMA and GHMA. However, the type of impacts described under Alternative A would still occur in non-PHMA or GHMA in the decision area.

Impacts from Habitat Restoration and Vegetation Management

Impacts on range management in PHMA and GHMA under this alternative would be minimized due to the removal of grazing from PHMA and GHMA. However, the type of impacts described under Alternative A would still occur in non-PHMA or GHMA in the decision area.

Impacts from ACECs

Under Alternative C, 96,246 acres of the planning area would be designated as an ACEC to protect GRSG. Due to the removal of grazing from PHMA and GHMA, impacts from the ACEC designation would be limited.

4.13.8 Alternative D

Impacts from Travel and Transportation Management

Under Alternative D, impacts would be similar to those described under Alternative B, but with additional restrictions on upgrades, realignment of roads, and requirements for site-specific travel management planning completion applied to PHMA and GHMA. As a result, disturbance from travel management on livestock grazing would be limited.

Impacts from Recreation
Impacts would be the same as under Alternative B.

Impacts from Lands and Realty
Under Alternative D approximately 240,087 acres would be proposed as a ROW avoidance area within areas open to livestock grazing. Impacts would be as described in Alternative A, but with increased intensity, due to the larger area that is less likely to be developed (see **Table 4-18**).

Impacts from Range Management
Similar to Alternative A, grazing would be allowed on all lands identified as suitable (see **Table 4-17**).

Within PHMA, the BLM would conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. State objectives would be used for fine-scale analysis unless local objectives are developed at the field office level, in partnership with MFWP and USFWS. Similar to Alternative B, the BLM would prioritize completion of land health assessments in PHMA. Like Alternative B, management under Alternative D would focus forage treatments in PHMA.

Management objectives would require analysis of grazing systems during the grazing authorization renewal process to determine the best treatment for maintaining or improving PHMA. Modifications to grazing systems could be required, increasing costs to lessees and permittees.

Impacts from noxious weed control would be the same as under Alternative B.

Actions to reduce grazing in riparian areas would include fencing and herding techniques or seasonal use or livestock distribution changes to meet GRSG habitat objectives. Some grazing within these areas may be allowed at site-specific locations when consistent with GRSG habitat objectives. However, options for permittees and lessees would be limited and their costs could be increased should additional fences be required.

Overall, impacts would be similar to Alternative B but would vary in site-specific implementation.

Impacts from Fluid Minerals
Acres of existing leases open to grazing would be the same as in Alternative B (29,778 acres, 33 percent less than Alternative A; see **Table 4-19**). RDFs and conservation measures applied as COAs to existing leases to limit fluid minerals impacts would also be similar to those described under Alternative B, but under this alternative would have greater flexibility for site-specific modification. As in

Alternative B, surface disturbing/disruptive activities in PHMA would avoid or minimize disturbance to GRSG or their habitat; therefore, conflicts between range management and fluid mineral development would be minimized in this area. In addition to the measures included under Alternative B, measures limiting placement of utility structures and noise would further reduce disturbance of livestock and livestock forge by mineral development as compared with Alternative A.

Impacts from Solid Minerals

Under Alternative D, impacts from solid mineral development would be similar to those described under Alternative A. Some additional site-specific restriction on nonenergy minerals and salable minerals could result in a reduction in development where not in the public interest; therefore, impacts on livestock grazing from mineral development could be slightly reduced as compared with Alternative A.

Impacts from Mineral Split Estate

Under Alternative D, as described in Alternative A, there would be no impact on BLM lessees and permittees. Conservation measures would be applied when federal action (mineral exploration or development) occurs, resulting in some potential reduction in disturbance for livestock on lands not administered by the BLM.

Impacts from Fire and Fuels Management

Under Alternative D, no fuels treatments would be allowed in GRSG winter range unless they would benefit GRSG. Rest requirements would vary based on site-specific conditions. As a result, some site-specific locations could have restrictions on range management due to fire and fuels management.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative D, restoration projects to benefit GRSG habitat improvements would be prioritized. Impacts would be similar to that described in Alternative B. However, under this alternative, any changes required to grazing systems, AUM levels or other changes to range management would be determined in consultation with lessees and permittees; therefore, the potential for impacts would be reduced.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.13.9 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including adaptive management, density and disturbance caps, regional mitigation, and lek buffers that could limit development and disturbance of livestock in certain areas. Further, if areas not achieving the GRSG habitat

objectives due to grazing would require site-specific adjustments to livestock grazing needed to achieve objectives. This strategy could result in site-specific changes in permitted use levels or grazing management strategy outside of the permit renewal cycle.

Impacts from Travel and Transportation Management
Impacts would be the same as under Alternative B.

Impacts from Recreation
Impacts from recreation would be similar to Alternative B. The Proposed Plan Amendment also restricts the construction of recreation facilities unless a net conservation gain would result. Restrictions on construction of new facilities would further limit disturbance to grazing from recreational use, as described under *Nature and Type of Effects*.

Impacts from Lands and Realty
Impacts from lands and realty would be similar to those discussed under Alternative D, however, the Proposed Plan Amendment would place a greater degree of restriction on GHMA by managing GHMA as ROW avoidance for high-voltage transmission lines and large pipelines (similar to Alternative B, see **Table 4-18**).

Impacts from Range Management
Similar to Alternative A, grazing would be allowed on all lands identified as suitable (see **Table 4-17**). Impacts would be similar to those described under Alternatives B and D. As under Alternative D, land health evaluations and determinations would be conducted that include indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives.

Under the Proposed Plan Amendment, the BLM would prioritize completion of land health assessments for allotments in PHMA not meeting Land Health Standards, focusing on those with riparian areas, followed by those in other PHMA, with timelines for changes in management following this priority. Based on current information as discussed in **Section 3.14.2**, approximately 24 allotments and 91,878 acres did not meet BLM's Standards for Rangeland Health due to livestock grazing in PHMA. Priority for assessment would be adjusted based on best available data and other natural resource concerns or legal obligations.

Adjustments to grazing management or authorized grazing use level would be tailored to achieve Land Health Standards and specific management thresholds based on GRSG habitat objectives (see **Objective SS-1.4**) for the specific GRSG habitat type in the areas assessed (i.e., breeding, nesting, wintering, etc.). Site-specific review of seasonal habitat type would be required as part of the land assessment process; quantitative analysis of current GRSG seasonal habitat conditions of allotments is not available at this time and is likely to change over

time based on precipitation level and other factors. Modifications to grazing systems could be required, increasing costs to lessees and permittees. Acres within nesting habitat may be more likely to require changes to grazing management, due to the desired conditions for this habitat type, including perennial grass height of at least seven inches. Impacts would occur on an allotment scale as changes to land assessments, permit renewal, and related management changes were implemented. The level and intensity of impacts would vary on a site-specific basis.

Under the Proposed Plan Amendment, limitations on structural range improvements would apply as discussed under Alternative D, increasing the time and cost for construction and maintenance of improvements.

Noxious weed control impacts would be as discussed under Alternatives A and D.

Under the Proposed Plan Amendment, as under Alternatives B-D, voluntary relinquishment of grazing privileges would be permitted. The BLM may determine if relinquished allotments should remain available for livestock grazing or be used for other resource management objectives per WO IM 2013-184. This may result in some reduction of overall available AUMs. Economic impacts on local communities that depend on livestock grazing are further discussed in **Section 4.22**.

Impacts from Fluid Minerals

Impacts would be the same as under Alternative D.

Impacts from Solid Minerals

Under the Proposed Plan Amendment, more acres would be withdrawn and proposed for withdrawal from locatable mineral entry than under Alternative A. More acres would also be closed to nonenergy solid mineral leasing than under Alternative A (281,487 acres under the Proposed Plan Amendment compared to 0 acres under Alternative A). As a result, disturbance of livestock grazing from mineral development would be reduced as compared with Alternative A.

Impacts from Mineral Split Estate

Impacts would be the same as under Alternative D.

Impacts from Fire and Fuels Management

Impacts under the Proposed Plan Amendment would be similar to those under Alternative D. Additional limits on prescribed burns in PHMA could limit disturbance of livestock forage from fuels management activities. Site-specific impacts from fire and fuels management would vary based on results of the GRSG Wildfire and Invasive Species Habitat Assessment (as described in **Appendix K**).

Impacts from Habitat Restoration and Vegetation Management
Impacts under the Proposed Plan Amendment would be similar to those under Alternative D. In addition, specific goals would be set for sagebrush canopy cover. Retaining cover could reduce suitability of site-specific areas for livestock forage. However, removal of conifers near sagebrush habitats would be extended, and this could potentially improve forage conditions in some areas.

As in Alternative D, consultation with leases/permittees would reduce potential impacts from grazing management changes required to meet vegetation objectives.

Impacts from ACECs
Impacts would be the same as under Alternative A.

4.14 AREAS OF CRITICAL ENVIRONMENTAL CONCERN

4.14.1 Methods and Assumptions

Direct impacts on ACECs are considered to be those that either impair or enhance the relevant and important values for which the ACEC was proposed for designation. This analysis focuses on the impacts on relevant and important values from the special management derived from ACEC designation or, under Alternatives A, B, and D and the Proposed Plan Amendment, where a GRSG ACEC is not proposed for designation, the management actions and allocations for other resources and resource uses. In this case, the relevant and important values considered are the unique pine forest and shale landscape of the existing Acid Shale-Pine Forest ACEC (which would continue to be managed as an ACEC under all alternatives) and GRSG habitat in the proposed GRSG ACEC (Alternative C). All impacts discussed are direct impacts, though some may not occur immediately after implementation of management actions.

Indicators
Table 4-20 provides a summary of the indicators that were used to analyze the effects on ACECs under each alternative.

Table 4-20
Comparison of ACEC Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Changes in the size or location of ACEC boundaries	No change	No change	New GRSG ACEC results in net increase of 96,246 acres	No change	No change
Specific management provisions designed to protect the relevant and	No change	No change	Manage 96,246 acres of new GRSG ACEC as ROW exclusion area	No change	No change

Table 4-20
Comparison of ACEC Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
important values for which the ACEC was designated					

Assumptions

The analysis includes the following assumptions:

- Permitted activities would not be allowed to impair the relevant and important values for which the ACEC(s) are designated. The exception is locatable minerals; until withdrawn from mineral entry, a mining claim can be filed, and subsequent mining activities could have an impact. However, measures would have to be identified in a Plan of Operations to mitigate unnecessary and undue degradation.

4.14.2 Nature and Type of Effects

Special status species management objectives would prevent degradation of, and could improve, relevant and important values where a GRSG ACEC is designated to protect such values. BLM management could protect the relevant and important values in the GRSG ACEC independent of an ACEC designation. Refer to **Section 4.3**, Greater Sage-Grouse**,** for a discussion of impacts on GRSG habitat.

In general, management actions that protect resources—such as surface-disturbance restrictions, management for desired habitats, travel restrictions and closures, livestock grazing, and recreation restrictions—would help maintain and improve the important and relevant values within ACECs. Management actions that create the potential for resource degradation—such as mineral development, livestock grazing, and infrastructure development—could impact the relevant and important values for which an ACEC is designated. Recreation and travel within ACECs could impact ACEC values. Limiting motorized travel to existing routes and trails would reduce surface disturbance and the potential for related GRSG habitat loss. Dispersed recreation activities in the planning area affect the unique soils found within the Acid Shale-Pine Forest ACEC. Management approaches that direct recreation to specific areas could result in more predictable and manageable impacts.

Identifying ACECs as ROW exclusion or avoidance areas would protect relevant and important values by reducing (for avoidance areas) or eliminating (for exclusion areas) impacts from development requiring a land use authorization, including utilities, access roads, and renewable energy projects.

Impacts from such development on GRSG habitat include compaction, erosion, and potentially habitat fragmentation. Impacts from development on the Acid Shale-Pine Forest ACEC include soil compaction and erosion and removal or disruption of the ACEC's unique plant community, which includes slow growing ponderosa pine trees. Due to the area's severely erodible soils and lack of understory vegetation, development would impact ACEC values beyond the footprint of the grant.

Energy and mineral development could impact ACEC values by increasing soil erosion potential and through the removal or disruption of unique ponderosa pine trees. Where GRSG habitat exists, energy and mineral development could degrade and fragment habitat. Construction, operation, and maintenance activities could disturb GRSG populations. Closing ACECs to fluid minerals leasing would help protect relevant and important values by eliminating surface-disturbance associated with such development.

Depending on their extent, location, and severity, wildfires could cause short- and long-term damage to ACEC values, particularly by removal of critical sagebrush habitats. ES&R techniques would be applied to minimize impacts where special values are at risk. If these techniques are successful, wildfires could also cause long-term improvement in ACEC values by maintaining natural vegetative ecosystem cycles.

Livestock grazing could impact ACEC values by increasing soil erosion potential and reducing understory plant species. Closing ACECs to livestock grazing would help protect relevant and important values by eliminating soil and vegetation disturbance associated with grazing, but could also increase the risk for fire due to increased fuel loads.

Implementing management for the following resources would have negligible or no impact on ACECs and are therefore not discussed in detail: solid minerals, mineral split estate, fire and fuels management, and habitat restoration and vegetation management.

4.14.3 Impacts Common to All Alternatives

Alternative C is the only alternative under which the BLM proposes a new ACEC. As such, analysis of impacts common to all alternatives focuses on the relevant and important values of the Acid Shale-Pine Forest ACEC, and impacts on these values from the special management derived from ACEC designation.

Impacts from Range Management

Under all alternatives, the Acid Shale-Pine Forest ACEC would continue to be open to grazing. Impacts on the ACEC would be consistent with those described in *Nature and Type of Effects*, including soil erosion potential and reducing understory plant species.

Impacts from Fluid Minerals

Under all alternatives, the Acid Shale-Pine Forest ACEC would continue to be closed to fluid mineral leasing and development and would therefore be protected from the impacts, such as soil erosion and the removal or disruption of unique ponderosa pines. Where GRSG habitat exists, energy and mineral development could degrade associated with oil and gas development, as described under *Nature and Types of Effects*.

4.14.4 Alternative A

Impacts from Travel and Transportation Management

Under Alternative A, the BLM would continue to limit motorized travel to existing routes and trails within the Acid Shale-Pine Forest ACEC. The types of impacts are the same as those described under *Nature and Types of Effects*, including limiting surface disturbance.

Impacts from Recreation

Impacts from recreation on the relevant and important values for which the Acid Shale-Pine Forest ACEC was established would be the same as those described under *Nature and Types of Effects*. Dispersed recreation could affect soils within the ACEC.

Impacts from Lands and Realty

The Acid Shale-Pine Forest ACEC would continue to be managed as a ROW avoidance area; impacts from ROW development, including soil compaction and erosion, and removal or disruption of the ACEC's unique plant community, are described under *Nature and Types of Effects*.

Impacts from ACECs

Table 4-21 provides a comparison of ACEC acreages by alternative. Under Alternative A, the BLM would continue to manage the Acid Shale-Pine Forest as the only ACEC within GRSG habitat in the planning area. The Square Butte ACEC, Judith Mountains Scenic Area ACEC, and Collar Gulch ACEC are also in the planning area but are outside GRSG habitat. Management activities to protect GRSG would not affect the relevant and important values for which the ACECs were established or the BLM management prescriptions for these ACECs. The BLM would continue to manage lands and PH in accordance with existing management policies.

4.14.5 Alternative B

Under Alternative B, the BLM would continue to manage the Acid Shale-Pine Forest as the only ACEC in the planning area. The BLM would implement new management strategies to protect PHMA but without establishing an ACEC. Refer to **Section 4.3** for a discussion of impacts on GRSG habitat.

Table 4-21
ACECs by Alternative

ACEC	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acid Shale Pine Forest (acres)	2,463	2,463	2,463	2,463	2,463
GRSG ACEC (acres)	0	0	96,246	0	0

4.14.6 Alternative C

Under Alternative C, in addition to the Acid Shale-Pine Forest ACEC, the BLM would manage a new GRSG ACEC. As a result, the total ACEC acreage in the planning area would increase by 96,246 acres. BLM management for the Acid Shale-Pine Forest (2,463 acres) would continue to be tailored to protect the relevant and important values for which the ACEC was originally designated.

Management actions in the new GRSG ACEC would be the same as those actions proposed for GRSG habitat outside the ACEC, including ROW exclusion areas, closures to mineral entry, and livestock grazing limitations. Designation of the GRSG ACEC boundary would bring heightened management attention and public awareness to GRSG habitat, and would further the management objective of helping to maintain and improve the important and relevant values within ACECs.

Impacts from Travel and Transportation Management

The BLM would evaluate the need for permanent or seasonal road closures and would avoid new construction within ACECs. If the BLM determines there is a need to close certain routes, then those closures would benefit the values for which the ACECs would be designated. Effects on ACECs under Alternative C would be the same as those described under Alternative B, except that Alternative C would include additional road closures within four miles of active GRSG leks.

Impacts from Recreation

Impacts from recreation to the relevant and important values for which the Acid Shale-Pine Forest ACEC was established would be the same as those described under *Nature and Types of Effects*.

Impacts from Lands and Realty

Under Alternative C, the Acid Shale-Pine Forest would continue to be managed as an ACEC, with the addition of the GRSG ACEC (96,246 acres), which would bring added restrictions to lands and realty actions to protect GRSG habitat to minimize surface-disturbing activities. The types of impacts are the same as those described under *Nature and Types of Effects*.

Impacts from Fluid Minerals

In addition to the impacts described in *Impacts Common to All Alternatives*, under Alternative C, the BLM would also pursue options to buy out existing fluid minerals leases. Management to reduce fluid mineral development would also protect the new GRSG ACEC from the impacts associated with fluid minerals exploration, development, and production, described under *Nature and Types of Effects*.

Impacts from ACECs

The designation and management of the GRSG ACEC would be used as a way to protect GRSG habitat. Management prescriptions to protect habitat under this ACEC would be similar to protective prescriptions under Alternatives B and D but would have the added ACEC administrative boundary designation. ACEC designation could heighten awareness of the resource and help prioritize BLM management. Acquisition of lands within a designated ACEC could help protect relevant and important values by bringing additional acres under BLM control and managing those acres according to special protection of GRSG habitats.

4.14.7 Alternative D

Impacts would be the same as under Alternative B.

4.14.8 Proposed Plan Amendment

Impacts would be the same as under Alternative B.

4.15 AIR RESOURCES

4.15.1 Methods and Assumptions

Indicators

Table 4-22 provides a summary of the indicators that were used to analyze the effects on air resources under each alternative.

Table 4-22
Comparison of Air Resource Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
A substantial change in the likelihood or severity of wildland fire/management actions that substantially inhibit a response to or appropriate treatments to prevent fire	Fires more likely to occur /no change	Fires less likely to occur /no change	Fires more likely to occur because, by removing grazing, fine fuels would increase	Fires less likely to occur/no change	Fires less likely to occur/no change

Table 4-22
Comparison of Air Resource Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres closed to new road construction	0	0	274,435	0	0
Acres closed to salable mineral disposal	2,538	284,337	457,774	2,538	284,337[1]
Acres closed to nonenergy leasable mineral exploration or development	2,538	284,337	457,774	2,538	284,337[1]

[1]PHMA would be "open" to free use permits and the expansion of existing active pits if criteria is met.

Assumptions

The analysis includes the following assumptions:

- Air resource impacts can be localized or regional.
- Weather-related events and wildfires may cause or contribute to local or regional air resource impacts.

4.15.2 Nature and Type of Effects

Actions that reduce emissions of air pollutants improve air resources. Actions that initiate or increase emissions of air pollutants can degrade air resources, including increased concentrations of air pollutants, decreased visibility, increased atmospheric nitrogen and sulfur deposition on soils and vegetation, and acidification of sensitive water bodies.

Emissions of hazardous air pollutants could potentially result in localized increased risk of impacts on human health. Criteria and hazardous air pollutants can negatively impact human health in a variety of ways. Exposure to air pollution most often affects the respiratory system, and is often also associated with pulmonary, cardiac, vascular, and neurological impairments (EPA 2010b). Children and other high-risk groups, such as the elderly, pregnant women, and individuals with chronic heart and lung diseases, are especially susceptible to impacts from air pollution (EPA 2010b).

Actions that increase emissions of air pollutants can result in negative effects on air quality related values, including visibility and atmospheric deposition. An increase in SO_2, NO_2, PM_{10}, and $PM_{2.5}$ emissions can result in decreased visibility, increased atmospheric nitrogen and sulfur deposition on soils and vegetation, and acidification of sensitive water bodies. Fugitive dust could potentially result in increases in ambient concentrations of PM_{10} and $PM_{2.5}$ resulting in localized impacts on vegetation and increases in atmospheric

deposition. Particulate matter also contributes to haze and limits visibility (EPA 2012b). Ozone, which is formed by a chemical reaction between volatile organic compounds and nitrogen oxides, contributes to smog, which limits visibility (EPA 2012c).

Particulate matter emissions (fugitive dust) are primarily caused by earth-moving activities and vehicular traffic on unpaved roads and surfaces associated with development and operation.

Implementing management for the following resources would have negligible or no impact on air resources and are therefore not discussed in detail: travel and transportation management (except for Alternative C), recreation, lands and realty, range management, fluid minerals, mineral split estate, habitat restoration and vegetation management, and ACECs.

4.15.3 Alternative A

Air resource impacts under Alternative A would be identical to impacts associated with current management as described above in *Nature and Type of Effects*. No changes to criteria air pollutant or hazardous air pollutant emissions would occur.

4.15.4 Alternative B

Impacts from Fire and Fuels Management

Fires, particularly uncontrolled fires, can significantly affect air quality by introducing large amounts of particulate, CO, atmospheric mercury, ozone precursors, and volatile organic compounds into the air, affecting both visibility and human health (BC Air Quality 2013). Controlling fuel load through prescribed burns and vegetation treatments can reduce the risk of uncontrolled wildfire and resultant effects on air resources (Wiedinmyer and Hurteau 2010).

Management under Alternative B would generally restrict prescribed burning within PHMA; however, fires would be less likely to occur compared with Alternative A because management actions would decrease the risk of human-caused ignitions and increase the level of fire suppression in PHMA. Management actions that would decrease human risk of fire include limiting route construction in PHMA, emphasizing nonmotorized recreation, and closing areas to mineral development. Because wildfires would be less likely to occur, there would be fewer fire-related impacts on air resources.

Habitat reconstruction or vegetation treatments used in fire and fuels management would cause negligible increases in exhaust and fugitive dust.

Impacts from Solid Minerals

Under Alternative B, 279,097 acres would be closed to salable mineral disposal and nonenergy leasable mineral exploration or development. Development of these mineral resources results in short-term and long-term emissions of

criteria and hazardous air pollutants during fuel combustion in vehicles and construction equipment; it also produces particulate emissions from surface disturbance. Closing areas with solid mineral potential to development would have the potential to result in fewer impacts on air resources, due to decreased emissions that would otherwise be associated with development of these mineral resources.

4.15.5 Alternative C

Impacts from Fire and Fuels Management

Impacts on air resources from fire and fuels management would be similar to those described under Alternative B, except restrictions would be applied to PHMA and GHMA. However, grazing may reduce fine fuel buildup, so removing it could increase the occurrence of large wildfires, given the potential impact on weed control.

Impacts from Solid Minerals

Under Alternative C, 453,969 acres would be closed to salable mineral disposal and nonenergy leasable mineral exploration or development. As described under Alternative B, closing areas with solid mineral potential to development would have the potential to result in fewer impacts on air resources, due to decreased emissions that would otherwise be associated with development of these mineral resources.

Impacts from Travel and Transportation Management

Under Alternative C, the BLM would close 274,435 acres of the planning area to new road construction compared with Alternative A. Road construction has short-term effects associated with construction of the roads, including fugitive dust emissions from surface disturbance and exhaust emissions associated with road construction equipment, worker vehicles, and material deliveries, and long-term effects associated with road use and maintenance. Prohibiting new road construction would likely result in fewer impacts on air resources, due to decreased emissions associated with road construction and use.

4.15.6 Alternative D

Impacts from Fire and Fuels Management

Impacts on air resources from fire and fuels management would be similar to those described under Alternative B in that restrictions may decrease the risk of fire from human-caused resource use. Under Alternative D, emphasis would be placed on tailoring GRSG habitat objectives to local site conditions and monitoring sites to ensure fuels treatments are helping to meet objectives; therefore, habitat may be further improved in the long term, which may reduce the risk of significant wildfires.

Impacts from Solid Minerals

Under Alternative D, no new areas would be closed to salable mineral disposal and nonenergy leasable mineral exploration or development. Impacts on air resources would be the same as those described under Alternative A.

4.15.7 Proposed Plan Amendment

Impacts from Fire and Fuels Management

Impacts would be the same as described under Alternative D.

Impacts from Solid Minerals

Impacts on air resources would be similar to those described under Alternative B. Under the Proposed Plan Amendment, 235,757 acres would be closed to salable mineral disposal, while 235,757 acres would be closed to nonenergy leasable mineral exploration and development. Closing areas with solid mineral potential to development would have the potential to result in fewer impacts on air resources, due to decreased emissions that would otherwise be associated with development of these mineral resources.

SFAs (53,440 acres) would be recommended for withdrawal. As discussed under **Section 4.9**, Solid Minerals (Locatable Minerals), there is no known locatable mineral potential in GRSG habitat, so no effect from locatable minerals is anticipated.

4.16 CLIMATE

4.16.1 Methods and Assumptions

Indicators

Table 4-23 provides a summary of the indicators that were used to analyze the effects related to climate change under each alternative.

Table 4-23
Comparison of Climate Change Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
A substantial change in the likelihood or severity of wildland fire / management actions that substantially inhibit a response to or appropriate treatments to prevent fire	Fires more likely to occur /no change	Fires less likely to occur /no change	Fires are more likely because removing grazing would increase fine fuels	Fires less likely to occur/no change	Fires less likely to occur/no change

Table 4-23
Comparison of Climate Change Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres closed to new road construction	0	0	274,435	0	0
Acres closed to salable mineral disposal	2,538	284,337	457,774	2,538	284,337[1]
Acres closed to nonenergy leasing and salable mineral disposal	2,538	284,337	457,774	2,538	284,337[1]

[1]PHMA would be "open" to free use permits and the expansion of existing active pits if criteria is met.

Assumption

The analysis assumes that there is a correlation between global concentrations of GHGs and climate change.

4.16.2 Nature and Type of Effects

Management actions that could affect climate change would include actions that increase GHG emissions, actions that reduce GHG emissions, actions that create carbon sinks, and actions that eliminate or damage carbon sinks.

While GHG emissions or GHG sequestration may result from many of the proposed management actions, these changes would be quite small relative to annual state, national, or global GHG emissions. For reference, the amount of total gross emissions in Montana in 2005 was 36.8 million metric tons of carbon dioxide equivalents (MTDEQ 2007). Relative to state and national GHG emissions, emission changes due to management actions associated with this RMPA would be negligible.

Implementing management for the following resources would have negligible or no impact on climate and are therefore not discussed in detail: travel and transportation management (except for Alternative C), recreation, lands and realty, range management, fluid minerals, mineral split estate, habitat restoration and vegetation management, and ACECs.

4.16.3 Alternative A

Climate impacts under Alternative A would be identical to impacts resulting from current management as described above in *Nature and Type of Effects*. No changes to GHG emissions would occur.

4.16.4 Alternative B

Impacts from Fire and Fuels Management

Fires, particularly uncontrolled fires, can emit large quantities of GHGs into the atmosphere, including carbon dioxide, methane, and nitrous oxide (EPA 2012d, page 7-21 to 7-22); fires also remove vegetation that acts as a carbon sink. Controlling fuel load through prescribed burns and vegetation treatments could reduce the risk of uncontrolled wildfire and resultant releases of GHG emissions (Wiedinmyer and Hurteau 2010).

Management under Alternative B would generally restrict prescribed burning within PHMA; however, fires would be less likely to occur compared with Alternative A because management actions would decrease the risk of human-caused ignitions and increase the level of fire suppression in PHMA. Because wildfires would be less likely to occur compared with Alternative A, there would be lower GHG emissions and smaller contributions to climate change than under Alternative A.

Impacts from Solid Minerals

Under Alternative B, 279,097 acres would be closed to salable mineral disposal and nonenergy leasable mineral exploration or development. Development of these mineral resources results in short-term and long-term emissions of GHG pollutants during fuel combustion in vehicles and construction equipment; it also removes vegetation and releases sequestered carbon. Closing areas with solid mineral potential would likely result in fewer GHG emissions in the planning area.

4.16.5 Alternative C

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be the same as described under Impacts on air resources from fire and fuels management would be similar to those described under Alternative B, except restrictions would be applied to PHMA and GHMA. However, grazing may reduce fine fuel buildup, so removing it could increase the occurrence of large wildfires, given the potential impact on weed control.

Impacts from Solid Minerals

Under Alternative C, 453,969 acres would be closed to salable mineral disposal and nonenergy leasable mineral exploration or development. As described under Alternative B, closing areas with solid mineral potential would likely result in fewer GHG emissions, and fewer contributions towards climate change.

Impacts from Travel and Transportation Management

Under Alternative C, the BLM would close 274,435 more acres of the planning area to new road construction compared with Alternative A. Road construction and use emits GHGs through the combustion of fuel in vehicles and

construction equipment. Prohibiting new road construction could reduce GHG emissions associated with road construction and use.

4.16.6 Alternative D

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to those described under Alternative B in that restrictions may decrease the risk of fire from human-caused resource use and associated GHG emissions. Under Alternative D, emphasis would be placed on tailoring management objectives to local site conditions and monitoring sites to ensure fuels treatments are helping to meet GRSG habitat objectives; therefore, habitat may be further improved in the long term, which may reduce the risk of significant wildfires. This would have the potential to result in fewer emissions of GHGs and fewer contributions towards climate change, as well as improve carbon sequestration in vegetation.

Impacts from Solid Minerals

Under Alternative D, no new areas would be closed to salable mineral disposal and nonenergy leasable mineral exploration or development. Impacts on climate change from solid minerals would the same as described under Alternative A.

4.16.7 Proposed Plan Amendment

Impacts from Fire and Fuels Management

Impacts under the Proposed Plan Amendment would be the same as those described under Alternative D.

Impacts from Solid Minerals

Impacts on climate change would be similar to those described under Alternative B. Under the Proposed Plan Amendment, 235,757 acres would be closed to salable mineral disposal, while 235,757 acres would be closed to nonenergy leasable mineral exploration and development. Closing areas with solid mineral potential to development would have the potential to result in fewer impacts on climate change, due to decreased GHG emissions that would otherwise be associated with development of these mineral resources.

SFAs (53,440 acres) would be recommended for withdrawal. As discussed under **Section 4.9**, there is no known locatable mineral potential in GRSG habitat, so no effect from locatable minerals is anticipated.

4.17 SOIL RESOURCES

4.17.1 Methods and Assumptions

Indicators

Table 4-24 provides a summary of the indicators that were used to analyze the effects on soils resources under each alternative.

Table 4-24
Comparison of Soil Resources Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres managed as ROW avoidance areas	30,193	1322,826	0	260,949	366,045
Acres managed as ROW exclusion areas	0	233,219	345,560	0	233,219[1]
Acres found unsuitable for surface coal leasing	0	284,337	464,178	0	0
Acres closed to nonenergy leasing and salable mineral disposal	0	284,337	457,774	0	284,337[2]

[1]PHMA would be exclusion for wind and solar energy only.
[2]PHMA would be "open" to free use permits and the expansion of existing active pits if criteria is met.

Assumptions

The analysis includes the following assumptions:

- Soils of the BLM-administered lands would be managed to maintain productivity and promote sustained yields while keeping erosion at minimal/acceptable levels and minimizing physical or chemical degradation.
- Proposed surface-disturbing projects would be analyzed to determine suitability of soils to support or sustain such projects and designed to minimize soil loss.
- Prime Farmlands would be protected from unnecessary and irreversible conversion to nonagricultural uses through identification as such and special attention during construction and reclamation.
- Achieving or maintaining Standards for Rangeland Health and Guidelines for Livestock Grazing Management generally are effective in managing the effects on soils from livestock grazing. Adjustments to grazing authorizations would be made on a case-by-case basis when site-specific studies indicate changes in management are needed.

- BLM management actions and objectives would be consistent with soil resource capabilities.
- Fuels projects, as well as planned and un-planned fire, that contribute towards establishment of a more "natural" fire regime would have long-term benefits on soil health.
- Restoration would effectively mitigate long-term surface-disturbing effects.
- Surface-disturbing actions related to fluid mineral development would comply with Onshore Oil and Gas Orders and Gold Book surface operating standards and guidelines (and subsequent updates). These orders and standards and guidelines would mitigate most effects.

4.17.2 Nature and Type of Effects

Activities that disturb, compact, contaminate, mix soil horizons, or remove vegetation from soils are generally considered to negatively affect soil health. Impacts on soil resources can result from a number of causes, including improper livestock grazing, recreation, mineral resource activities, renewable energy development, and road construction. The intensity and extent of impacts on soil resources are determined in part by the type and location of the surface-disturbing activities and surface occupancy. Impacts on soil resources can also be affected by any applicable stipulations and Plan of Operations that address site-specific environmental concerns and require mitigation to stabilize soil, to prevent unnecessary erosion, and to revegetate disturbed surfaces.

Direct and indirect impacts from resource programs to soil resources are generally mitigated by avoiding or minimizing the impact using designations such as ROW exclusion and avoidance areas. Impacts that cannot be avoided are generally minimized by the application of COAs, RDFs, and standard operating procedures.

Mixing of soil horizons is another concern with surface-disturbing actions, as is loss of the "A" horizon (i.e., top layer of the soil horizon or the topsoil) through erosional forces (e.g., wind and water). Mixing of topsoil and subsoil and loss of the "A" horizon remove surface cover for erosion control and organic matter inputs for nutrient recycling. The result is decreased soil productivity in the long term, inhibiting revegetation, decreasing soil reclamation potential, and increasing susceptibility for noxious and invasive species.

Surface-disturbing activities and surface occupancy can impact soil resources by compacting soil. In some cases, soil compaction aids in plant establishment and growth. However, too much compaction decreases water infiltration rates and gas exchange rates. Decreased gas exchange rates can cause aeration problems, induce nitrogen and potassium deficiency, and negatively impact root development, which is a key component of soil stabilization. As soil compaction

increases, the soil's ability to support vegetation diminishes because the resulting increase in soil strength and change in soil structure (loss of porosity) inhibit root system growth and reduce water infiltration. As vegetative cover, water infiltration, and soil stabilizing crusts are diminished or disrupted, the surface water runoff rates increase, further accelerating rates of soil erosion.

Poor soil health generally limits the ability of an area to support vegetation, particularly native vegetation such as sagebrush. Any impacts that adversely affect soil health would also adversely affect sagebrush.

Travel across land by foot, bicycle, horse or OHV results in vegetation loss, soil compaction, and soil erosion. Management approaches that designate travel to specified routes can result in more predictable, localized and manageable impacts. Selectively locating travel routes away from areas of sensitive soil conditions can minimize the extent of these effects, ideally limiting them to the footprint of the trail.

Most recreation on BLM-administered lands results in vegetation loss, soil compaction, and soil erosion. Management approaches that direct recreation to specific areas and avoid dispersed recreation can result in more predictable, localized and manageable impacts.

Lands and realty management decisions affect where ground disturbing activities can and cannot occur. Ground disturbing activities could result in the compaction of soils, the erosion of soils, or vegetation loss which reduces soil stability. ROW exclusion and ROW avoidance areas protect certain areas from compaction and erosion.

Fluid mineral development generally requires temporary roads, wells, and associated well pads. Local soil health and characteristics within project footprints are typically impacted by compaction and clearing of vegetation. Restoration and revegetation efforts can restore soil health over the long term once mineral extraction activities are complete.

Solid mineral development generally requires roads and large areas of soil excavation. Local soil health and characteristics within project footprints are typically impacted by excavation, compaction, erosion, and vegetation clearing Restoration and revegetation efforts can restore soil health over the long term once mineral extraction activities are complete, but landscapes are often scarred and areas of prior soil cover are often permanent altered through open pits, mineshafts, and other features.

Grazing is known to alter vegetation and biological soil crust communities. Livestock grazing can have adverse impacts on soils, particularly in the case of high-intensity, low-duration, grazing systems in small pastures. Modified grazing management can be necessary to maintain soil health where soils are found to be sensitive to livestock disturbances (for example, soil on steep slopes and

fragile soils). Properly managed grazing can protect soils and help provide healthy plant communities.

Implementing management for the following resources would have negligible or no impact on soil resources and are therefore not discussed in detail: fire and fuels management, and ACECs.

4.17.3 Impacts Common to All Alternatives

Impacts from Habitat Restoration and Vegetation Management

Under all alternatives habitat restoration would occur and would be implemented based on environmental variables that indicate areas most likely to succeed in restoration. Restoring habitat generally has a beneficial effect on soils, and soils that currently have a high restoration potential value would tend to support restorative vegetation easier due to proper soil conditions, such as low salt content, adequate water retention, and available rooting depth.

Table 4-25 provides a comparison of the quantifiable impacts of each alternative to soils.

Table 4-25
Quantitative Impact Summary by Alternative for Soils

Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ROW exclusion area (acres)	0	233,219	345,560	0	233,219[1]
ROW avoidance area (acres)	30,193	132,826	0	260,949	366,045
Closed to livestock grazing (acres)	0	0	337,165	0	0
Unsuitable for surface coal mining (acres)	0	284,975	464,178	0	0
Closed to salable minerals (acres)	2,538	284,337	457,774	2,538	284,337[2]
Closed to nonenergy leasing (acres)	0	284,337	457,774	0	284,337

[1]PHMA would be exclusion for wind and solar energy only.
[2]PHMA would be "open" to free use permits and the expansion of existing active pits if criteria is met.

4.17.4 Alternative A

Impacts from Travel and Transportation Management

Direct impacts on soils from travel and transportation management are discussed above under *Nature and Type of Effects*. Under Alternative A, motorized cross country travel would be restricted to existing roads and trails

throughout the project area on BLM-administered lands, which would reduce new soil disturbances and localize further disturbance to existing travel routes.

Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could reduce new soil disturbances and localize further disturbance to existing travel routes.

Impacts from Recreation

Direct impacts on soils, including vegetation loss, soil compaction, and soil erosion, from recreation is discussed above under *Nature and Type of Effects*. Under Alternative A, SRPs would be evaluated on a case-by-case basis throughout the project area. Management approaches that direct recreation to specific areas and avoid dispersing recreation could result in more predictable, localized, and manageable impacts. This would result in less vegetation loss, soil compaction, and soil erosion from recreation.

Impacts from Lands and Realty

Direct impacts on soils from ground-disturbing activities related to ROW development are discussed above under *Nature and Type of Effects*. As shown in **Table 4-25**, Alternative A has two ROW avoidance areas and no ROW exclusion areas. The ROW avoidance areas make up 9,708 acres and are associated with the Acid Shale-Pine Forest ACEC and Judith River Canyon. Surface-disturbing activities related to ROW development would be restricted in the ROW areas, limiting impacts on soil resources.

Impacts from Range Management

Direct impacts on soils from range management are discussed above under *Nature and Type of Effects*. Under Alternative A, livestock grazing would continue to be managed through the development and monitoring of AMPs which use guidelines to maintain or enhance ecological condition, enhance vegetation production, maintain and enhance wildlife habitat, protect watersheds, and reduce bare ground by introducing soil stabilizing vegetation cover that is applicable to the soil subgroup type. Achieving or maintaining Standards for Rangeland Health and Guidelines for Livestock Grazing Management generally are effective in managing the effects on soils from livestock grazing. Grazing would continue to alter vegetation and biological soil crust communities.

Impacts from Fluid Minerals

Direct impacts, such as erosion and compaction, to soils from fluid minerals development are discussed above under *Nature and Type of Effects*. Alternative A does not prohibit surface occupancy on existing federal leases within the decision area and therefore does not protect any portions of the decision area from the expected associated impacts on soils. Local soil health and characteristics within project footprints would be impacted by compaction and vegetation clearing.

Impacts from Solid Minerals

Direct impacts, such as erosion and compaction, to soils from solid minerals management are discussed above under *Nature and Type of Effects*. Under Alternative A, 2,538 acres would be closed to salable mineral disposal (see **Table 4-25**). Management under Alternative A would allow for coal exploration and does not identify any portions of the decision area as unsuitable or unacceptable for surface mining of coal, and does not provide for withdrawing any lands from mineral entry. Alternative A therefore does not protect most of the planning area from impacts on soils associated with solid mineral extraction.

Impacts from Mineral Split Estate

Direct impacts on soils from mineral split estate are the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. Under Alternative A, lands where the BLM manages the subsurface mineral estate but not the surface would be administered and managed in each phase of mineral extraction to ensure that undue degradation to soil resources does not occur and that final restoration of the landscape is satisfactory to the surface landowner. Management actions would reduce the total surface disturbance and protect soils from unnecessary compaction, erosion, and vegetation loss.

4.17.5 Impacts Common to Alternatives B-D and the Proposed Plan Amendment

Adoption of a Monitoring Framework (see **Section 2.7.2**) to oversee the implementation and effectiveness of GRSG habitat improvement efforts could result in improved soil conditions.

4.17.6 Alternative B

Impacts from Travel and Transportation Management

Direct impacts on soils from travel and transportation management are discussed above under *Nature and Type of Effects*. Management under Alternative B would provide for protection measures on PHMA, which would provide for fewer and more localized disturbances to soils. In PHMA, motorized travel would be limited to existing roads, primitive roads, and trails and construction of new routes would be limited to specified needs. Construction of new routes or the upgrade of current routes would be limited to the realignment of existing designated routes if the realignment would eliminate the need for the construction of a new road, is necessary for motorist safety, or would have a minimal impact on GRSG habitat. The construction of new roads for access to valid existing rights would be limited to a cumulative total disturbance of less than three percent of the PHMA, and restricted to the minimal road standard necessary. This would reduce overall soil disturbance from construction.

Travel management would provide for the evaluation of roads and areas for permanent or seasonal closures, and for the restoration of travel routes using

appropriate seed mixes, and possibly transplanted sagebrush. These actions would allow soils to return, over time and through the re-establishment of vegetation, to a more natural state and would reduce site-specific erosion.

Like Alternative A, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could reduce new soil disturbances and localize further disturbance to existing travel routes.

Impacts from Recreation

Direct impacts on soils from recreation are discussed above under *Nature and Type of Effects*. Under Alternative B, SRPs in PHMA would only be approved when recreation would have a neutral or beneficial effect on PHMA. Such restriction on recreation could reduce impacts on soils from compaction, erosion, and vegetation loss.

Impacts from Lands and Realty

Direct impacts on soils from lands and realty management are discussed above under *Nature and Type of Effects*. Under Alternative B, the BLM would manage PHMA as ROW exclusion areas for new land use authorizations, and GHMA as ROW avoidance areas for new land use authorizations. These actions protect a larger portion of the decision area from surface disturbing activities and therefore would be more protective of soil resources from vegetation loss, soil compaction, and soil erosion than Alternative A, which does not provide for exclusion areas or as much acreage of avoidance areas (see **Table 4-25**).

Impacts from Range Management

Direct impacts on soils from range management are discussed above under *Nature and Type of Effects*. Alternatives B would be similar to Alternative A with the addition of GRSG habitat objectives and management considerations incorporated into all BLM AMPs within PHMA. Also, the option of voluntary retirement of permitted grazing uses in PHMA would be available. GRSG habitat objectives would manage or restore PHMA so that at least 70 percent of the land cover provides adequate sagebrush habitat to meet GRSG needs, and manage anthropogenic disturbances to cover less than three percent of the total GRSG habitat which would protect soils from disturbances on 70 percent of the land cover within PHMA from surface disturbing activities that could result in soil compaction, soil erosion, and vegetation loss.

Impacts from Fluid Minerals

Direct impacts on soils from fluid minerals development are discussed above under *Nature and Type of Effects*. Management under Alternative B would apply RDFs and conservation measures as COAs on existing leases in PHMA. These measures would include surface use restrictions on existing federal leases within PHMA, which would protect portions of the decision area from the soil impacts associated with oil and gas exploration, development, and production.

Impacts from Solid Minerals

Direct impacts on soils from solid minerals management are discussed above *under Nature and Type of Effects*. Management under Alternative B would find all PHMA unsuitable for surface mining of coal and would allow subsurface mining only if associated facilities were located outside of PHMA. Under Alternative B, the BLM would also provide for withdrawing areas from mineral entry within PHMA, and closing PHMA to nonenergy mineral leases and salable mineral disposal. Closure to surface disturbing activities reduces the potential for impacts on soil resource through compaction, erosion, and contamination. The BLM would also provide for restoring salable mineral pits within PHMA, which would increase soil health and stability in those areas. Solid minerals management would be more protective of soils resources under Alternative B than under Alternative A, as seen in (**Table 4-25**).

Impacts from Mineral Split Estate

Direct impacts on soils from mineral split estate would be the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. On lands where the BLM manages the surface, but not the subsurface mineral estate, appropriate fluid mineral RDFs would be applied in PHMA. This would protect a greater amount of soil resources from undue degradation through compaction, erosion, and vegetation loss than Alternative A.

On PHMA lands where the BLM manages the subsurface split estate, but not the surface, the same conservation measures applicable to solid minerals on BLM-administered lands would be applied. This includes closing PHMA to surface coal mining, nonenergy mineral leases, and salable mineral disposal, which would reduce the potential for soil compaction, erosion and vegetation loss.

4.17.7 Alternative C

Impacts from Travel and Transportation Management

Direct impacts on soils from travel and transportation management are discussed above under *Nature and Type of Effects*. Management under Alternative C would provide the same measures as Alternative B in PHMA and GHMA, which would result in less disturbance to soils than under Alternative A. Management under Alternative C would also prohibit the construction of new roads within four miles of GRSG leks, would avoid new road construction where possible, and would require the mitigation of any impacts on GRSG habitat from the construction of new roads or the upgrade of existing roads by using measures that have been proven to offset GRSG habitat loss. These additional measures would further protect soils from surface-disturbing activities.

Like Alternative A, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable

adverse effects on wildlife and its habitat. Those closures could reduce new soil disturbances and localize further disturbance to existing travel routes.

Impacts from Recreation

Impacts on soil resources from recreation would be the same as under Alternative A.

Impacts from Lands and Realty

Direct impacts on soils from lands and realty management are discussed above under *Nature and Type of Effects*. Under Alternative C, the BLM would manage PHMA and GHMA as ROW exclusion areas for new land use authorizations, which would reduce the potential effects of surface-disturbance on soils (see **Table 4-25**). This would protect a larger portion of the decision area from surface disturbing activities and therefore would be more protective of soil resources from vegetation loss, soil compaction, and soil erosion than Alternative A.

Impacts from Range Management

Direct impacts on soils from range management are discussed above under *Nature and Type of Effects*. Under Alternative C livestock grazing would be removed from all allotments within PHMA and GHMA, totaling 337,165 acres and 69,408 AUMs. Management under Alternative C would provide for the opportunity for improving PHMA and GHMA through striving to attain reference state vegetation relative to the ecological site description. The lack of grazing would provide the potential for soil health to improve in areas where Rangeland Health Standards are not met due to current livestock grazing.

Impacts from Fluid Minerals

Direct impacts on soils from fluid minerals development are discussed above under *Nature and Type of Effects*. Under Alternative C, the BLM would apply RDFs and conservation measures as COAs on existing leases in GHMA and PHMA. These measures would include surface use restrictions on existing federal leases within PHMA and GHMA, which would protect portions of the decision area from the soil impacts associated with oil and gas exploration, development, and production.

Impacts from Solid Minerals

Direct impacts on soils from solid minerals management are discussed above under *Nature and Type of Effects*. Under Alternative C, the BLM would find both GHMA and PHMA as unsuitable for surface mining of coal and would allow subsurface mining only if associated facilities were located outside of PHMA and GHMA. Management under Alternative C would also provide for withdrawing areas from mineral entry within PHMA, closing PHMA to nonenergy mineral leases and salable mineral disposal, which would reduce the potential for soil impacts of compaction, erosion, and contamination. Management under Alternative C would also provide for restoring salable mineral pits within PHMA, which would increase soils health and stability in those areas. Solid

minerals management would be more protective of soils resources under Alternative C due to more land closures than under Alternative A (see **Table 4-25**).

Impacts from Mineral Split Estate

Direct impacts on soils from mineral split estate would be the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. On lands where the BLM manages the surface, but not the subsurface mineral estate, appropriate fluid mineral RDFs would be applied in PHMA and GHMA. This would protect a greater amount of soil resources from undue degradation through compaction, erosion, and vegetation loss than Alternative A.

In PHMA and GHMA where the BLM manages the subsurface split estate, but not the surface, the same conservation measures applicable to solid minerals on BLM-administered lands would be applied. This includes closing PHMA and GHMA to surface coal mining, nonenergy mineral leases, and salable mineral disposal, which would reduce the potential for soil compaction, erosion and vegetation loss.

4.17.8 Alternative D

Impacts from Travel and Transportation Management

Direct impacts on soils from travel and transportation management are discussed above under *Nature and Type of Effects.* Management under Alternative D would be more protective of soils than Alternative A and similar to Alternative B. Management under Alternative D would result in additional closures and reclamation of roads, providing for less future disturbance and further mitigation of current disturbances of soils. Management under Alternative D would provide for, on a case-by-case basis, the reclamation of commercially or administratively used roads upon completion of site-specific projects. Roads that were user created and unauthorized would also be subject to closure for further restoration. Within PHMA, roads may be evaluated for permanent or seasonal closures where off-road vehicles may be causing adverse effects.

Like Alternative A, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could reduce new soil disturbances and localize further disturbance to existing travel routes.

Impacts from Recreation

Direct impacts on soils from recreation are discussed above under *Nature and Type of Effects*. Management under Alternative D would be more protective of soils than Alternative A in that SRPs on PHMA would only occur if the recreation would have a neutral or beneficial effect on PHMA. This could result in less possible disturbance to soils and vegetation as these are key habitat features for GRSG.

Impacts from Lands and Realty

Direct impacts on soils from lands and realty management are discussed above under *Nature and Type of Effects*. Under Alternative D, the BLM would manage PHMA as a ROW avoidance area for all land use authorizations (including wind energy). GHMA would also be managed as a ROW avoidance area for wind energy. Impacts on soil resources from construction could be reduced due to restrictions on development in ROW avoidance areas. Other ROW authorizations in GHMA would be authorized with appropriate mitigation and conservation measures, which would reduce the potential for effects of construction disturbances to soil resources. Management under Alternative D would provide for more protection than Alternative A.

Impacts from Range Management

Direct impacts on soils from range management are discussed above under *Nature and Type of Effects*. Management under Alternative D would be similar to Alternative A with the additional incorporation of GRSG habitat objectives into all AMPs, and the addition of GRSG management considerations into AMPs of allotments on PHMA. Management under Alternative D would provide for the opportunity for improving GHMA and PHMA through striving to attain suitable GRSG seasonal habitats; therefore, soil conditions would improve in these areas.

Impacts from Fluid Minerals

Direct impacts on soils from fluid minerals development are discussed above under *Nature and Type of Effects*. Management under Alternative D would provide greater protection of soil resources by applying conservation measures as COAs to existing leases. The conservation measures would be designed to reduce surface disturbances associated with mineral extraction, which would reduce soil compaction, soil erosion, and vegetation loss.

Impacts from Solid Minerals

Direct impacts on soils from solid minerals management are discussed above under *Nature and Type of Effects*. As with Alternative A, management under Alternative D would manage 2,437 acres of PHMA and 101 acres of GHMA as closed to salable mineral disposal. Under Alternative D, the BLM would allow for coal exploration, does not identify any portions of the decision area as unsuitable or unacceptable for surface mining of coal, and does not provide for withdrawing any lands from mineral entry. Alternative D provides for the restoration of salable mineral pits on PHMA which could locally improve soil health.

Impacts from Mineral Split Estate

Direct impacts on soils from mineral split estate are the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. As with Alternative A, Alternative D, would manage lands where the BLM manages the subsurface mineral estate, but not the surface, during each phase of mineral

extraction to ensure that undue degradation does not occur and that final restoration is satisfactory to the surface landowner. Management actions would reduce the total surface disturbance and protect soils from unnecessary compaction, erosion, and vegetation loss.

4.17.9 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including adaptive management, regional mitigation, density and disturbance caps, and lek buffers. If an adaptive management hard trigger response was met, PHMA would be the top priority for regional mitigation, habitat restoration, and fuels reduction treatments. These actions could offer considerable protection for soil resources by maintaining or restoring vegetation and by limiting vegetation disturbance in certain areas as described in *Nature and Type of Effects*.

Impacts from Travel and Transportation Management

Impacts would be the same as under Alternative B.

Impacts from Recreation

Impacts would be similar to Alternative D. In addition, the Proposed Plan Amendment would limit the construction of new recreational facilities, which would reduce impacts on soils from development activities, as described in *Nature and Type of Effects*.

Impacts from Lands and Realty

Impacts from ROW management would be similar to those described under Alternative D. However, under the Proposed Plan Amendment, both PHMA and GHMA would be ROW avoidance areas for high voltage transmission lines and large pipelines (366,045 acres) with limited exceptions, while PHMA would also be minor ROW avoidance areas. In addition, PHMA would be ROW exclusion areas, and GHMA would be ROW avoidance areas for wind and solar energy. These measures could offer an increased level of protection from disturbance and habitat loss than Alternative A.

Impacts from Range Management

Impacts from the Proposed Plan Amendment would be similar to Alternative A with respect to the number of AUMs available and the acreage open for grazing, resulting in the same impacts on soils (see **Table 4-25**). In addition, under the Proposed Plan Amendment, the BLM would prioritize the review and processing of grazing permits/leases in PHMA, particularly in areas not meeting Land Health Standards. Together, these measures would help to improve soil conditions throughout the planning area and would have a beneficial incidental impact on soils, as described under *Nature and Type of Effects*.

Impacts from Fluid Minerals
Impacts from fluid minerals management would be similar to those described for Alternative D. However, additional restrictions on geophysical exploration within PHMA would be proposed. Therefore, these measures would have a beneficial incidental impact on soil resources due to reductions in disturbance the planning area from exploration.

Impacts from Solid Minerals
The BLM would determine coal suitability on a case-by-case basis as leases or lease modifications are submitted. Currently, there is no coal potential in the planning area. Therefore, no impacts on soils are expected from coal management.

The Proposed Plan Amendment would provide additional protections on soils in the planning area by closing nonenergy leasable mineral leasing and new mineral material sales. These closures would reduce the potential disturbance of soils from mineral activities, as described under *Nature and Type of Effects*.

Impacts from locatable minerals management would be similar to those described under Alternative D. SFAs (53,440 acres of PHMA) would be recommended for withdrawal. As discussed under **Section 4.9**, there is no known locatable mineral potential in GRSG habitat, so no effect from locatable minerals is anticipated.

Impacts from Mineral Split Estate
Direct impacts on soils from mineral split estate are the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. The Proposed Plan Amendment would manage lands in PHMA or GHMA with sub-subsurface federal mineral estate through each phase of mineral extraction using RDFs and COAs, which would reduce the total surface disturbance and protect soils from unnecessary compaction, erosion, and vegetation loss.

4.18 WATER RESOURCES

4.18.1 Methods and Assumptions

Indicators
Table 4-26 provides a summary of the indicators that were used to analyze the effects on water resources under each alternative.

Assumptions
The analysis includes the following assumptions:

- Projects that help restore watersheds, desirable vegetation communities, or wildlife habitats (including surface disturbance associated with these efforts) would benefit water resources over the long term;

Table 4-26
Comparison of Water Resources Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres managed as ROW avoidance areas	30,193	132,826	0	260,949	366,045
Acres managed as ROW exclusion areas	0	233,219	345,560	0	233,219[1]
Acres found unsuitable for surface coal mining	0	284,975	464,178	0	0
Acres closed to nonenergy leasing and salable mineral disposal	0	284,337	457,774	0	284,337[2]
Opportunity to restore or improve water sources for GRSG and their habitat through range management	No change	Increase	Variable-see analysis	Increase	Increase
Opportunity for elimination of mosquito breeding water conditions	No change	Increase	Increase	Increase	Increase

[1]PHMA would be exclusion for wind and solar energy only.
[2]PHMA would be "open" to free use permits and the expansion of existing active pits if criteria are met.

- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors, including proximity to drainages and groundwater wells, location within the watershed, time and degree of disturbance, reclamation potential of the affected area, vegetation, precipitation, and mitigating actions applied to the disturbance;
- Fuels projects as, well as planned and un-planned fire, that contribute towards establishment of a more "natural" fire regime would have long-term benefits on water quality; and
- Surface-disturbing actions related to fluid mineral development would comply with Gold Book surface operating standards (and subsequent updates).

4.18.2 Nature and Type of Effects

Management actions could change the quality and accessibility of water features. Streams surrounded by poorly functioning riparian habitat do not have sufficient vegetation cover, forb diversity, or insect life to provide quality habitat that streams with riparian habitat in PFC could. Streams with poorly functioning riparian habitats are also more susceptible to stream bank erosion and cutting, and poorer water quality due to a reduced ability to filter sediments, dissipate

stream energy during high flow periods, and develop diverse ponding and channel characteristics to provide the habitat, water depth, duration, and temperature necessary for fish production, waterfowl breeding and other uses.

Management actions could also increase or decrease the ability of water sources to serve as mosquito breeding habitat, which could in turn increase or decrease, respectively, the risk of West Nile virus transmission to GRSG.

Surface water quality is influenced by both natural and human factors. Surface water quality concerns created by natural conditions are hard to control. Surface water quality impacts can result from a number of causes, including transport of eroded soils into streams due to improperly managed livestock grazing, introduction of waste matter into streams from domestic livestock, and "low-water" crossing points of roads, routes, and ways used by motorized vehicles.

Livestock can cause decreases in water quality through the trampling of soils and vegetation along and within natural water features. At the same time, water supply structures throughout the landscape that have been established for the benefit of livestock also often provide seasonal foraging habitat (succulent forbs, grasses, and associated insects) for wildlife.

Mineral development is generally associated with the risk of impairments to local surface waters and groundwater. Mineral development disturbs soils and can result in increased erosion and contamination of waterways through runoff. Mineral development increases the presence of petroleum-using vehicles and equipment on the land, and increases the likelihood of chemical spills that can sink into the earth and contaminate groundwater. Mineral development can result in pools of standing water that can serve as mosquito breeding habitat, increasing the ability for West Nile virus to spread into a landscape otherwise not at risk to the pathogen.

Travel across land by foot, bicycle, horse or OHV results in vegetation loss and soil compaction, which can then lead to soil erosion and increased in sediment flow into waterways. Travel by vehicle also increases the presence of petroleum-using vehicles and equipment on the land, which increases the likelihood of chemical spills that could contaminate surface waters through runoff. Management approaches that designate travel to specified routes can result in more predictable, localized and manageable impacts. Selectively locating travel routes away from areas where water resources exist can minimize the extent of these effects.

Most recreation on BLM-administered lands is dispersed recreation associated with hunting and includes walking and vehicle use (limited to existing roads and trails). Use of this type results in minor amounts of vegetation loss, soil compaction, and soil erosion, which would incidentally impact water resources by increasing sediment load and chemical contamination. Management

approaches that direct recreation to specific areas and avoid dispersed recreation can result in more predictable, localized and manageable impacts.

Lands and realty management decisions affect where ground disturbing activities can and cannot occur. The use of ROW exclusion and ROW avoidance areas limit the amount of man-made runoff of soils and chemicals into waterways within those areas, and are generally considered to be protective of water quality. ROW exclusion and avoidance areas are also seen to reduce the likelihood of chemical spills onto the ground, which can then sink into the earth and contaminate groundwater.

Implementing management for the following resources would have negligible or no impact on water resources and are therefore not discussed in detail: fire and fuels management, and ACECs.

4.18.3 Impacts Common to All Alternatives

Impacts from Habitat Restoration and Vegetation Management

Under all alternatives habitat restoration would occur and would be implemented based on environmental variables that indicate areas most likely to succeed in restoration and therefore benefit GRSG. Restoring habitat generally has a beneficial effect on water quality through the reduction in runoff and sedimentation into surface waters. Restoration would include restoring streams to PFC, which would increase water quality by propagating proper channel widths, water temperatures, transportation of suspended and bedload sediments, and stream bank vegetation.

4.18.4 Alternative A

Table 4-27 provides a comparison of the quantifiable aspects of each alternative with respect to soils.

Table 4-27
Quantitative Impact Summary by Alternative for Water Resources

Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ROW exclusion area (acres)	0	233,219	345,560	0	233,219[1]
ROW avoidance area (acres)	30,193	132,826	0	260,949	366,045
Closed to livestock grazing (acres)	0	0	337,165	0	0
Unsuitable for surface coal mining (acres)	0	284,975	464,178	0	0
Closed to salable minerals (acres)	2,538	284,337	457,774	2,538	284,337[2]

Table 4-27
Quantitative Impact Summary by Alternative for Water Resources

Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Closed to nonenergy leasing (acres)	2,538	284,337	457,774	2,538	284,337

[1]PHMA would be exclusion for wind and solar energy only.
[2]PHMA would be "open" to free use permits and the expansion of existing active pits if criteria are met.

Impacts from Travel and Transportation Management

Direct impacts on water resources from travel and transportation management are discussed above under *Nature and Type of Effects*. Under Alternative A, motorized cross country travel would continue to be restricted to existing roads and trails throughout the project area on BLM-administered lands, which would reduce new soil disturbances and localize further disturbance to existing travel routes which would reduce the possibility of additional sediment load or chemical contamination into water resources.

Per BLM regulations, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could reduce soil disturbances and reduce erosion or contamination.

Impacts from Recreation

Direct impacts, including vegetation loss, soil compaction, and soil erosion, to water resources from recreation are discussed above under *Nature and Type of Effects*. Under Alternative A, SRPs would be evaluated on a case-by-case basis throughout the project area. Management approaches that direct recreation to specific areas and avoid dispersed recreation can result in more predictable, localized, and manageable impacts. This would result in less vegetation loss, soil compaction, and soil erosion from recreation, which could limit sediment load into waterways and disturbance to stream banks.

Impacts from Lands and Realty

Direct impacts on water resources from ground-disturbing activities related to ROW development are discussed above under *Nature and Type of Effects*. Alternative A has two ROW avoidance areas and no ROW exclusion areas as seen in **Table 4-27**. The ROW avoidance areas make up 9,708 acres and are comprised of the Acid Shale-Pine Forest ACEC and Judith River Canyon. Surface-disturbing activities related to ROW development would be restricted in the ROW areas, limiting impacts on water resources.

Impacts from Range Management

Direct impacts on water resources from range development are discussed above under *Nature and Type of Effects*. Under Alternative A, stream bank riparian habitat would be improved from unsatisfactory to satisfactory

conditions. BLM would maintain PFC of riparian and wetland areas through proper livestock grazing systems and methods. Water sources would be developed where needed as indicated by allotment monitoring.

Impacts from Fluid Minerals

Direct impacts, such as impairment of water quality from erosion and chemical spills, to water resources from fluid minerals development are discussed above under *Nature and Type of Effects*. It is presumed that water quality has been affected in the planning area due to fluid mineral exploration and development. It is also presumed that fluid mineral projects have resulted in standing water that has provided mosquito breeding habitat and increased the likelihood that GRSG could be infected with West Nile virus. Alternative A does not include any fluid minerals management actions for the protection of GRSG against West Nile virus.

Impacts from Solid Minerals

Direct impacts, such as impairment of water quality from erosion and chemical spills, to water resources from solid minerals development are discussed above under *Nature and Type of Effects*. Under Alternative A, 2,538 acres are managed as closed to salable mineral disposal (**Table 4-27**). Alternative A does not include any locatable minerals management actions that would protect GRSG against West Nile virus. Management under Alternative A would allow for coal exploration and does not identify any portions of the decision area as unsuitable or unacceptable for surface mining of coal, and does not provide for the withdrawal of lands from mineral entry.

Impacts from Mineral Split Estate

Direct impacts on water resources from mineral split estate are the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. Under Alternative A, lands where the BLM manages the subsurface mineral estate, but not the surface, would be administered and managed in each phase of mineral extraction to ensure that undue degradation does not occur and that final restoration is satisfactory to the surface landowner. Management actions would reduce the possibility of man-made erosion, runoff and chemical contamination into surface and ground water features.

4.18.5 Impacts Common to Alternatives B-D and the Proposed Plan Amendment

Adoption of a Monitoring Framework (see **Section 2.7.2** and **Appendix B**) to oversee the implementation and effectiveness of GRSG habitat improvement efforts could result in improvement of water resources by reducing soil erosion and the introduction of contaminants.

4.18.6 Alternative B

Impacts from Travel and Transportation Management

Direct impacts on water resources from travel and transportation management are discussed above under *Nature and Type of Effects*. Management under Alternative B would provide for protection measures on PHMA, which would provide for fewer and more localized disturbances to water resources. In PHMA, motorized travel would be limited to existing roads, primitive roads, and trails and construction of new routes would be limited to specified needs. Construction of new routes or the upgrade of current routes would be limited to the realignment of existing designated routes if the realignment would eliminate the need for the construction of a new road, is necessary for motorist safety, or would have a minimal impact on GRSG habitat. The construction of new roads for access to valid existing rights would be limited to a cumulative total disturbance of less than three percent of the PHMA, and restricted to the minimal road standard necessary, which would reduce overall soil disturbance from construction resulting in a reduced possibility of runoff into streams and springs.

Travel management would provide for the evaluation of roads and areas for permanent or seasonal closures, and for the restoration of travel routes using appropriate seed mixes, and possibly transplanted sagebrush which could indirectly influence water quality by stabilizing soils and restoring restricted areas a natural state.

Like Alternative A, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could reduce soil disturbances and erosion, or contamination.

Impacts from Recreation

Direct impacts on water resources from recreation are discussed above under *Nature and Type of Effects*. Under Alternative B, SRPs in PHMA would only be approved when the recreation would have a neutral or beneficial effect on PHMA. Such restriction on recreation could reduce impacts on water resources from compaction and erosion of soils, and vegetation loss.

Impacts from Lands and Realty

Direct impacts on water resources from lands and realty management are discussed above under *Nature and Type of Effects*. Under Alternative B, the BLM would manage PHMA as ROW exclusion areas and GHMA as ROW avoidance areas for new land use authorizations. These actions protect a larger portion of the decision area from surface disturbing activities and therefore would be more protective of water resources than Alternative A (see **Table 4-27**).

Impacts from Range Management

Direct impacts on water resources from range development are discussed above under *Nature and Type of Effects*. Management under Alternative B would provide greater potential for improvement of water quality sources in riparian areas and wet meadows with PFC than Alternative A. Unlike Alternative A, management under Alternative B would provide the opportunity for improving PHMA through new water diversions from springs and seeps. Impacts from Alternative B would be of greater benefit than Alternative A through the analysis of existing water sources and the implementation of appropriate modifications to maintain the continuity of the predevelopment riparian area within PHMA. Management under Alternative B would provide GRSG with greater protection against West Nile virus than Alternative A through implementing RDFs when developing or modifying water developments in PHMA.

Impacts from Fluid Minerals

Direct impacts on water resources from fluid minerals development are discussed above under *Nature and Type of Effects*. Management under Alternative B would apply conservation measures to PHMA for fluid mineral leasing. These measures would include limitations on surface disturbances in PHMA, which would decrease the chance for the contamination of surface and ground waters, and would decrease the likelihood for the creation of new mosquito breeding habitat and the risk of infection of GRSG with West Nile virus in these areas.

Impacts from Solid Minerals

Direct impacts on water resources from solid minerals development are discussed above under *Nature and Type of Effects*. Under Alternative B, the BLM would find all PHMA as unsuitable for surface mining of coal and would allow subsurface mining only if associated facilities were located outside of PHMA. Management under Alternative B would also provide for withdrawing areas from mineral entry within PHMA, and would close PHMA to nonenergy mineral leases and salable mineral disposal. This would reduce the chance for the contamination of water resources within PHMA, and would reduce the chance for forming mosquito breeding habitat and furthering the potential transmission of West Nile virus to GRSG. Overall, management under Alternative B would be more protective of GRSG with respect to water quality and West Nile virus transmission than Alternative A (see **Table 4-27**).

Impacts from Mineral Split Estate

Direct impacts on water resources from mineral split estate would be the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. On lands where the BLM manages the surface, but not the subsurface mineral estate, appropriate fluid mineral RDFs would be applied in PHMA. This would protect a greater amount of water resources from manmade runoff, sedimentation and chemical contamination, and would reduce the chance for

forming mosquito breeding habitat and furthering transmission of West Nile virus to GRSG.

On PHMA lands where the BLM manages the subsurface split estate, but not the surface, the same conservation measures applicable to solid minerals on BLM-administered lands would be applied. This includes closing PHMA to surface coal mining, nonenergy mineral leases and salable mineral disposal, which would reduce the potential for contamination of water resources within PHMA and would reduce the chance for forming mosquito breeding habitat and furthering the potential transmission of West Nile virus to GRSG.

4.18.7 Alternative C

Impacts from Travel and Transportation Management

Direct impacts on water resources from travel and transportation management are discussed above under *Nature and Type of Effects*. Management under Alternative C would provide the same measures as Alternative B in PHMA and GHMA, which would result in fewer disturbances to water resources than under Alternative A. Under Alternative C, the BLM would also prohibit the construction of roads within four miles of GRSG leks, would avoid new road construction where possible, and would require the mitigation of any impacts on GRSG habitat from the construction of new roads or the upgrade of existing roads by using measures that have been proven to offset GRSG loss. These additional measures would further protect water resources from surface-disturbing activities.

Like Alternative A, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could reduce soil disturbances and erosion, or contamination.

Impacts from Recreation

Impacts on water resources from recreation activities would be the same as under Alternative A.

Impacts from Lands and Realty

Direct impacts on water resources from lands and realty management are discussed above under *Nature and Type of Effects*. Alternative C would manage PHMA and GHMA as ROW exclusion areas for new land use authorizations (see **Table 4-27**). This would protect a larger portion of the decision area from surface disturbing activities and therefore would be more protective of water resources than Alternative A.

Impacts from Range Management

Direct impacts on water resources from range development are discussed above under *Nature and Type of Effects*. Alternative C would remove livestock grazing from PHMA and GHMA totaling 337,165 acres and 69,408 AUMs. This

would provide the potential for improved soil and vegetative health, and would reduce the amount of fecal coliforms being generated on the landscape that could then flow into waterways, and would overall move the landscape toward more natural conditions that support clean surface waters. Alternative C would improve surface water quality over existing conditions as represented by Alternative A.

Alternative C would also provide greater potential for improvement of water quality sources than Alternative A by striving to attain reference state vegetation relative to ecological site descriptions in riparian areas and wet meadows on GHMA and PHMA. Compared with Alternative A, Alternative C may limit the BLM in its ability to improve water availability through banning the authorization of new water developments through diversions from seeps or springs in GRSG habitat. Alternative C would provide GRSG with greater protection against West Nile virus than Alternative A through implementing RDFs when developing or modifying water developments in PHMA.

Impacts from Fluid Minerals

Direct impacts on water resources from fluid minerals development are discussed above under *Nature and Type of Effects*. Alternative C would apply conservation measures to both GHMA and PHMA for fluid mineral leasing. These measures would include surface use restrictions on existing federal leases, which would decrease the chance for the contamination of surface and ground waters and would decrease the likelihood for the creation of new mosquito breeding habitat and the risk of infection of GRSG with West Nile virus in these areas.

Impacts from Solid Minerals

Direct impacts on water resources from solid minerals development are discussed above under *Nature and Type of Effects*. Alternative C would find all GHMA and PHMA as unsuitable for surface mining of coal and would allow subsurface mining only if associated facilities were located outside of PHMA. Alternative C would also provide for withdrawing areas from mineral entry within PHMA, and would close both GHMA and PHMA to nonenergy mineral leases and salable mineral disposal. This would reduce the chance for the contamination of water resources within PHMA and would reduce the chance for forming mosquito breeding habitat and furthering the potential transmission of West Nile virus to GRSG. Overall, Alternative C would be more protective with respect to water quality and West Nile virus transmission than Alternative A (see **Table 4-27**).

Impacts from Mineral Split Estate

Direct impacts on water resources from mineral split estate would be the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. On lands where the BLM manages the surface, but not the subsurface mineral estate, appropriate fluid mineral RDFs would be applied in PHMA and

GHMA. This would protect a greater amount of water resources from manmade runoff, sedimentation, and chemical contamination and would reduce the chance for forming mosquito breeding habitat and furthering transmission of West Nile virus to GRSG.

On PHMA and GHMA lands where the BLM manages the subsurface split estate, but not the surface, the same conservation measures applicable to solid minerals on BLM-administered lands would be applied. This includes closing PHMA and GHMA to surface coal mining, nonenergy mineral leases, and salable mineral disposal, which would reduce the potential for would reduce the chance for the contamination of water resources within PHMA and GHMA, and would reduce the chance for forming mosquito breeding habitat and furthering the potential transmission of West Nile virus to GRSG.

4.18.8 Alternative D

Impacts from Travel and Transportation Management

Direct impacts on water resources from travel and transportation management are discussed above under *Nature and Type of Effects*. Management under Alternative D would be more protective of water resources than Alternative A and similar to Alternative B. Management under Alternative D would result in additional closures and reclamation of roads, providing for less future disturbance and further mitigation of current disturbances of water resources. Management under Alternative D would provide for, on a case-by-case basis, the reclamation of commercially or administratively used roads upon completion of site-specific projects. Roads that were user created and unauthorized would also be subject to closure for further restoration. Within PHMA, roads may be evaluated for permanent or seasonal closures where off-road vehicles may be causing adverse effects.

Like Alternative A, temporary area, road, or trail closures for other resources would be considered where OHVs are causing, or would cause, considerable adverse effects on wildlife and its habitat. Those closures could reduce soil disturbances and erosion, or contamination.

Impacts from Recreation

Direct impacts on water resources from recreation are discussed above under *Nature and Type of Effects*. Management under Alternative D would be more protective of soils than Alternative A in that SRPs on PHMA would only occur if the recreation would have a neutral or beneficial effect on PHMA. This would result in less disturbance GRSG habitat which would prevent impacts on water resources from runoff and stream bank erosion.

Impacts from Lands and Realty

Direct impacts on water resources from lands and realty management are discussed above under *Nature and Type of Effects*. Under Alternative D, the BLM would manage PHMA as a ROW avoidance area for all land use authorizations

(including wind energy). GHMA would also be managed as a ROW avoidance area for wind energy (see **Table 4-27**). Impacts on water resources from construction could be reduced by restricting development in ROW avoidance areas. Other ROW authorizations in GHMA would be authorized with appropriate mitigation and conservation measures, which would reduce the potential for effects of construction on water resources. Management under Alternative D would provide for more protection than Alternative A.

Impacts from Range Management

Direct impacts on water resources from range development are discussed above under *Nature and Type of Effects*. Management under Alternative D would provide similar potential for improvement of water quality as Alternative A. Riparian-wetland habitats would be managed for PFC and the desired plant community, thereby mitigating many nonpoint source pollutants. Unlike Alternative A, management under Alternative D would provide the opportunity for improving PHMA through new water diversions from springs and seeps. Management under Alternative D would provide GRSG with greater protection against West Nile virus than Alternative A through implementing RDFs when developing or modifying water developments in PHMA.

Impacts from Fluid Minerals

Direct impacts on water resources from fluid minerals development are discussed above under *Nature and Type of Effects*. Similar to Alternative B, conservation measures would be applied to provide greater protection of GRSG from West Nile virus than Alternative A through managing water developments to reduce the spread of the virus within GRSG habitat areas, and through minimizing or avoiding surface disturbance.

Impacts from Solid Minerals

Direct impacts on water resources from solid minerals development are discussed above under *Nature and Type of Effects*. Management under Alternative D, as with Alternative A, would manage 101 acres of PHMA and 2,437 acres of GHMA as closed to salable mineral disposal. Management under Alternative D does not include any locatable minerals management actions that would protect GRSG against West Nile virus (see **Table 4-27**). Management under Alternative D would allow for coal exploration and does not identify any portions of the decision area as unsuitable or unacceptable for surface mining of coal, and does not provide for the withdrawal of lands from mineral entry.

Impacts from Mineral Split Estate

Direct impacts on water resources from mineral split estate would be the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. As with Alternative A, Alternative D, would manage lands where the BLM manages the subsurface mineral estate but not the surface each phase of mineral extraction to ensure that undue degradation does not occur and that final restoration would be satisfactory to the surface landowner. Management

actions would reduce the total surface disturbance and protect soils from unnecessary compaction, erosion, and vegetation loss which would protect surface waters from additional runoff and sedimentation, as well as chemicals from mineral extraction.

4.18.9 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including adaptive management, regional mitigation, density and disturbance caps, and lek buffers. If an adaptive management hard trigger response was met, PHMA would be the top priority for regional mitigation, habitat restoration, and fuels reduction treatments. These actions could offer incidental protection for water resources by maintaining or restoring vegetation and by limiting vegetation disturbance in certain areas. As described in *Nature and Type of Effects*, this could reduce erosion of soils into waterbodies.

Impacts from Travel and Transportation Management

Impacts would be the same as under Alternative B.

Impacts from Recreation

Impacts would be similar to Alternative D. In addition, the Proposed Plan Amendment would limit the construction of new recreational facilities, which may further protect water resources from potential runoff.

Impacts from Lands and Realty

Impacts from ROW management would be similar to those described under Alternative D. However, under the Proposed Plan Amendment, both PHMA and GHMA would be ROW avoidance areas for high-voltage transmission lines and large pipelines (366,045 acres) with limited exceptions, while PHMA would also be minor ROW avoidance areas for minor ROWs. In addition, PHMA would be ROW exclusion areas, and GHMA would be ROW avoidance areas for wind and solar energy. These measures could offer an increased level of protection of water resources from disturbance and habitat loss designation, as described under *Nature and Types of Effects*.

Impacts from Range Management

Impacts from the Proposed Plan Amendment would be similar to Alternative A with respect to the number of AUMs available and the acreage open for grazing, resulting in the same impacts on soils (see **Table 4-27**). In addition, under the Proposed Plan Amendment, the BLM would prioritize the review and processing of grazing permits/leases in PHMA, particularly in areas not meeting Land Health Standards. Together, these measures would help to improve soil, vegetation, and water resource conditions throughout the planning area and would have a beneficial incidental impact on water resources, as described under *Nature and Type of Effects*.

Impacts from Fluid Minerals

Impacts from fluid minerals management would be similar to those described for Alternative D. However, additional restrictions on geophysical exploration within PHMA would be proposed. Therefore, these measures would have a beneficial incidental impact on water resources due to reductions in soil and vegetation disturbance in the planning area from exploration.

Impacts from Solid Minerals

The BLM would determine coal suitability on a case-by-case basis as leases or lease modifications are submitted. Currently, there is no coal potential in the planning area. Therefore, no impacts on water resources are expected from coal management.

The Proposed Plan Amendment would provide additional protections on water resources in the planning area by closing nonenergy leasable mineral leasing and new mineral material sales. These closures would reduce the potential for soil erosion/runoff and contamination of waterbodies from mineral activities, as described under *Nature and Type of Effects*.

Impacts from locatable minerals management would be similar to those described under Alternative D. SFAs (53,440 acres) would be recommended for withdrawal. As discussed under **Section 4.9**, there is no known locatable mineral potential in GRSG habitat, so no effect from locatable minerals is anticipated.

Impacts from Mineral Split Estate

Direct impacts on water resources from mineral split estate are the same as those discussed above for fluid and solid minerals under *Nature and Type of Effects*. The Proposed Plan Amendment would manage lands in PHMA or GHMA with sub-subsurface federal mineral estate through each phase of mineral extraction using RDFs and COAs, which would reduce the total surface disturbance and protect water resources from unnecessary contamination, compaction, erosion, and vegetation loss.

4.19 SPECIAL STATUS SPECIES – OTHER SPECIES OF ISSUE

4.19.1 Methods and Assumptions

Although data on known locations and habitats within the planning area are available, the data are neither complete nor comprehensive concerning all special status species known to occur nor potential habitat that might exist. Known and potential special status species and habitat locations were considered in the analysis; however, the potential for species to occur outside of these areas was also considered and, as a result, some impacts are discussed in more general terms. See **Section 4.3** for a discussion of impacts on GRSG.

Indicators

Table 4-28 provides a summary of the indicators that were used to analyze the effects on special status species under each alternative.

Table 4-28
Comparison of Special Status Species-Other Species of Issue Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
ROW exclusion areas (acres)	0	233,219	345,560	0	233,219[1]
ROW avoidance areas (acres)	30,193	132,826	0	260,949	366,045
Acres closed to livestock grazing	0	0	337,165	0	0
Available AUMs	69,408	69,408	0	69,408	69,408

[1] Wind and solar energy development would be excluded in PHMA.

Assumptions

The analysis includes the following assumptions:

- The travel and transportation management analysis of impacts on special status species has an assumed road width of 10 feet. This width is an overestimate for two track roads and an underestimate for two-lane roads. Additionally, the existing route data are not surface management specific, it includes all ownerships.
- The exclusion or removal of livestock in grazing allotments as proposed in Alternative C would eventually require the installation of fences. In the short term, reduced grazing could lead to an accumulation of fuels thus increasing the risk of fire. In the long term, more fencing would be installed within the decision area that could lead to an increase habitat fragmentation, reducing the connectivity for animal movement across the decision area and limiting access to resources.
- Direct and indirect effects of reduced ROWs for each alternative within the ROW avoidance and exclusion areas were analyzed using data from BLM-administered land only. Potential increased development of ROWs on land not administered by the BLM would increase habitat fragmentation and increase the likelihood of spreading noxious weeds in these areas.
- Impacts on special status species would be more significant than impacts on common species because population viability is already uncertain for special status species.

- Short-term effects would occur over a timeframe of two years or less and long-term effects would occur over longer than two years.

4.19.2 Nature and Type of Effects

Habitat loss, competition, predation, disease, and other factors are causes of species decline and imperilment. Habitat loss or modification due to human activity is the greatest threat to ecosystems, particularly for species adapted to specific ecological niches. BLM land management practices are intended to sustain the health, diversity, and productivity of BLM-administered lands for the use and enjoyment of present and future generations.

Impacts on special status species would primarily result from surface-disturbing activities, such as construction of roads and facilities, construction of barriers and fences, resource extraction, cross-country motorized travel, wildfires, wildfire suppression, erosion, unauthorized collection or poaching, and trampling. Direct and indirect impacts on special status species result from surface-disturbing activity that alters habitats or disruptive activities that disturb animals. Without mitigation, surface-disturbing and disruptive activities can cause the flowing impacts on special status species:

- Violation of the ESA, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, or applicable state laws or BLM regulations (e.g., BLM Manual 6840 and related IMs)
- Harm, harassment, or adverse effects on any federally listed threatened or endangered species or federally proposed or candidate species
- Destruction or deterioration of federally listed threatened or endangered species' or federally proposed or candidate species' habitat, migration corridors, breeding areas, or designated or proposed critical habitat
- Decreased population viability or contribution to the need for a federal listing of any federal candidate species or BLM sensitive species
- Loss of habitat function or habitat value in BLM sensitive species habitats

All federal actions would comply with ESA consultation requirements. All implementation actions would be subject to further special status species review before site-specific projects are authorized or implemented. Federal protections and BLM policy protecting threatened, endangered, and sensitive species are considered methods for reducing the potential impacts from permitted activities. If adverse impacts were identified, mitigation measures would be implemented to minimize or eliminate the impacts, or in some cases project authorization could be denied. However, even with the above administrative processes, not all impacts could be avoided.

Types of Impacts—Special Status Wildlife Species

Special status wildlife habitats on BLM-administered lands within the decision area would be affected under all alternatives, and the condition of habitats is directly linked to vegetation conditions, water quality and quantity, and progression towards land health standards (**Section 4.5**, Vegetation (Including Noxious Weeds; Riparian and Wetlands), and **Section 4.18**, Water Resources).

The decision area provides a wide variety of habitat vegetation types for special status wildlife species across multiple ownerships (**Table 3-3** and **Table 3-4**). Nearly 170,000 acres within BLM-administered PH or PHMA consists of sagebrush followed by 4,807 acres of mixed-grass prairie. In BLM GH or GHMA, 44,698 acres consists of sagebrush and 8,377 acres of mixed-grass prairie. Special status species that occupy these dominant habitat types within PH/PHMA and GH/GHMA would be the most affected by changes to habitat caused by the following three types of disturbances: 1) disturbance from casual use; 2) disturbance from permitted activities; and 3) changes to habitat conditions.

Disturbance from Casual Use

Substantial analysis and planning is used to determine the locations and types of casual use activities that would occur, such as recreation, motorized vehicle use, and use of authorized and unauthorized routes. However, these uses are not subject to site-specific environmental review and monitoring requirements, and impacts on habitats or species would not be apparent until after change has occurred. Examples of impacts on special status wildlife from casual use include habitat modifications, fragmentation, or degradation; mortality or injury of animals; sedimentation of waterways; increased turbidity; decreased water quality; disturbance to species during sensitive or critical periods in their life cycle such as nesting or denning; short-term displacement; and long-term habitat avoidance by species that are sensitive to noise or human presence such as raptors. Some species may adapt to disturbances over time and could recolonize disturbed habitats. Conversely, changes to these habitats may promote the expansion of other species from adjacent habitats or the spread of invasive weeds. While no lands within the decision area are designated open to motorized travel, impacts would still occur in areas limited to designated routes due to noise disturbance, human presence, potential for weed spread and habitat modification, and the potential for injury or mortality to wildlife from vehicle collisions.

Both short-term loud noise (such as from vehicles or construction) and long-term low-level noise (such as from oil and gas development) have been documented to cause physiological effects on multiple wildlife species, including increased heart rate, altered metabolism, and hormones changes, foraging and antipredator behavior, reproductive success, density, and community structure (Radle 2007; Barber et al. 2009a). In addition, noise can impact wildlife species,

including mammals and birds, by disrupting communication and environmental cues (FHA 2011).

Determining the effect of noise is complicated because different species and individuals have varying responses, and certain species rely more heavily on acoustical cues than others (Radle 2007; Barber et al. 2009b). Impacts would be both short term and long term, depending on the type and source of noise.

On-site management of recreation and motorized activity and designation and closure of travel routes could prevent or reduce impacts on habitat. Seasonal closure of routes would prevent impacts on species during sensitive or critical times of the year, such as during winter or birthing.

Disturbance from Permitted Activities

Permitted, surface-disturbing activities (e.g., mineral exploration and development and ROW authorizations) would result in short-term direct impacts through mortality, injury, displacement, and noise or human disturbance caused by increased vehicle traffic and use of heavy machinery. Displacement of species could increase competition for resources in adjacent habitats or promote the expansion of species from adjacent habitats. Over the long term, these activities would remove and fragment habitats due to road development and use, facility construction and placement, creation of well pads and pipelines, and construction within ROWs. Species could avoid developed areas over the long term, or may adapt and recolonize sites after construction. ROW exclusion areas would eliminate habitat impacts on BLM-administered lands from infrastructure development activities, but they could shift impacts to private lands in the same vicinity. ROW avoidance areas could concentrate infrastructure development on non-BLM-administered lands which would decrease direct impacts from ROW developments on special status species on federal lands but could increase indirect impacts on those species on non-BLM-administered lands.

Bird mortality and injury could occur from collision or electrocution with transmission lines and other ROW structures. Similar development in areas where there are existing ROWs would reduce impacts, since resident birds may have adapted to the existing ROWs. COAs such as requiring flight diverters or following Avian Power Line Interaction Committee guidelines would be applied to new ROW authorizations to reduce impacts. Wind energy may also cause direct impacts on birds and bats, including blade strikes, barotrauma (injury or mortality caused by rapid or excessive pressure changes), habitat loss, and displacement. Indirect impacts may include introduction of invasive vegetation that may result in altered fire cycles, degraded land health conditions and habitat fragmentation.

Changes to Habitat Conditions

Changes to habitat conditions could occur from vegetation and weed treatments; livestock grazing; GRSG habitat enhancements; fire; fuels

treatments; and range improvements. Overall, the BLM would aim to achieve or make significant progress toward achieving Rangeland Health Standard 5: Biodiversity, which would maintain and/or restore habitat values for wildlife. Over the short term, vegetation, fire, and weed treatments would alter habitat for existing species, and impacts would occur until the desired habitat was established. Over the long term, vegetation and habitat treatments would increase habitat structural and compositional diversity, increase cover and nesting habitat, prevent sedimentation of waterways, and retain riparian and wetland habitats. Depending on the extent and severity, fire can improve habitat for some species in the long term.

Wildlife species that use grazing habitat can benefit from properly managed livestock grazing. These benefits to wildlife include providing sustainable, diverse, and vigorous mixtures of native vegetation for forage and habitat, control of noxious weeds in areas where they are present, reduced fuel accumulations, protection of intact sagebrush habitat, and increased habitat extent and continuity (NRCS 2011). If managed improperly, overutilization of forage by livestock could lead to increased competition with wildlife for forage, and potentially reduced cover and nesting habitat for birds and small mammals. Livestock could also spread weeds into new habitats, which would degrade habitat. Special status wildlife could be displaced from their habitats, which could increase competition for resources in adjacent habitats. These impacts would vary depending on the extent of removal, type of vegetation impacted, and length of the grazing period. In general, the more acres that are open to grazing under a given alternative, the greater the risk for impacts. Livestock may also degrade riparian areas, which could impact riparian-dependent, aquatic species.

The complete closure of BLM-administered lands to grazing may reduce the impacts from livestock grazing on special status species; however, this action could significantly increase fencing requirements and therefore, impacts from habitat fragmentation would also increase. Additionally, the closure of BLM-administered lands to livestock grazing could lead to an increase in numbers of livestock foraging on non-BLM-administered lands, thus increasing impacts on special status species on those lands.

Unplanned fire ignitions could cause short- or long-term damage to habitats depending on the vegetation type affected, extent, and severity of the fire. In the short term, fire removes forage, nesting, and habitat cover and leaves bare areas that provide little habitat value. Sagebrush destroyed by fire takes years to become reestablished and could lead to long-term reductions in available habitat for sagebrush obligate special status species. Grasses can recover more quickly from wildfire; therefore, special status species that inhabit grasslands could have an increase in available habitat in the short term.

Further, fire could displace species from suitable habitat, which could increase competition for resources in adjacent habitats. In the long term, wildland and

prescribed fires, as well as fuels treatments, improve habitat by increasing structural diversity. Often, fire and fuels treatments lower the risk for an uncharacteristically large or severe wildfire that would destroy a large acreage of wildlife habitats. For additional information on the effects of wildland fire on sagebrush habitat see **Section 4.3.2**, Nature and Type of Effects.

Management actions that restrict surface-disturbing activities would reduce impacts such as habitat removal, fragmentation, and human disturbance. Such management actions include measures to protect GRSG; closure of areas to mineral leasing and development; ROW avoidance and exclusion areas; areas recommended for withdrawal from mineral entry; restrictions within ACECs; and route closure or restrictions.

Criteria would be used to guide land exchanges, disposals, and acquisitions, which could reduce the fragmentation of BLM-administered land in the planning area. This could improve the BLM's ability to implement management actions that would result in improved habitats, undisturbed wildlife populations, and attainment of land health standards. However, lands identified for disposal could cause fragmentation and habitat loss if the disposed land is converted to other uses, such as agriculture or residential or industrial development.

Types of Impacts—Special Status Plant Species

Based on the 2014 BLM sensitive species list (see **Appendix L**), there are no special status plant species within the planning area.

4.19.3 Impacts Common to All Alternatives

Determination of Effects

Based on Black-footed ferret, Canada lynx, and Pallid Sturgeon descriptions discussed in **Section 3.20.1**, the proposed actions under all alternatives and the Proposed Plan Amendment would have **No Effect** on any Threatened or Endangered species in the planning area, because 1) there is no lynx Critical Habitat or occupied habitat that occurs in any PHMA or GHMA in the planning area; 2) no prairie dog colonies occur in the planning area on PHMA or GHMA of sufficient size to support black-footed ferrets; and 3) no active GRSG leks or PHMA occur near the Missouri River (where pallid sturgeon occur) for the planning area.

4.19.4 Alternative A

Impacts from Travel and Transportation Management

BLM-administered lands are designated limited yearlong for motorized wheeled vehicles which are restricted to existing roads and trails. The BLM would minimize or prevent road and trail development on crucial big game and upland bird habitat areas. Road and trail areas may be closed to off-road vehicles where harm to wildlife or habitat is occurring. These policies would protect special status species as described in *Nature and Type of Effects*.

Ecological impacts would likely continue from roads and motorized trails include mortality due to collisions, behavior modifications due to noise, activity or habitat loss, alteration of physical environment, leaching of nutrients, erosion, spread of invasive plants, increased use, and alteration by humans due to accessibility.

Impacts from Recreation

Under Alternative A, the BLM would implement limited recreation management. Recreational use may result in human disturbance, degradation of habitat, or mortality, as described in *Nature and Type of Effects*.

Impacts from Lands and Realty

Under Alternative A, ROWs outside of the ROW avoidance areas and WSAs are considered on a case-by-case basis. As a result, human disturbance- and infrastructure-related impacts described above in *Nature and Type of Effects* would continue. There is a current policy to collocate grants when possible. This would reduce impacts on some special status species by reducing the extent of new disturbance. A total of 9,708 acres of habitat would continue to be managed as a ROW avoidance area which would protect special status species habitat (**Table 4-29**). GHMA and PHMA ReGAP Class 3 habitat composition details, including associated acreages for each alternative, are described in **Section 4.1**. There would be no ROW exclusion areas within the planning area.

Land tenure adjustments would be subject to current disposal/acquisition criteria in the Headwaters Resource Management Plan (BLM 1984) and Judith Resource Area Resource Management Plan (BLM 1994). This could include retaining important wildlife habitat as well as nesting and breeding habitat for game animals, which would benefit special status species. This would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove habitat.

Impacts from Range Management

Livestock grazing would continue to be managed through development and monitoring of AMPs, or similar grazing plans. Methods and guidelines from the Headwaters Resource Management Plan (BLM 1984) and Judith Resource Area Resource Management Plan (BLM 1994) would be followed to maintain ecological conditions, enhance vegetation production, maintain and enhance wildlife habitat, during implementation of grazing regimens. Livestock use would be adjusted by changing the kind or class of livestock, the season of use, or distribution patterns if necessary to maintain the ecological conditions objectives. Monitoring would be used to maintain the effectiveness of these practices. As discussed in the *Assumptions* section above, grazing practices could have negative, neutral or positive effects on special status species. Impacts from grazing as described under *Nature and Types of Effects* would continue under Alternative A.

Table 4-29
Non-BLM Acreage, GHMA, and PHMA within Right-of-way Avoidance and Exclusion Areas by Alternative (Acres)

Non-BLM[1]		Alternative A		Alternative B			Alternative C		Alternative D		Proposed Plan Amendment	
GHMA	PHMA	Avoidance[2]	Neither[3]	Avoidance[4]	Exclusion[5]	Neither[3]	Exclusion[6]	Neither[3]	Avoidance[7]	Neither[3]	Avoidance[8]	Exclusion[9]
902,694	974,775	9,919	335,852	112,341	233,219	0	345,560	0	233,219	112,341	366,032	233,219

Source: BLM 2012a

1 – Non-BLM acreage includes state lands, privately owned land, and other lands not managed by BLM.
2 – Alternative A avoidance acreage represents existing protective habitat within BLM-administered lands.
3 – Represents BLM-administered lands outside of the avoidance and exclusion areas.
4 – Alternative B avoidance acreage is equal to GHMA.
5 – Alternative B exclusion acreage is equal to PHMA.
6 – Alternative C exclusion acreage is equal to GHMA + PHMA.
7 – Alternative D avoidance acreage is equal to PHMA.
8 – Proposed Plan Amendment avoidance acreage is equal to PHMA + GHMA + Alternative A Avoidance Area.
9 – Exclusion is for solar and wind energy development ROWs within PHMA.

Riparian habitats would be managed to achieve PFC, maintain desired plant community or wildlife habitat, improve watershed conditions, and comply with the Clean Water Act. Grazing systems would consider riparian impacts, including seasonal avoidance of riparian zones, encouraging livestock to congregate away from riparian areas, or fencing-off riparian areas. Restricting livestock from riparian areas would benefit riparian vegetation health and therefore positively impact special status species.

Impacts from Fluid Minerals

Under Alternative A, fluid mineral leasing and development would continue on previously leased lands. Development in these areas would continue to impact special status species by surface disturbance and occupancy, as described under *Nature and Type of Effects*.

Impacts from Solid Minerals

Prior to approving coal exploration licenses or prospecting permits for nonenergy leasable minerals, project-specific environmental review would be required to assess impacts on resources and develop mitigation measures. Surface occupancy is generally prohibited within key wildlife areas, floodplains and ROWs. No known coal resources are located in the management area. Therefore, no impacts are expected from coal.

For locatable minerals, RDFs would be applied to the extent consistent with applicable law to prevent unnecessary degradation would apply to the proposed Plan of Operations. The BLM would review these plans in withdrawn areas and would consider purchasing claims where activities threaten resource values, such as special status species and their habitat. Prospecting permits would be issued for nonenergy leasable minerals after environmental review of impacts and development of mitigation measures. Salable minerals contracts would be issued where disposal is deemed to be in the public interest while providing for reclamation of mined lands and preventing unnecessary impacts on nonmineral resources. Solid minerals management could improve other special status species habitat in the decision area. Impacts from surface disturbance and changes in habitat, as described under *Nature and Type of Effects*, would continue.

Impacts from Fire and Fuels Management

Prescribed burning may be used in support of resource management objectives, such as restoring grassland or shrubland, reducing conifer encroachment, or increasing age-class variety. The intention of prescribed burning is to improve wildlife habitat and vegetation production. Sagebrush treatments would be designed to maintain sagebrush within the canopy at 15 to 50 percent and to increase succulent forbs.

Chemical weed treatments (herbicide) may also be applied following prescribed burns to limit the expansion of weeds or invasive species in the burned area. A minimum rest period from livestock grazing of two growing seasons would be

required after major vegetative disturbance, such as re-seeding. Rest periods following wildfire or controlled burn would be determined on a site-specific basis.

Intensive wildfire suppression would be applied to high-value areas, such as sagebrush areas, fire-sensitive woody riparian areas, and commercial forests. Current fire management practices within the decision area would not reduce impacts on special status species as described under *Nature and Type of Effects*. In some instances, habitat for some special status species would be lost to fire, while other habitats would be protected from fuels management.

Impacts from Habitat Restoration and Vegetation Management

Grazing methods, land treatments and other improvements would be designed to accomplish habitat restoration objectives. Surface-disturbing activities greater than 0.25 acre require rehabilitation. Normally, native species would be used for re-seeding surface disturbances, unless nonnative species would better provide habitat stabilization. The BLM would manage for the benefit of succulent vegetation, forbs, and maintenance of big and silver sage in GRSG habitat areas. These improvements would also affect special status species associated with sagebrush ecosystems. Sagebrush obligate populations would trend upward in the long term, while special status grassland species would likely decline.

Impacts from ACECs

Under Alternative A, the BLM would not designate any additional ACECs and therefore would not provide additional protection to other special status species' habitats through ACEC management.

4.19.5 Impacts Common to Alternatives B-D and the Proposed Plan Amendment

Adoption of a Monitoring Framework (see **Section 2.7.2** and **Appendix B**) to oversee the implementation and effectiveness of GRSG habitat improvement efforts would facilitate and expedite the necessary management responses to improve and protect sagebrush and GRSG habitats. Indirectly, these protections would maintain or improve habitat for other sagebrush obligates and associates in PHMA and GHMA such as Brewer's sparrow, sagebrush sparrow, and sage thrasher. Managing PHMA and GHMA for more shrub habitats would reduce habitat suitability for grassland associates such as chestnut-collared longspur and long-billed curlew.

4.19.6 Alternative B

Impacts from Travel and Transportation Management

Actions to limit motorized vehicles to existing roads and trails would continue until travel management planning is completed. Planning would evaluate roads in PHMA for permanent or seasonal closure. Route construction in PHMA would be limited to realignments of existing roads or would be built or upgraded to minimum standards necessary. This would reduce impacts from disturbance,

habitat changes, and mortality on other special status species in these areas. The surface disturbance to vegetation associated with road-building would be part of the three percent maximum disturbance for that area. If closures were applied, the impacts from roads on special status species described in the *Nature and Type of Effects* section would be reduced in these areas.

Like Alternative A, road and trail areas may be closed to off-road vehicles where harm to wildlife or habitat is occurring. These policies would protect special status species, as described in *Nature and Type of Effects*.

Impacts from Recreation

To protect GRSG, SRPs would be issued in PHMA only where the effects of the recreational use were neutral or beneficial to GRSG habitat. This action would reduce impacts, such as human disturbance, degradation of habitat, or mortality, from recreation as described under the *Nature and Type of Effects* for special status species that occur in PHMA.

Impacts from Lands and Realty

ROW exclusion areas (233,219 acres) for PHMA would be established and could reduce impacts from disturbance and habitat changes as described under *Nature and Type of Effects* for other special status species that occur in these areas (**Table 3-3**). Additionally, ROW avoidance areas (112,341 acres) would be included for GHMA under Alternative B (**Table 4-29**). See **Table 3-4** for a description of vegetation types within GH that would be included as ROW avoidance areas However, due to the large aerial extent and variety of ownerships (non-BLM) within PHMA (974,735 acres) and GHMA (899,659 acres), impacts from development on other special status species would still continue to occur on lands outside of BLM jurisdiction.

Public ownership would be retained in PHMA, with exceptions for increasing contiguous federal ownership patterns within PHMA, and in areas with effective mitigation or conservation easement for disposal of federal land. State or private lands may be acquired to enhance GRSG conservation value of existing federal lands. Ownership changes might positively or negatively impact special status species, depending on the proposed use of the land, as described under *Nature and Type of Effects.*

Impacts from Range Management

Under Alternative B, the number of acres open or closed for grazing and available AUMs would be the same as Alternative A. As described under *Nature and Types of Effects*, impacts from grazing would occur, including changes to habitat conditions.

Permit renewals and AMPs would be used to incorporate GRSG habitat objectives into grazing allotments. NEPA analysis of grazing permit renewals would include specific objectives to restore and improve GRSG habitat, and include an alternative that achieves this objective. Planning efforts would identify

allotments where retirement of permitted grazing uses is potentially beneficial to special status species habitat.

In PHMA, management would promote vegetation composition and structure consistent with GRSG habitat objectives. Grazing management actions, such as numbers or type of livestock, season of use or distribution may be considered to meet GRSG habitat objectives. Following drought periods, PHMA would be managed to allow for vegetation recovery. Wet meadows and riparian areas in PHMA would be managed to maintain forbs, edge cover, and species richness to facilitate GRSG brood rearing. Seasonal restrictions on livestock grazing would be used to reduce pressure on riparian vegetation used by GRSG in summer. Modifications to water developments would be considered to maintain continuity of riparian areas within PHMA. This management could benefit other special status species that depend on these habitats.

Vegetation treatments to increase forage for livestock would only be allowed in PHMA if they conserve or enhance GRSG habitat. Structural range improvements would be designed to improve GRSG habitat through improved grazing management. Existing structural range improvements (e.g., fences) would be modified to minimize strikes on GRSG. Existing improvements and project planning for new improvements would reduce impacts described under *Nature and Type of Effects* for other special status species that occur in these areas. However, sensitive grassland species may have reduced habitat as a result of GRSG habitat enhancements.

Impacts from Fluid Minerals

The BLM would implement limitations on exploration within PHMA, which would reduce impacts on special status species and their habitats from exploration and development of fluid minerals (i.e., mortality, injury, displacement, noise or human disturbance, and habitat loss and fragmentation). RDFs and conservation measures would be applied as COAs on existing federal leases, limiting surface occupancy within PHMA, imposing seasonal restrictions, and restricting surface disturbance to three percent of the area.

Impacts from Solid Minerals

All surface mining of coal would be found to be unsuitable in PHMA. Subsurface leases would be allowed if all surface facilities were placed outside PHMA. In existing lease areas, surface facilities would be located outside PHMA, or collocated in existing disturbed areas to the extent possible. In GHMA, surface disturbances would be minimized during activity level planning. Currently there is no coal potential in the management area. Therefore, no impacts are expected from coal.

For locatable minerals, areas in PHMA would be proposed for withdrawal from mineral entry based on risk to GRSG habitat. Existing claims would be subject to validity examination, mitigation would be applied to claims, and RDFs would be applied to the extent consistent with applicable law.

PHMA would be closed to nonenergy leasable mineral leasing and to salable mineral disposal. RDFs would be applied to existing leases and restoration to any existing salable mineral pits. These proposed limitations would minimize impacts from surface disturbance and changes in habitat, as described under *Nature and Type of Effects* for other special status species that occur in these areas.

Impacts from Fire and Fuels Management

The approach to prescribed burning would be as described under Alternative A. Fuels treatments would be designed and implemented with an emphasis on promoting sagebrush. Sagebrush canopy would not be reduced below 15 percent unless required for fuels management objectives, and seasonal restrictions would be applied to fuels management. Rest periods would be required and invasive species controlled, with native seeds utilized for treatment wherever possible, including for emergency stabilization projects. Climate change potential would be considered in selection of seeding for restoration. Grazing livestock would be considered as an option to reduce fuel load.

Fire suppression would prioritize GRSG habitat in PHMA and GHMA, after life and property, and RDFs would be followed. These restrictions would minimize impacts described under *Nature and Type of Effects* for other special status species that occur in these habitats. Together these actions would reduce the effects from wildfire. However, suppression over large areas could allow for fuels to build up and could lead to a large-scale fire over the long term.

Impacts from Habitat Restoration and Vegetation Management

Within the analysis area, vegetation treatments would continue to be used to achieve resource management objectives and considered for the protection of sagebrush ecosystems. Implementation of restoration efforts would be prioritized based on the proposed benefit to GRSG. Habitat restoration would attempt to meet GRSG habitat parameters as the highest priority. Native seed would be used for restoration unless precluded; climate change potential would be considered in selection of seeding for restoration. Sagebrush seed harvest areas may be established in areas prone to fire. Vegetation treatments and sagebrush ecosystem restoration efforts would minimize impacts on special status species in these areas, as described under *Nature and Type of Effects*. This would improve habitat for other special status species that use the same habitat as GRSG.

Impacts from ACECs

Impacts would the same as under Alternative A.

4.19.7 Alternative C

Impacts from Travel and Transportation Management

New road construction would be prohibited within four miles of active leks and avoided in PHMA and GHMA. Road construction would be limited to

realignments of existing routes in PHMA, if the realignment has minimal impact on GRSG habitat. No upgrading (e.g., paving of primitive roads) of existing routes would be allowed unless necessary for safety or to avoid construction of a new road. When roads or trails are closed, re-seeding would be done with native seed mixes and transplanted sagebrush would be required. All additional impacts would be the same as under Alternative B. Prohibiting or limiting road construction in the decision area would minimize impacts on special status species in these areas, as described under *Nature and Type of Effects*.

Impacts from Recreation

As under Alternative A, the BLM would continue to manage the area for dispersed recreation opportunities, such as hunting, camping, biking, and hiking; therefore, no protection would be provided to other special status species' habitats. Impacts would be similar to Alternative A.

Impacts from Lands and Realty

PHMA would be ROW exclusion areas (345,560 acres). No ROW avoidance areas would be established. Designation of PHMA and GHMA as a ROW exclusion area would improve protection of other special status species on BLM-administered lands from disturbance and habitat loss, as described under *Nature and Type of Effects*. Because of the current ownership patterns in PHMA (974,735 acres), the ROW exclusion areas proposed under Alternative C could increase habitat fragmentation on land not administered by the BLM. See **Tables 3-3** and **3-4** for a description of vegetation types in PHMA and GHMA that would be designated ROW exclusion and avoidance areas respectively.

As under Alternative B, public ownership would be maintained in PHMA, but without the exceptions provided under that alternative. Private lands, when offered, may be acquired in ACECs to enhance GRSG conservation value of existing lands. Adding lands to ACECs would enhance protection of special status species in these areas.

Impacts from Range Management

Under Alternative C, 337,165 acres of grazing lands would be removed within PHMA and GHMA, and would include the removal of 103,806 AUMs. This action would likely reduce the impacts from grazing as stated under the *Nature and Type of Effects* section. However, grazing practices contribute to noxious weed control efforts and grazing reduces fuels. Therefore, removing grazing could allow for noxious weeds to spread and fuels to accumulate, leading to an increase in wildfire risk in special status species habitat. Unplanned fire ignitions could lead to long-term reductions in the availability of sagebrush habitat. This could lead to a short-term increase in habitat for grassland special status species, including Sprague's pipit, as described in *Nature and Type of Effects*. For a detailed list of species associated with sagebrush or grasslands habitat refer to **Appendix L**.

In addition, not allowing grazing on BLM-administered lands could substantially increase fencing to avoid trespassing from private lands onto BLM-administered lands. This would result in over 3,400 miles of fencing and would both increase and decrease habitat quality described above. However, it would further fragment the landscape.

An indirect impact from excluding livestock grazing from BLM-administered lands is the potential conversion of adjacent private grazing lands to agriculture or other land uses in the planning area, including development. This is especially a concern in areas with a mosaic of ownership boundaries, which would decrease available habitat for special status species that inhabit rangeland outside of BLM-administered lands.

The complete exclusion of grazing from PHMA and GHMA would also eliminate the need for maintaining nearly 90 percent of stock water in the long term. A minimum amount of stock water ponds would be maintained for other wildlife management on BLM-administered lands in the planning area. Special status amphibians, shorebirds and waterfowl, and aquatic invertebrates that depend on stock water would decrease. The substantial reduction in stock water in GRSG habitat on BLM-administered lands under Alternative C would not likely decrease the risk of mosquito-borne diseases due to land ownership patterns and stock water remaining on land not administered by the BLM.

No new water diversions from seeps or springs would be permitted within GRSG habitat. Modifications to water developments, including dismantling, would be considered to maintain continuity of riparian areas within GRSG habitat. This management could benefit other special status species habitat. However, dismantling human modifications within PHMA could remove man-made wetlands and riparian areas. Water developments in PHMA would use RDFs to mitigate potential impacts from West Nile virus.

Treatments would only be allowed in PHMA if they demonstrably benefit GRSG habitat. Existing seedings in PHMA that are primarily introduced grasses would be considered for restoration to sagebrush. Treatment plans must include pre-treatment data, nongrazing enclosures, and long-term monitoring. Soil cover and native herbaceous cover would be maintained in GRSG habitat. This management could benefit other special status species habitat.

Existing structural range improvements (e.g., fences) would be evaluated to ensure they conserve, enhance, or restore GRSG habitat. Fences may be modified or removed to minimize strikes on GRSG. Existing improvements and project planning for new improvements would consider the potential for invasive species. The potential range management actions proposed in Alternative C would decrease the impacts described under *Nature and Type of Effects* for special status species in these areas.

Impacts from Fluid Minerals

Exploration within PHMA would be permitted to obtain information for adjacent areas. Only helicopter-portable drilling methods would be allowed for geophysical operations in PHMA, according to seasonal timing restrictions. No exploration would be conducted in habitat areas during their season of use by GRSG. As under Alternative B, RDFs and conservation measures would be applied as COAs on existing federal leases, limiting surface occupancy within PHMA and GHMA, imposing seasonal restrictions to exploratory drilling, including vehicle traffic and other human activity, restricting surface disturbance to three percent of the area, and making RDFs mandatory as COA.

Impacts from Solid Minerals

Impacts from all actions on other special status species would be as described under Alternative B.

Impacts from Fire and Fuels Management

Vegetation treatments within the decision area may be used in support of resource management objectives, given special consideration for the protection and maintenance of sagebrush ecosystems. Fuels treatments would be designed and implemented with an emphasis on promoting sagebrush ecosystems. Sagebrush canopy would not be reduced below 15 percent unless fuels management objectives required it, and seasonal restrictions would be applied to fuels management. Evaluate the benefits of the fuel break in the NEPA process versus the additional loss of sagebrush cover. These treatments could benefit special status species habitat.

Fuels treatments would not be allowed in winter range unless the treatment is designed to reduce wildfire risk and maintain habitat quality in the winter range. Establishing proper fire control lines and adequate preparation would be used in any fuel reduction project. Vegetation treatment plans would include pretreatment data, nongrazing exclosures, and long-term monitoring. These treatments could benefit special status species habitat.

The approach for fire suppression and emergency stabilization projects would be as described under Alternative B. Additional policies make efforts to assure availability of native seed, to establish grazing exclosures where possible to assess recovery post-fire, and exclude livestock from burned areas until GRSG habitat objectives are met. These restrictions would minimize impacts described under *Nature and Type of Effects* for other special status species that occur in these areas. While this would reduce the likelihood of impacts from livestock on habitat and species, it could also allow for fuels to build up and could increase the likelihood of a large fire that would destroy special status species habitat.

Impacts from Habitat Restoration and Vegetation Management

The approach is as described under Alternative B, with additional measures to prioritize restoration in seasonal habitats thought to be limiting GRSG and

where factors causing degradation (e.g., livestock management) have already been addressed. In addition, native vegetation community composition and function would specifically provide for recovering GRSG habitat. Existing areas of exotic plant seedings would be interseeded and restored to recover sagebrush in order to expand occupied habitat. Vegetation treatments and sagebrush ecosystem restoration would minimize impacts on special status species that occupy these areas, as described under *Nature and Type of Effects*. As a result, a greater area of habitat would be improved for some special status species.

Impacts from ACECs

ACECs to protect GRSG would be designated as sagebrush reserves on 97,762 acres. Vegetation within areas designated as ACECs would benefit from increased management attention to environmental resources in these areas.

4.19.8 Alternative D

Impacts from Travel and Transportation Management

In addition to measures described under Alternative A, a travel management plan would be developed and would designate public roads and trails. Roads in PHMA would be evaluated for permanent or seasonal closure. Upon completion of projects, site-specific roads would be reclaimed unless the route provided specific public access benefits. Route construction would be limited to realignments that have minimal impact, as described under Alternatives B and C. Upgrading of existing roads would be allowed when there is minimal impact on GRSG habitat. Restoration of roads not designated in travel management plans would occur as described under Alternative B. Prohibiting or limiting road construction in the decision area would minimize direct and indirect impacts on special status species in these areas as described under *Nature and Type of Effects*.

Impacts from Recreation

Impacts would be the same as under Alternative B.

Impacts from Lands and Realty

PHMA would be ROW avoidance areas (233,219 acres), and PHMA and GHMA would be ROW avoidance areas for wind energy development. New authorizations would be collocated within existing disturbance areas or where impacts on GRSG and habitat are minimized. Authorizations would be allowed in GHMA with appropriate mitigation measures. These measures could offer an increased level of protection from disturbance and habitat loss than Alternative A.

Retired ROWs would be reclaimed by restoring habitat, which would benefit special status species and their habitat. Power lines would be removed or buried where feasible within PHMA, but this would be on a very limited basis. Burying power lines would cause short-term surface disturbances but would reduce

long-term impacts for other special status species. Leases and permits for agricultural and other uses would be considered on a case-by-case basis, with PHMA a ROW avoidance area. In GHMA leases would be allowed with appropriate mitigation measures.

Public land withdrawals would not be recommended within habitat areas unless land management would include GRSG conservation measures. Public ownership would be maintained in PHMA, except where land exchange would provide a greater benefit to GRSG. Ownership changes would reduce impacts described under *Nature and Type of Effects* for other special status species that occur in these areas.

Impacts from Range Management

Within PHMA, the BLM would conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. State objectives would be used for fine-scale analysis unless local objectives are developed at the field office level, in partnership with MFWP and USFWS. This management action could benefit other special status species that occupy GRSG habitat.

Under Alternative D, there would be no change to the acreage open for grazing or available AUMs: currently, 337,165 acres in the decision area are open for livestock grazing, with 103,806 available AUMs. Impacts from grazing on habitat are described under *Nature and Type of Effects*.

Integrated ranch planning and land health assessments would be used as described under Alternative B. Allotments that have the best opportunities for GRSG habitat conservation, enhancement, or restoration would be high priorities for evaluation and management. Lands would be managed for vegetation composition consistent with ecological potential to achieve GRSG habitat objectives. If an effective grazing system meeting GRSG habitat objectives is not in place, the permit renewal process would examine at least one alternative to restore this habitat. This management could benefit other special status species that occupy GRSG habitat. Drought issues would continue to be managed under Montana/Dakotas drought policy (**Appendix I**).

Wet meadows and riparian areas in PHMA would be managed to maintain forbs, edge cover, and species richness to facilitate GRSG brood rearing. Seasonal restrictions on livestock grazing would be used to reduce pressure on riparian vegetation used by GRSG in summer. New water diversions from seeps or springs would be authorized only when PHMA would benefit from the development. Modifications to water developments would be considered to maintain continuity of riparian areas within PHMA. Reservoirs and stock ponds with riparian and wetland characteristics would be managed to support wildlife

to the extent possible, with consideration given to the original purpose of the development. This management could benefit other special status species that occupy wet meadow and riparian habitat.

Vegetation treatments to increase forage for livestock would prioritize restoration of sagebrush steppe as budgets allow; sagebrush treatments would be justified for GRSG or other sensitive species and would be analyzed in subsequent NEPA documents. Vegetation treatments to increase forage for livestock would only be allowed in PHMA if they conserve or enhance GRSG habitat. Allowances would be made for treatments with negative short-term effects but overall long-term benefits.

Existing seedings in PHMA that are primarily introduced grasses would be considered for restoration to sagebrush, as described under Alternatives B and C. Appropriate monitoring would be established to evaluate success of the treatments. Structural range improvements would be designed to improve GRSG habitat as described under Alternative B.

Impacts from Fluid Minerals

As under Alternative B, conservation measures would be applied as COAs on existing federal leases. The conditions would minimize noise, traffic, and other disturbance associated with mineral extraction. These measures would likely result in minor impacts on special status species, compared to Alternative A.

Impacts from Solid Minerals

The planning area would be available for coal exploration licensing; prior to licensing environmental review would be conducted to assess impacts and develop mitigation measures. Currently, there is no coal potential in the planning area. Therefore, no impacts are expected from coal.

Locatable minerals development would be managed as described under Alternative A. Prospecting for nonenergy leasable minerals would be permitted after appropriate environmental review with assessment of impacts and mitigation. Mineral pits would be restored as described under Alternative B. These actions would have minimal impacts on special status species.

Impacts from Fire and Fuels Management

Fuels management would be designed and implemented as described in Alternative C, but would also include additional specific parameters governing selection of sites for prescribed burns. Invasive vegetation would be monitored and controlled post-burn, and livestock grazing deferral evaluated on a case-by-case basis.

Fire suppression would be prioritized, RDFs applied, ES&R procedures would be as described in Alternative B. Additional provisions would be implemented to protect vegetation to benefit GRSG in fire-prone areas. Together these actions would reduce the effects from wildland fire. However, suppression over large

areas could allow for fuels to build up and could lead to a large fire in the long term. For fuels management, livestock grazing would be considered for fuel reduction efforts as described under Alternative B. These actions would minimize impacts on other special status species that occupy GRSG habitat.

Impacts from Habitat Restoration and Vegetation Management

As described under Alternative B, habitat restoration would give special emphasis to protection of sagebrush ecosystems in designing vegetation treatments. Prioritization would occur as described under Alternative B, with emphasis given to other sensitive and listed species in addition to GRSG. Restoration projects would strive to meet GRSG habitat objectives for projects in PHMA, but those objectives would not be the highest priority as under Alternatives B and C. Restoration design seed mixes, landscape patterns and changes to grazing would be as described under Alternative B. However, this alternative includes management direction that other restoration projects may take precedence over sagebrush projects based on funding requirements, landowner cooperation, future ESA listings, and other factors. These actions would minimize impacts on other special status species, as described under *Nature and Type of Effects*, and would provide more protection for special status species and GRSG, compared to Alternatives B and C.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.19.9 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including adaptive management, regional mitigation, density and disturbance caps, and lek buffers that could improve and protect sagebrush and GRSG habitats. Indirectly these protections would maintain or improve habitat for other sagebrush obligates and associates in PHMA and GHMA such as Brewer's sparrow, sagebrush sparrow, and sage thrasher. Managing PHMA and GHMA for more shrub habitats would reduce habitat suitability for grassland associates such as chestnut-collared longspur and long-billed curlew.

Impacts from Travel and Transportation Management

Impacts would be the same as under Alternative D.

Impacts from Recreation

Impacts would be similar to those described under Alternative B. The Proposed Plan Amendment would provide additional incidental protections, as described under *Nature and Type of Effects*, for some special status species by limiting construction of new recreation facilities to those that provide a GRSG "net conservation gain" or are required for public health and safety or resource protection.

Impacts from Lands and Realty

Impacts from ROW management would be similar to those described for Alternative D. However, under the Proposed Plan Amendment, both PHMA and GHMA would be ROW avoidance areas for high-voltage transmission lines and large pipelines (345,560 acres) with limited exceptions, while PHMA would also be ROW avoidance areas for minor ROWs. In addition, PHMA would be ROW exclusion areas, and GHMA would be ROW avoidance areas for wind and solar energy. RDFs would be applied to further reduce impacts. These measures could offer an increased level of protection from disturbance and habitat loss as described under *Nature and Type of Effects*.

Land tenure adjustments would have impacts similar to Alternative D. Under the Proposed Plan Amendment, public ownership would be maintained in both PHMA and GHMA, except where land exchange would provide a net conservation gain to GRSG or if there would be no direct or indirect adverse impact on conservation of GRSG. These measures would provide increased incidental protection to other special status species in the planning area by maintaining intact habitat.

Impacts from Range Management

Impacts from range management would be similar to those described for Alternative D. In addition, under the Proposed Plan Amendment, the BLM would prioritize the review and processing of grazing permits/leases in PHMA, particularly in areas not meeting Land Health Standards. RDFs would be implemented to reduce impacts when developing or modifying water developments in GRSG habitat. GRSG Habitat Objectives identified as **Objective SS-1.4**, would be incorporated into the land health assessments. Together, these measures would help to improve and protect habitat quality throughout the planning area, thereby having incidental impacts on special status species.

Impacts from Fluid Minerals

Impacts would be the same as under Alternative D.

Impacts from Solid Minerals

The BLM would determine coal suitability on a case-by-case basis as leases or lease modifications are submitted. Currently, there is no coal potential in the planning area. Therefore, no impacts on special status species are expected from coal management.

The Proposed Plan Amendment would provide additional protections on special status species and habitat in the planning area by closing nonenergy leasable mineral leasing and new mineral material sales. These closures would reduce the potential disturbance of special status species and habitats from mineral activities, as described under *Nature and Type of Effects*.

Impacts from locatable minerals management would be similar to those described under Alternative D. SFAs (53,440 acres of PHMA) would be recommended for withdrawal. As discussed under **Section 4.9**, there is no known locatable mineral potential in GRSG habitat, so no effect from locatable minerals is anticipated.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to those described for Alternative D. In addition, Burn Plans would be required to meet the four criteria under the Proposed Plan Amendment if prescribed fire is used in GRSG habitat. This would provide additional protections to special status species habitat by reducing risks from use of prescribed fire.

Impacts from Habitat Restoration and Vegetation Management

Impacts from habitat restoration and vegetation management would be similar to those described for Alternative D. The Proposed Plan Amendment also specifies management objectives for vegetation, and encroaching conifers would be removed from sagebrush habitats. This could impact other special status species occurring in these areas by removing potential nesting habitat for species such as Ferruginous hawks and improving and maintaining habitats for sagebrush associates such as Brewer's sparrows.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.20 FISH AND WILDLIFE

4.20.1 Methods and Assumptions

Methods of Analysis

Impacts on wildlife and their habitats include the following:

- Disturbance or changes to plant communities, food supplies, cover, breeding sites, and other habitat components necessary for any species to a degree that would lead to substantial population changes.
- Disturbance or changes in seasonally important habitat (e.g., critical for overwintering or successful breeding) to a degree that would lead to substantial population changes.
- Interference with a species movement pattern that decreases the ability of a species to breed or overwinter successfully to a degree that would lead to substantial population changes.

Impacts specific to aquatic species and their habitats include the following:

- Sediment and Turbidity. Increased sediment loading in waters containing sediment-intolerant species, loss of recruitment, stress, habitat alteration, and habitat loss.
- Habitat Alteration. Changes in habitat that make it nonfunctional for select species or more conducive to competitive species.
- Loss or Reduction of Streamside Vegetation and Cover. Increased temperatures, stress, reduced productivity, and impacts on food webs.
- Water Quality Alteration. Actions that alter important water quality parameters, including pH, dissolved oxygen, temperature, hardness, alkalinity/salinity, and turbidity.
- Water Depletions. Loss of physical habitat, changes in water quality, sediment accumulation, habitat alteration, loss of habitat complexity, or food source reduction.
- Potential direct mortalities to aquatic wildlife from motorized travel.

Indicators

Table 4-30 provides a summary of the indicators that were used to analyze the effects on wildlife species under each alternative.

Table 4-30
Comparison of Wildlife Species Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
ROW exclusion areas (acres)	0	233,219	345,560	0	233,219[1]
ROW avoidance areas (acres)	30,403	132,826	0	260,560	366,045
Acres closed to livestock grazing	0	0	337,165	0	0
Available AUMs	103,806	103,806	0	103,806	103,806

[1] Wind and solar energy development would be excluded in PHMA.

Assumptions

The analysis includes the following assumptions:

- The travel and transportation management analysis of impacts on wildlife species has an assumed road width of 10 feet. This width is an overestimate for two track roads and an underestimate for two-lane roads. Additionally, the existing route data are not surface management specific, it includes all ownerships.
- The exclusion or removal of livestock in grazing allotments would eventually require that fences be installed. In the short term, reduced grazing could lead to an increase in fire issues. In the long term, more fencing could be installed within the decision area that could lead to an increase habitat fragmentation, reducing the

connectivity for animal movement across the decision area and limiting access to resources. Alternative C could result in the greatest increase in fencing in order to exclude both PHMA and GHMA from grazing.

- Direct and indirect effects of reduced ROWs for each alternative within the avoidance and exclusion areas were analyzed using data from BLM-administered land only. Potential development of ROWs on land not administered by the BLM would increase habitat fragmentation and increase the likelihood of spreading noxious weeds in these areas.
- Short-term effects would occur over a timeframe of two years or less and long-term effects would occur over longer than two years.

4.20.2 Nature and Type of Effects

As discussed in **Section 3.21**, Fish and Wildlife, implementation of any of the alternatives would result in general and unquantifiable indirect beneficial effects for fish in terms of greater protection through new restrictions on surface and resource use resulting in reduced opportunities for surface disturbance or habitat disruption where they exist. Therefore, general fish species will not be discussed further in **Chapter 4**.

Similar to **Section 4.19**, Special Status Species – Other Species of Issue, wildlife habitats on BLM-administered lands would be affected under all alternatives within the decision area. The condition of habitats is directly linked to vegetation conditions, water quality and quantity, and progression towards land health standards (see **Sections 4.1** and **Section 4.1**).

Changes to wildlife and their habitats would be caused by the following three types of disturbances: 1) disturbance from casual use; 2) disturbance from permitted activities; and 3) changes to habitat conditions. Detailed descriptions of each disturbance type are provided in **Section 4.19.2,** Nature and Type of Effects. General impacts on wildlife are provided for each disturbance type below.

Disturbance from Casual Use

Casual use activities are not subject to site-specific environmental review and monitoring requirements, and impacts on habitats or species would not be apparent until after damage has occurred. Wildlife impacts from casual use include habitat loss, fragmentation, or degradation; mortality or injury of animals; sedimentation of waterways; increased turbidity; decreased water quality; disturbance to species during sensitive or critical periods in their life cycle such as spawning, nesting, or denning; short-term displacement; and long-term habitat avoidance by species that are sensitive to noise or human presence such as raptors.

Noise affects many wildlife species physiologically in a variety of ways, as described in **Section 4.19.2**. Generally, noise impacts would be both short term and long term, depending on the type and source.

Some species may adapt to disturbances over time and could recolonize disturbed habitats. While no lands within the decision area are designated open to motorized travel, impacts would still occur in areas limited to designated routes due to noise disturbance, human presence, potential for weed spread and habitat degradation, and the potential for injury or mortality to wildlife from vehicle collisions. On-site management of recreation and motorized activity and designation and closure of travel routes could prevent or reduce impacts. Seasonal closure of routes would prevent impacts on species during sensitive or critical times of the year, such as during winter or birthing.

Disturbance from Permitted Activities
Impacts from permitted, surface-disturbing activities, as described in **Section 4.19.2**, would result in short-term direct impacts on wildlife through mortality, injury, displacement, and human disturbance. Long-term impacts would remove and fragment habitats due to the development and use of human infrastructure and development. Species could avoid developed areas over the long term or may adapt and recolonize sites after construction. ROW avoidance and exclusion areas would reduce or avoid habitat impacts and could reduce the total acreage of habitat disturbance and fragmentation.

Changes to Habitat Conditions
Wildlife could be impacted from changes to habitat from treatments or enhancement, changes in livestock grazing, and range improvements. The BLM would aim to achieve or trend toward achieving Rangeland Health Standard 5: Biodiversity, which would maintain or restore habitat values for wildlife. See **Section 4.19.2** for general short-term and long-term descriptions of potential impacts on wildlife habitat from grazing, fire and fire treatment, and modifications to the management of surface-disturbing activities.

4.20.3 Alternative A

Impacts from Travel and Transportation Management
Management would protect habitat and reduce impacts on wildlife species, similar to the affects described in **Section 4.19.4**, Alternative A. Road and trail areas may be closed to off-road vehicles where harm to wildlife or habitat is occurring. These policies would protect special status species, as described in *Nature and Type of Effects*. In addition to these effects, the BLM would minimize or prevent road and trail development on crucial big game and upland bird habitat under this alternative. Roads and trails may be closed to OHVs where wildlife or habitat is being harmed.

Impacts from Recreation
The BLM would continue managing for dispersed recreation under Alternative A. Recreational use may result in human disturbance, degradation of habitat, or mortality, as described in *Nature and Type of Effects*.

Impacts from Lands and Realty
Habitat loss and human-related disturbance effects on wildlife from development in ROWs are similar to **Section 4.19.4**, Alternative A.

Impacts from Range Management
Livestock grazing could have negative, neutral, or positive effects on wildlife species, as discussed in the *Assumptions* section above. Effects on wildlife from current grazing practices would continue, as described in **Section 4.19.4**.

Management goals within riparian habitats would be set to achieve PFC, to maintain desired plant community or wildlife habitat, to improve watershed conditions, and to comply with the Clean Water Act. Grazing systems would consider riparian impacts, including seasonal avoidance of riparian zones, encouraging livestock to congregate away from riparian areas, or fencing-off riparian areas. Restricting livestock from riparian areas would improve riparian vegetation health and would therefore provide more suitable habitat for wildlife species.

Impacts from Fluid Minerals
Fluid mineral leasing and development would continue on previously leased lands and would continue to affect wildlife, as described under **Section 4.19.4**.

Impacts from Solid Minerals
There are no known coal resources in the planning area, so there would be no impacts from coal development. Surface occupancy is generally prohibited within key wildlife areas, floodplains, and public ROWs. Solid minerals management could improve habitat in the decision area, as described in **Section 4.19.4**.

Impacts from Fire and Fuels Management
Current fire management and suppression within the decision area would likely reduce effects on wildlife, in ways similar to the impacts described in **Section 4.19.4**.

Impacts from Habitat Restoration and Vegetation Management
Management to improve succulent vegetation, forbs, and big and silver sage maintenance in GRSG habitat areas would increase habitat availability for sagebrush obligate species. However, these improvements would reduce habitat for grassland species.

Impacts from ACECs
No additional ACECs would be designated under Alternative A, so no additional protection for wildlife habitats would occur.

4.20.4 Impacts Common to Alternatives B-D and the Proposed Plan Amendment

Adoption of a Monitoring Framework (see **Section 2.7.2** and **Appendix B**) to oversee the implementation and effectiveness of GRSG habitat improvement efforts would facilitate and expedite the necessary management responses to improve and protect sagebrush and GRSG habitats. Indirectly, these protections would maintain or improve habitat for other sagebrush obligates and associates in PHMA and GHMA such pronghorn, mule deer, and sharp-tailed grouse. Managing PHMA and GHMA for more shrub habitats would reduce habitat suitability for grassland associates, primarily migratory birds not identified as special status species.

4.20.5 Alternative B

Impacts from Travel and Transportation Management

Motorized vehicles would continue to be limited to existing roads and trails until travel management planning is completed. Roads in PHMA would be evaluated for permanent or seasonal closure. Route construction in PHMA would be limited to realignments of existing roads, built or upgraded to minimum standards necessary. Approximately 12,937 acres of overlapping wildlife habitat for a number of big game including deer, elk, antelope, big horn sheep, and moose as well as upland species including Hungarian partridge, pheasant, other grouse species inhabit the proposed PHMA. An additional 3,839 acres of winter range habitat for big game species would be included in the proposed PHMA. GHMA include 11,520 acres of wildlife habitat and 2,878 acres of winter habitat. Surface disturbances to vegetation associated with road-building would be part of the disturbance cap for that area. Road closures would reduce the impacts on wildlife species described in **Section 4.19.2**.

Like Alternative A, road and trail areas may be closed to off-road vehicles where harm to wildlife or habitat is occurring. These policies would protect wildlife, as described in *Nature and Type of Effects*.

Impacts from Recreation

SRPs would be issued in PHMA only where the effects of the recreational use were neutral or beneficial to GRSG habitat. This action would reduce impacts from recreation as described in **Section 4.19.2** for those wildlife species that inhabit PHMA.

Impacts from Lands and Realty

PHMA would be managed as ROW exclusion areas (233,219 acres). These areas would reduce impacts described in **Section 4.19.2** for those wildlife species that occupy these areas.

Ownership changes described in **Section 4.19.6**, Alternative B, could improve or degrade wildlife species and habitat, depending on the proposed use of the land.

Impacts from Range Management

Under Alternative B, the number of acres open and closed for grazing and available AUMs would be the same as Alternative A. Impacts from grazing described in **Section 4.19.2** would continue under Alternative B. Existing improvements and project planning for new range improvements would reduce impacts described under *Nature and Type of Effects* for those wildlife species that inhabit rangeland. Enhancement to increase GRSG habitat may increase available habitat for sagebrush obligates but reduce habitat for grassland species.

Impacts from Fluid Minerals

Limitations on exploration within PHMA would reduce impacts on wildlife species and their habitats, as described in **Section 4.19.6**. RDFs and conservation measures would be applied as COAs to existing fluid mineral leases within PHMA, restricting surface occupancy, imposing seasonal restrictions, and restricting surface disturbance to three percent of the area.

Impacts from Solid Minerals

Currently there is no coal potential in the management area, so there would be no impacts from coal development. PHMA would be closed to nonenergy leasable minerals and to salable mineral disposal. RDFs would be applied to existing leases, and existing salable mineral pits would be restored. Together, these proposed limitations on solid mineral development would minimize the impacts described in **Section 4.19.2** for those wildlife species that occupy these areas.

Impacts from Fire and Fuels Management

Under Alternative B, fire and fuels treatments would be managed, as described under Alternative A. Fire suppression would prioritize GRSG habitat in PHMA and GHMA, after life and property, and RDFs would be followed. These actions would minimize impacts described in **Section 4.19.2** for those wildlife species that inhabit PHMA and GHMA.

Impacts from Habitat Restoration and Vegetation Management

Within the analysis area, vegetation treatments would continue to be used to achieve resource management objectives and would be considered to protect sagebrush ecosystems. Restoration would be prioritized based on the proposed benefit to GRSG. In general, vegetation treatments and sagebrush ecosystem restoration would increase habitat for sagebrush obligates but would reduce grassland habitat, understory habitat, and habitat for species associated with adjacent encroaching conifers.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.20.6 Alternative C

Impacts from Travel and Transportation Management

New road construction would be prohibited within four miles of active leks and avoided in PHMA and GHMA. Road construction would be limited to realignments of existing routes in PHMA, if the realignment has minimal impact on GRSG habitat. Prohibiting or limiting new road construction in the decision area would minimize impacts on wildlife species in these areas, as described in **Section 4.19.2**.

Like Alternative A, road and trail areas may be closed to off-road vehicles where harm to wildlife or habitat is occurring. These policies would protect wildlife, as described in *Nature and Type of Effects*.

Impacts from Recreation

As under Alternative A, the BLM would continue to manage the area for dispersed recreation, such as hunting, camping, biking, and hiking; therefore, no protection would be provided to wildlife species' habitats. Impacts would be similar to Alternative A.

Impacts from Lands and Realty

PHMA would be managed as ROW exclusion areas (345,660 acres) and no ROW avoidance areas would be established. ROW exclusion areas would improve protection of wildlife species as described in **Section 4.19.2**. Private lands, when offered, may be acquired in ACECs to enhance GRSG conservation value of existing lands. Adding lands to ACECs would enhance protection of wildlife species in these areas.

Impacts from Range Management

Grazing would be would be removed on allotments within PHMA and GHMA (337,165 acres, comprising 69,408 AUMs) under Alternative C. Impacts from grazing on wildlife species, as described in **Section 4.19.2**, would be reduced. However, the potential for more fine fuels to accumulate as a result of decreased grazing could increase wildland fires. In the long term, sagebrush habitat availability could be reduced, but grasses and habitat for grassland species could increase. The total exclusion of grazing in PHMA and GHMA would also eliminate the need for maintaining nearly 90 percent of stock water in the long term.

A minimum amount of stock water ponds would be maintained for other wildlife management on BLM-administered lands in the planning area. Amphibians, shorebirds and waterfowl, and aquatic invertebrates that depend on stock water would decrease. The substantial reduction in stock water in GRSG habitat on BLM-administered lands under Alternative C would not likely decrease the risk of mosquito-borne diseases due to land ownership patterns and stock water remaining on land not administered by the BLM. Additional

impacts wildlife species from changes in range management under Alternative C are similar to those described in **Section 4.19.7**, Alternative C.

Impacts from Fluid Minerals

Fluid minerals management would apply RDFs and conservation measures as COAs to existing leases. This would limit surface occupancy within PHMA and GHMA, would impose seasonal restrictions on exploratory drilling, including vehicle traffic and other human activity, and would restrict surface disturbance to three percent of the area. Seasonal surface limitations would decrease impacts on wildlife species that inhabit PHMA and GHMA, as described in **Section 4.19.2**.

Impacts from Solid Minerals

Impacts from all actions on wildlife species would be the same as described under Alternative B.

Impacts from Fire and Fuels Management

Fuels treatments would not be allowed in winter range unless the treatment is designed to reduce wildfire risk and maintain habitat quality in the winter range. Proper fire control and adequate preparation work would be used in any fuel reduction project. Vegetation treatment plans would include pretreatment data, nongrazing exclosures, and long-term monitoring.

Fire suppression and emergency stabilization projects would be as described under Alternative B and would result in similar effects on wildlife species.

Impacts from Habitat Restoration and Vegetation Management

Actions would be the same as under Alternative B. There would be additional measures to prioritize restoration in seasonal habitats thought to be limiting GRSG and where factors causing degradation have already been addressed. Vegetation treatments and sagebrush ecosystem restoration would increase available habitat for sagebrush obligates; however, grassland species habitat or species that inhabit encroaching conifers would likely decline.

Impacts from ACECs

ACECs to protect GRSG would be designated as sagebrush reserves in PHMA, consisting of 4,000-acre blocks of BLM-administered land, covering 96,246 acres. However, no additional protections would occur for GRSG or habitat that could reduce impacts on wildlife habitat with an ACEC designation since all conservation measures would be applied to both PHMA and GHMA under Alternative C.

4.20.7 Alternative D

Impacts from Travel and Transportation Management

Prohibiting or limiting road construction in the decision area would minimize direct and indirect impacts on wildlife, as described in **Section 4.19.2**. Impacts

on wildlife habitat from this proposed action are similar to those described for other special status species under **Section 4.19.8**, Alternative D.

Impacts from Recreation

The actions proposed under this alternative are similar to Alternative B. SRPs would be issued only in habitat areas where the effects of recreation were neutral or beneficial to GRSG habitat. This action would reduce impacts from recreation described in **Section 4.19.2** for wildlife species that occupy PHMA.

Impacts from Lands and Realty

Management actions proposed under this alternative could increase the protection of wildlife, compared to those provided under Alternatives B and C, by minimizing disturbance on the landscape (taking ownership patterns and private lands into account). Public ownership would be maintained in PHMA, except where land exchanges would provide a greater benefit to GRSG. Ownership changes would reduce impacts described in **Section 4.19.2** for wildlife species that inhabit PHMA.

Impacts from Range Management

Under Alternative D, there would be no change to the acreage open for grazing or available AUMs. Currently, 337,165 acres in the decision area are open for livestock grazing, with 69,408 available AUMs. Within PHMA, the BLM would conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions would be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. State objectives would be used for fine-scale analysis unless local objectives are developed at the field office level, in partnership with MFWP and USFWS.

Wet meadows and riparian areas in PHMA would be managed by the LFO to maintain forbs, edge cover, and species richness to facilitate GRSG brood rearing. Seasonal restrictions on livestock grazing would reduce pressure on riparian vegetation used by GRSG in summer. New water diversions from seeps or springs would be authorized only when PHMA would benefit from the development. Modifications to water developments would be considered to maintain continuity of riparian areas within PHMA. Reservoirs and stock ponds with riparian/wetland characteristics would be managed to support wildlife to the extent possible, with consideration given to the original purpose of the development.

Vegetation treatments to increase forage for livestock would only be allowed in PHMA if they conserve or enhance GRSG habitat. Allowances would be made for treatments with negative short-term effects but overall long-term positive impacts. Structural range improvements would be designed to improve GRSG habitat, as described under Alternative B. The proposed actions described under Alternative D require adjustments to grazing management if current

livestock grazing is a causal factor in an allotment not meeting land health standards and would provide range enhancements to benefit GRSG. Sagebrush obligate species within PHMA would increase habitat quantity and quality under Alternative D.

Impacts from Fluid Minerals

During implementation review, conservation measures would be applied in conformance with the approved RMP and a list of constraints and RDFs applied as COA to leases. The conditions are designed to minimize noise, traffic, and other disturbance associated with mineral extraction. These limited measures to reduce disturbance would likely have minimal impact on wildlife species compared to current practices.

Impacts from Solid Minerals

As there is no coal potential in the planning area, there would be no impacts from coal development. Locatable minerals development would be managed as described under Alternative A. Mineral pits would be restored as described under Alternative B. These actions would have minimal impacts on wildlife species.

Impacts from Fire and Fuels Management

Fuels management would be designed and implemented as described in Alternative C. Fire suppression would be prioritized, RDFs would be applied, and ES&R procedures would be as described under Alternative B. Additional provisions would be implemented to protect vegetation to benefit GRSG in areas susceptible to fire. Livestock grazing would be considered for fuel reduction, as described under Alternative B. These actions would minimize impacts on sagebrush obligate species.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative D, habitat restoration would give special emphasis to protecting sagebrush ecosystems in designing vegetation treatments, similar to the actions proposed under Alternative B. Prioritization would occur as described under Alternative B, with emphasis given to other sensitive and listed species, in addition to GRSG. Restoration projects would strive to meet GRSG habitat objectives for projects in PHMA, but those objectives would not be the highest priority, as under Alternatives B and C.

This alternative includes the caveat that other restoration projects may take precedence over sagebrush projects, based on such factors as funding requirements, landowner cooperation, and future ESA listings. Compared to Alternatives B and C, the actions proposed under Alternative D would provide more protection for wildlife habitat that overlap with other special status species' and GRSG habitat.

Impacts from ACECs

Impacts would the same as under Alternative A.

4.20.8 Proposed Plan Amendment

Impacts from GRSG Management

The Proposed Plan Amendment would incorporate additional GRSG management, including adaptive management, regional mitigation, density and disturbance caps, and lek buffers that could improve and protect sagebrush and GRSG habitats. Indirectly, these protections would maintain or improve habitat for other sagebrush obligates and associates in PHMA and GHMA such as pronghorn, mule deer, and sharp-tail grouse. Managing PHMA and GHMA for more shrub habitats would reduce habitat suitability for grassland associates, primarily migratory birds not considered special status species.

Impacts from Travel and Transportation Management

Impacts would be the same as under Alternative D.

Impacts from Recreation

Impacts would be similar to those described under Alternative B. The Proposed Plan Amendment would provide additional incidental protections, as described under *Nature and Type of Effects*, for some special status species by limiting construction of new recreation facilities to those that provide a GRSG "net conservation gain" or are required for public health and safety or resource protection.

Impacts from Lands and Realty

Impacts from ROW management would be similar to those described for Alternative D. However, under the Proposed Plan Amendment, both PHMA and GHMA would be ROW avoidance areas for high voltage transmission lines and large pipelines (366,032 acres) with limited exceptions, while PHMA would also be ROW avoidance areas for minor ROWs. In addition, PHMA would be ROW exclusion areas, and GHMA would be ROW avoidance areas for wind and solar energy. These measures could offer an increased level of protection from disturbance and habitat loss, as described under *Nature and Type of Effects*.

Land tenure adjustments would have impacts similar to Alternative D. Under the Proposed Plan Amendment, public ownership would be maintained in both PHMA and GHMA, except where land exchange would provide a net conservation gain to GRSG or if there would be no direct or indirect adverse impact on conservation of the GRSG. These measures would provide increased incidental protection to wildlife species in the planning area by maintaining intact habitat.

Impacts from Range Management

Impacts from range management would be similar to those described for Alternative D. In addition, under the Proposed Plan Amendment, the BLM would prioritize the review and processing of grazing permits/leases in PHMA, particularly in areas not meeting Land Health Standards, and integrate GRSG Habitat Objectives as identified as **Objective SS-1.4** into land health

assessments. RDFs would be implemented to reduce impacts when developing or modifying water developments in GRSG habitat. Together, these measures would help to improve and protect habitat quality throughout the planning area, thereby having incidental impacts on wildlife species.

Impacts from Fluid Minerals
Impacts would be the same as under Alternative D.

Impacts from Solid Minerals
The BLM would determine coal suitability on a case-by-case basis as leases or lease modifications are submitted. Currently, there is no coal potential in the planning area. Therefore, no impacts on special status species are expected from coal management.

The Proposed Plan Amendment would provide additional protections for wildlife species and habitat in the planning area by closing nonenergy leasable mineral leasing and new mineral material sales. These closures would reduce the potential disturbance of wildlife species and habitats from mineral activities, as described under *Nature and Type of Effects*.

Impacts from locatable minerals management would be similar to those described under Alternative D. SFAs (53,440 acres) would be recommended for withdrawal. As discussed under **Section 4.9**, there is no known locatable mineral potential in GRSG habitat, so no effect from locatable minerals is anticipated.

Impacts from Fire and Fuels Management
Impacts from fire and fuels management would be similar to those described for Alternative D. In addition, Burn Plans would be required to meet the four criteria under the Proposed Plan Amendment if prescribed fire is used in GRSG habitat. This would provide additional protections to habitat by reducing risks from use of prescribed fire.

Impacts from Habitat Restoration and Vegetation Management
Impacts from habitat restoration and vegetation management would be similar to those described for Alternative D. The Proposed Plan Amendment also specifies management objectives for vegetation, and encroaching conifers would be removed from sagebrush habitats. This could impact wildlife species occurring in these areas by either removing or enhancing habitat, depending on the habitat needs of the particular special status species.

Impacts from ACECs
Impacts would be the same as under Alternative A.

4.21 RENEWABLE ENERGY

4.21.1 Methods and Assumptions

Indicators

Table 4-31 provides a summary of the indicators that were used to analyze the effects on renewable energy under each alternative.

Table 4-31
Comparison of Renewable Energy Resource Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres with "Good" or better wind potential within ROW exclusion areas	0	43,728	49,322	0	43,728
Acres with "Good" or better wind potential within ROW avoidance areas	0	5,595	0	49,322	5,595
Acres with "Good" or better solar potential within ROW exclusion areas	0	0	0	0	0
Acres with "Good" or better solar potential within ROW avoidance areas	0	0	0	0	0

Assumptions

The analysis includes the following assumptions:

- "Good" or better wind potential is classified as wind speeds of 7.0 meters/second at 50 meters height or at wind power density of above 400 watts/meter (NREL 2012a).
- "Good" or better solar potential is classified as having average annual solar energy above 6.0 kilowatt-hours/square meter/day or a solar power density above 400 watts/square meter (NREL 2012b).
- Existing ROWs may be modified on their renewal, assignment, or amendment if the requested actions meet GRSG habitat objectives.
- ROW holders may continue their authorized use as long as they are in compliance with the terms and conditions of their grant.
- The demand for ROWs would increase over the life of the amended RMP.
- Renewable energy resources include solar, wind, and biomass facilities. Biomass projects are generally authorized under the forestry regulations, unless a new facility is being authorized for biomass generation, which would likely be authorized under lands and realty regulations. Based on recent trends (see **Chapter 3**), the development of biomass facilities within the planning area is unlikely;

therefore, impacts from biomass production facilities are not analyzed.

Alternatives were evaluated for acres of ROW avoidance, acres of ROW exclusion, and areas where new road construction is prohibited or to be avoided. All of these factors are considered to be impediments to solar and wind development. Alternatives with greater acreages of such restrictions are considered to have a greater impact on solar and wind development potential than alternatives with fewer acres of such restrictions.

4.21.2 Nature and Type of Effects

Impacts on solar and wind projects are generally related to where ROW authorizations are allowed to occur, the mitigation measures required for specific project siting, and special stipulations required for resource protection.

ROWs can only occur on lands that are not ROW exclusion areas. Alternatives with greater ROW exclusion acreages would have long-term direct impacts on the ability for solar and wind projects to be developed.

As discussed in **Section 4.4**, ROW applications may be filed within ROW avoidance areas; however, projects proposed in such areas may be subject to restrictions that would add application processing time and increased project costs. Alternatives with greater ROW avoidance areas are considered to have short-term direct impacts (e.g., special surveys, reports, and construction and reclamation) and long-term direct impacts (e.g., potential operation and maintenance requirements) on the development of renewable energy resources.

Implementing management for the following resources would have negligible or no impact on renewable energy and are therefore not discussed in detail: travel and transportation management, recreation, range management, fluid minerals, solid minerals, mineral split estate, fire and fuels management, habitat restoration and vegetation management, and ACECs.

4.21.3 Impacts Common to All Alternatives

The acreages of ROW exclusions and avoidances vary across alternatives and are provided in **Table 4-32**.

Table 4-32
BLM-Administered Lands Managed as ROW Exclusion and Avoidance Areas for Wind and Solar ROWs

	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ROW exclusion area (acres)	0	0	345,560	0	233,219
ROW avoidance area (acres)	9,708	112,341	0	233,219	112,341

As stated in *Indicators*, there is no "Good" (6.0 kilowatt-hours/square meter/day) or better solar potential within the planning area. As such, none of the alternatives would result in impacts on solar energy development potential.

Table 4-31 provides an overview of impacts across alternatives on wind development potential through showing the number of acres of "Good" or better (Class 4 or higher) wind potential within ROW exclusion and avoidance areas.

Collocating utilities would reduce land use conflicts by grouping similar facilities and activities in specific areas and away from conflicting developments and activities. It would also clarify the preferred locations for utilities on BLM-administered lands, would make construction and maintenance of the facilities easier, and would simplify the application process for new facilities.

4.21.4 Alternative A

Impacts from Lands and Realty

Under Alternative A, zero acres of lands with "Good" or better wind potential would be affected by ROW exclusion or avoidance areas. All lands with such potential would continue to be open for ROW applications on a case-by-case basis.

4.21.5 Alternative B

Impacts from Lands and Realty

Under Alternative B, 233,219 acres would be managed as ROW exclusion areas and would not be open for ROW applications. Within this exclusion area, there are 43,728 acres considered to have "Good" or better wind potential. This represents 70 percent of lands with "Good" or better wind potential that exist within the decision area. Management under Alternative B would result in 43,728 fewer acres open to wind energy development than under Alternative A. Therefore, 70 percent of lands with "Good" or better wind potential that are open for ROW applications within the decision area under Alternative A would become ROW exclusion areas under Alternative B and would not be available for wind development.

Under Alternative B, an additional 102,633 acres would be managed as ROW avoidance areas. Within this ROW avoidance area there are 5,595 acres considered to have "Good" or better wind potential. This represents nine percent of lands with "good" or better wind potential that exist within the decision area. Management under Alternative B would result in 5,595 fewer acres available for wind development without substantial restrictions. Therefore, under Alternative B, nine percent of lands with "Good" or better wind potential available for ROW applications within the decision area would be subject to substantial restrictions when compared with Alternative A.

Table 4-33 provides a detailed overview of how these ROW restrictions relate to individual wind classes.

Table 4-33
Wind Potential Affected by Alternative B

Wind Potential (square meters at 50 meters)	Total Acres on BLM-Administered Land	ROW Exclusion Acres (percent of total)	ROW Avoidance Acres (percent of total)
Class 4 "Good" 7.0-7.5	55,951	41,601.4 (74)	5,247.1 (9.4)
Class 5 "Very Good" 7.5-8.0	5,700.3	2,120.6 (37)	301.2 (5.3)
Class 6 "Excellent" 8.0-8.8	965.7	5.7 (0.6)	45.2 (4.7)
Class 7 "Best" 8.8 & above	318.5	0 (0)	1.2 (0.4)
Total Classes 4-7	**62,935.5**	**43,727.7 (70)**	**5,594.7 (8.8)**

Source: NREL 2012a; BLM 2012a

4.21.6 Alternative C

Impacts from Lands and Realty

Under Alternative C, 345,560 acres would be managed as ROW exclusion areas and would not be open for ROW authorizations. Within this exclusion area there are 49,322 acres considered to have "Good" or better wind potential. This represents 79 percent of lands with "Good" or better wind potential that exist within the decision area. Alternative C would result in 49,322 acres open to wind energy development than under Alternative A. Therefore, 79 percent of lands with "Good" or better wind potential that are open for ROW applications in the decision area under Alternative A would become ROW exclusion areas under Alternative C and would not be available for wind development.

Table 4-34 provides a detailed overview of how these ROW restrictions relate to individual wind classes.

Table 4-34
Wind Potential Affected by Alternative C

Wind Potential (square meters at 50 meters)	Total Acres on BLM-Administered Land	ROW Exclusion Acres (percent of total)	ROW Avoidance Acres (percent of total)
Class 4 "Good" 7.0-7.5	55,951	46,848.4 (84)	0
Class 5 "Very Good" 7.5-8.0	5,700.3	2,421.8 (42)	0
Class 6 "Excellent" 8.0-8.8	965.7	50.9 (5.3)	0
Class 7 "Best" 8.8 & above	318.5	1.2 (0.4)	0
Total Classes 4-7	**62,935.5**	**49,322.3 (79)**	**0**

Source: NREL 2012a; BLM 2012a

4.21.7 Alternative D

Impacts from Lands and Realty

Under Alternative D, no acres would be managed as ROW exclusion areas and would not be open for ROW applications. Therefore, the same acreage would be open to wind energy development as under Alternative A.

Under Alternative D, an additional 233,219 acres would be managed as ROW avoidance areas. Within this ROW avoidance area there are 49,322 acres considered to have "Good" or better wind potential. This represents 79 percent of lands with "Good" or better wind potential that exist within the decision area. Management under Alternative D would result in 49,322 fewer acres available for wind development without substantial restrictions. Therefore, under Alternative D 79 percent of lands with "Good" or better wind potential available for ROW applications would be subject to substantial restrictions when compared with Alternative A.

Table 4-35 provides a detailed overview of how these ROW restrictions relate to individual wind classes.

Table 4-35
Wind Potential Affected by Alternative D

Wind Potential (square meters at 50 meters)	Total Acres on BLM-Administered Land	ROW Exclusion Acres (percent of total)	ROW Avoidance Acres (percent of total)
Class 4 "Good" 7.0-7.5	55,951	0	46,848.4 (84)
Class 5 "Very Good" 7.5-8.0	5,700.3	0	2,421.8 (42)
Class 6 "Excellent" 8.0-8.8	965.7	0	50.9 (5.3)
Class 7 "Best" 8.8 & above	318.5	0	1.2 (0.4)
Total Classes 4-7	**62,935.5**	**0**	**49,322.3 (79)**

Source: NREL 2012a; BLM 2012a

4.21.8 Proposed Plan Amendment

Impacts from Lands and Realty

Impacts would be similar to those described under Alternative B. The Proposed Plan Amendment would exclude wind energy development in PHMA (233,219 acres), which would eliminate any wind energy development potential in those areas.

Within the ROW exclusion area, there are 47,516 acres considered to have "Good" or better wind potential. This represents 70 percent of lands with "Good" or better wind potential that exist within the decision area. Managing an additional 9 percent (5,900 acres) as avoidance would discourage development in those areas due to added costs and processing times for the proposed development.

Table 4-36 provides a detailed overview of how these ROW restrictions relate to individual wind classes.

Table 4-36
Wind Potential Affected by Proposed Plan Amendment

Wind Potential (square meters at 50 meters)	Total Acres on BLM-Administered Land	ROW Exclusion Acres (percent of total)	ROW Avoidance Acres (percent of total)
Class 4 "Good" 7.0-7.5	55,951	41,779 (75)	5,519 (10)
Class 5 "Very Good" 7.5-8.0	5,700.3	2,179 (38)	324 (6)
Class 6 "Excellent" 8.0-8.8	965.7	6 (1)	55 (6)
Class 7 "Best" 8.8 & above	318.5	0	3 (1)
Total Classes 4-7	**62,935.5**	**43,964 (70)**	**5,901 (9)**

Source: NREL 2012a; BLM 2012a

4.22 SOCIAL AND ECONOMIC CONDITIONS

4.22.1 Methods and Assumptions

The analysis of economic effects considers job and labor income in an economic impact analysis. Economic impact analysis is used to evaluate potential direct, indirect, and induced effects on the economy. The analytical technique used by the BLM to estimate employment and income impacts is "input-output" analysis using the IMPLAN Pro software system. Input-output analysis is a means of examining relationships within an economy both between businesses and between businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in one or several economic activities on an entire economy, all else constant. This examination is called economic impact analysis. IMPLAN translates changes in final demand for goods and services into economic effects, such as labor income and employment of the affected area's economy. The IMPLAN modeling system requires one to build regional economic models of one or more counties for a particular year. The model for this analysis uses 2010 IMPLAN data and the impact area for this analysis includes Chouteau, Fergus, Judith Basin, Meagher, and Petroleum counties.

The impacts on the local economy from the RMPA are measured by estimating the employment (full- and part-time jobs) and labor income generated by grazing on allotments potentially affected and recreation under the alternatives. The direct employment and labor income benefit employees and their families and therefore directly affect the local economy. Additional indirect and induced multiplier effects (ripple effects) are generated by the direct activities. Together the direct and multiplier effects comprise the total impacts on the local economy (**Table 4-37**). The multiplier effects tied to grazing and recreation were estimated using IMPLAN. Potential limitations of these estimates are the time lag in IMPLAN data and the data intensive nature of the input-output model.

Table 4-37
Employment Generated from Recreation and Grazing under the RMPA

	Employment (full and part time jobs)				
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
Wildlife-related recreation	8	less than Alt A	less than other Alts	less than Alt A	less than Alt A
Non-Wildlife-related recreation	12	less than Alt A	less than other Alts	less than Alt A	less than Alt A
Grazing	201	201	66	201	201

Source: IMPLAN 2010

Table 4-38
Labor Income Generated from Recreation and Grazing under the RMPA

	Labor income				
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
Wildlife-related recreation	$192	less than Alt A	less than other Alts	less than Alt A	less than Alt A
Non-Wildlife-related recreation	$289	less than Alt A	less than other Alts	less than Alt A	less than Alt A
Grazing	$2,810	$2,810	$931	$2,810	$2,810

Source: IMPLAN 2010

4.22.2 Alternative A

A summary of impacts on employment and labor income across alternatives is provided in **Table 4-37** and **Table 4-38**. Details of analysis are provided below by resource and resource use.

Impacts from Range Management

Livestock grazing would continue to be managed under the existing RMPs and Standards for Rangeland Health. Consequently, current economic contributions from allocated grazing on allotments covered under this RMPA would continue. Use of allocated forage on these allotments would generate 201 total jobs (direct, indirect, and induced) and $2.8 million in labor income (direct, indirect and induced) on an average annual basis within the impact area economy (refer to **Table 4-37** and **Table 4-38**). On an annual basis use of the allocated forage and associated employment and income can be less, based on market conditions, drought or range practices to protect other resources. As noted in the discussion of employment specialization in **Section 3.23.1**, the five-county impact area can be considered specialized with respect to the grazing sector. Direct employment generated as a result of grazing under this alternative would

provide 128 jobs which would comprise about 29 percent of employment in this sector.

Impacts from Lands and Realty

Currently, there are no ROW exclusion areas within the decision area. As a result, land use authorizations would continue to be analyzed and if approved could continue to support area communities and economies under this alternative. There are two ROW avoidance areas within the decision area. One is within PH and one in GH. Under this alternative, land use authorizations could continue within avoidance areas with implementation of proper mitigation measures.

Impacts from Recreation

Under Alternative A, BLM management would result in no additional measures to protect GRSG habitat. As a result, no impacts on recreation on BLM-administered lands would occur and associated economic contributions to the five-county impact would continue. Approximately eight jobs (direct, indirect, and induced) are associated with wildlife related recreation and 12 jobs (direct, indirect and induced) are associated with recreation not related to wildlife in the five-county impact area (refer to **Table 4-37**). Direct employment generated as a result of wildlife and recreation not related to wildlife under this alternative would comprise about one percent of employment in sectors specifically attributable to tourism and recreation.

Impacts from Habitat Restoration and Vegetation Management and ACECs

Management under this alternative would not specifically protect GRSG habitat. Grazing methods, land treatments and other improvements would continue to be designed to accomplish habitat restoration objectives. Continuation of these policies would promote sagebrush habitat, but less than under Alternatives B or C. No ACECs to protect GRSG habitat would be included in this alternative. As a result, well-being and non-market values associated with GRSG habitat would be less than Alternatives B and C.

4.22.3 Alternative B

Impacts from Range Management

Under Alternative B, there would be no change to the acreage open for grazing or available AUMs. AMPs and permit renewals would be used to incorporate GRSG habitat objectives into grazing allotments. Consequently, it is anticipated that current economic contributions from allocated grazing on allotments covered under this RMPA would continue. Use of allocated forage on these allotments generates 201 total jobs (direct, indirect and induced) and $2.8 million in labor income (direct, indirect and induced) on an average annual basis within the impact area economy (refer to **Table 4-37** and **Table 4-38**). On an annual basis use of the allocated forage and associated employment and income

can be less, based on market conditions, drought or range practices to protect other resources. In addition, further reductions could occur with voluntary retirement of allotments under Alternative B, which would further reduce economic contributions. As noted in the discussion of employment specialization (see **Section 3.23.1**), the five-county impact area can be considered specialized with respect to the grazing sector. Direct employment generated as a result of grazing under this alternative would provide 128 jobs which would comprise about 29 percent of employment in this sector.

Impacts from Lands and Realty and Energy Development

Under Alternative B, 233,219 acres (67 percent) of the decision area associated with PHMA would be managed as ROW exclusion areas for new ROW authorizations. Further, GHMA would be identified as ROW avoidance areas. ROW development and land use authorizations within ROW avoidance areas would generally avoid habitat areas, but authorizations are possible if proper mitigation measures are implemented as part of the development and authorization to offset any loss of general GRSG habitat if impacted. In addition, new ROWs in PHMA may only be authorized if they are collocated completely within the footprint of an existing authorized ROW. Further, under this alternative, development associated with valid existing rights (an authorized ROW which needs improvement) would only be allowed to the absolute minimum standards. All new disturbances would be limited so not to exceed a disturbance of three percent for that area. Therefore, this alternative may limit new ROWs or energy development within the planning area and would consequently support communities and economies less than under Alternative A.

Impacts from Recreation

Under Alternative B, BLM would consider the effects of SRPs on PHMA. If future SRP applications were denied (if not found to be neutral or beneficial to GRSG) under this alternative, there would be less organized hunting opportunities on BLM-administered land in the decision area as compared with Alternative A. As a result, economic contributions could be less than current contributions depicted under Alternative A.

Impacts from Habitat Restoration and Vegetation Management and ACECs

Under this alternative, restoration projects would be prioritized based on benefit to GRSG habitat. Vegetation treatments would continue to be used for resource management objectives such as protection of sagebrush ecosystems. These actions would enhance GRSG habitat. No ACECs to protect GRSG habitat would be included in this alternative. Non-market values, such as existence value, would be higher for sagebrush ecosystems under this alternative than for Alternative A.

4.22.4 Alternative C

Impacts from Range Management

Under Alternative C, livestock grazing would be removed from all allotments in PHMA and GHMA resulting in a 66 percent reduction in AUMs relative to Alternative A. Consequently, it is anticipated that economic contributions from allocated grazing on allotments covered under this RMPA would be less than currently contributed. As a result of the reductions employment would decrease from 201 to 66 total jobs (direct, indirect and induced) and labor income would decrease from $2.8 million to $931,000 (direct, indirect and induced) on an average annual basis within the impact area economy (refer to **Table 4-37** and **Table 4-38**). Decreases may not be as large since actual use of BLM is not equal to allocated use levels analyzed here. For example on any given year actual employment associated with billed use could be less than 201 jobs if actual use of BLM forage is less than allocated (possible due to increases in prices of factors of production, drought, market conditions, etc.). In addition, the decrease portrayed here could be less if alternative sources of forage is found for willing permittees. As noted in the discussion of employment specialization in **Section 3.23.1**, the five-county impact area can be considered specialized with respect to the grazing sector. Direct employment generated as a result of grazing under this alternative would decrease from 128 jobs to 42 jobs which would correspond to a decrease from 29 percent to 10 percent of employment in this sector.

Impacts from Lands and Realty and Energy Development

Under Alternative C, 345,560 acres of the decision area associated with PHMA and GHMA would be managed as ROW exclusion area for new ROW grants. As a result, current land use authorizations would be relocated which could decrease the degree to which area communities and economies depend on current authorizations under this alternative. In addition, new applications in PHMA may only be authorized if they are collocated completely within the footprint of an existing authorization. Further, under this alternative, development associated with valid existing rights (an authorization which needs improvement) would only be allowed to the absolute minimum standards. All new disturbances would be limited so not to exceed a disturbance of three percent for that area. Therefore, this alternative may limit new authorizations or energy development within the planning area and would consequently support communities and economies less than under Alternative A.

Impacts from Recreation

Under Alternative C, implementation of a travel plan could change access important for current recreation activities in the decision area. If changes to recreation access occurred there would be a reduction in recreation visitation on BLM-administered lands in the decision area. As a result, economic contributions could be less than current contributions (depicted under Alternative A) and the other alternatives.

Impacts from Habitat Restoration and Vegetation Management and ACEC

Under this alternative, additional actions would promote expansion of GRSG habitat at levels greater than the other alternatives. In addition, ACECs to protect GRSG habitat would be designated under in this alternative. These policies would promote expansion of GRSG habitat. As a result, well-being and non-market values associated with GRSG habitat would be protected to a greater degree than the other alternatives.

4.22.5 Alternative D and Proposed Plan Amendment

Impacts from Range Management

Under Alternative D and the Proposed Plan Amendment, there would be no change to the acreage open for grazing or available AUMs. GRSG habitat objectives would be considered when evaluating land health standards. Consequently, it is anticipated that current economic contributions from allocated grazing on allotments covered under this RMPA would continue. Use of allocated forage on these allotments generates 201 total jobs (direct, indirect and induced) and $2.8 million in labor income (direct, indirect and induced) on an average annual basis within the impact area economy (refer to **Table 4-37** and **Table 4-38**). On an annual basis use of the allocated forage and associated employment and income can be less based on market conditions, drought or range practices to protect other resources. As noted in the discussion of employment specialization (see **Section 3.23.1**), the five-county impact area can be considered specialized with respect to the grazing sector. Direct employment generated as a result of grazing under Alternative D and the Proposed Plan Amendment would provide 128 jobs which would comprise about 29 percent of employment in this sector.

Impacts from Lands and Realty and Energy Development

Under Alternative D and the Proposed Plan Amendment, PHMA (233,219 acres within the decision area) would be managed as an avoidance area for new applications for ROWs, leases, or permits. In GHMA (112,341 acres), Alternative D and the Proposed Plan Amendment would allow for the issuance of minor ROWs, leases, and permits with appropriate conservation and mitigation measures on a case-by-case basis. As a result, local communities and economies (as well as individuals who may live in remote locations) may be impacted, depending on the degree to which they rely on local electricity or utility services.

Further, under Alternative D and the Proposed Plan Amendment, development associated with valid existing rights (an authorization that needs improvement) would be allowed only to minimum standards. Therefore, Alternative D and the Proposed Plan Amendment would provide less support to the communities than Alternative A but more than Alternatives B or C.

Impacts from Recreation

Under Alternative D and the Proposed Plan Amendment, impacts on recreation would be the same as discussed under Alternative B. As a result, economic contributions would be the same as Alternative B.

Impacts from Habitat Restoration and Vegetation Management and ACECs

Under Alternative D and the Proposed Plan Amendment, other restoration projects associated with threatened, endangered, or sensitive species would be considered when prioritizing projects, which could reduce the potential to improve GRSG habitat. In addition, no ACECs to protect GRSG habitat would be included. As a result, well-being and non-market values associated with other threatened and endangered species habitat would be more than Alternatives B and C. Due to uncertainty in how restoration projects are prioritized, a relative comparison to Alternative A cannot be made.

4.23 ENVIRONMENTAL JUSTICE

While minority and low-income populations may exist in the area, the alternatives and Proposed Plan Amendment are not expected to have a disproportionately high and adverse human health or environmental effects on these communities. Impacts on local communities are expected to be negligible, and there is no reason to suspect that any impacts would disproportionately affect minority and low income populations. For example, decreases in employment and income anticipated under Alternative C would be distributed amongst all segments of the population regardless of minority or poverty status.

As described in **Section 3.24**, Choteau County met the criteria for an environmental justice population in regards to the American Indian population. Outreach and coordination with several different tribes was conducted and is documented in **Chapter 6**. The planning actions in this Proposed RMPA/Final EIS does not impact tribal lands or any tribal oil and gas interests, nor does it restrict any access to sacred sites.

4.24 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 there are no mitigation measures. Some unavoidable adverse impacts occur as a result of implementing the Lewistown Field Office Greater-Sage-Grouse RMPA. Others are a result of public use of the decision area lands. This section summarizes major unavoidable impacts; discussions of the impacts of each management action (in the discussion of impacts for each resource topic) provide greater information on specific unavoidable impacts.

Surface-disturbing activities would result in unavoidable adverse impacts under current BLM policy to foster multiple uses. Although these impacts would be

mitigated to the extent possible, unavoidable damage would be inevitable. Long-term conversion of areas to other uses such as mineral and energy development would increase erosion and change the relative abundance of species within plant communities, the relative distribution of plant communities, and the relative occurrence of seral stages of those communities. Where habitat areas are not protected by stipulations, oil and gas development would result in unavoidable long-term wildlife habitat loss where developed.

Excessive use by wildlife and livestock would contribute to soil erosion, compaction, and vegetation loss, which could be extensive during drought cycles and dormancy periods. Conversely, unavoidable losses or damage to forage from resource development in the planning area would affect livestock and wildlife. Some level of competition for forage between these types of animals, although mitigated to the extent possible, would be unavoidable. Instances of displacement, harassment, and injury could also occur.

Recreational activities, mineral resource development, and general use of the planning area would introduce additional ignition sources into the planning area, which would increase the probability of wildland fire occurrence and the need for suppression activities. These activities, combined with continued fire suppression, would also affect the overall composition and structure of vegetation communities, which could increase the potential for high-intensity wildland fires.

As recreation demand increases, recreation use would disperse, creating unavoidable conflicts as more users compete for a limited amount of space. In areas where development activities would be greater, the potential for displaced users would increase.

Numerous land use restrictions imposed throughout the planning area to protect sensitive resources and other important values, by their nature, affect the ability of operators, individuals, and groups who use BLM-administered lands to do so freely without limitations. These restrictions could also require closing roads or trails or limiting certain modes or seasons of travel. Although attempts would be made to minimize these impacts by limiting them to the level of protection necessary to accomplish management objectives, and providing alternative use areas for affected activities, unavoidable adverse impacts would occur under all alternatives.

4.25 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Section 102(C) of NEPA requires a discussion of any irreversible or irretrievable commitments of resources that are 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 period of time (e.g., extraction of any solid 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).

Implementing the Lewistown Field Office Greater Sage-Grouse RMPA management actions would result in surface-disturbing activities, including permitted recreation activities, mineral and energy development, and development in ROWs, which result in a commitment to the loss of irreversible or irretrievable resources. Mineral extraction or sale eliminates a nonrenewable resource, thereby resulting in irreversible and irretrievable commitment of the resource. Surface disturbance associated with energy development is reclaimed after the resource is removed. However, surface disturbances from gas storage, and road ROWs, and wind development are a long term encumbrance of the land. Soil erosion or the loss of productivity and soil structure may be considered irreversible commitments to resources. Surface-disturbing activities, therefore, would remove vegetation and accelerate erosion that would contribute to irreversible soil loss; however, management actions and RDFs are intended to reduce the magnitude of these impacts and restore some of the soil and vegetation lost. Primarily because of the number of acres available for energy and mineral development, and development in ROWs, such disturbances would occur to the greatest degree under Alternative A; management under Alternative D and the Proposed Plan Amendment would be similar but with more stipulations for surface-disturbing activities. Alternative B, and to a greater extent Alternative C, contains additional conservation measures, mitigation measures, and stipulations to protect planning area resources.

Across all alternatives, an irreversible commitment of nonrenewable fossil fuels (e.g., oil and gas), solid minerals, and salable materials would occur from development over the life of the Headwaters RMP and Judith Resource Area RMP.

4.26 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 the human 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 one to five years of the activity's implementation. "Long term" is defined as following the first five years of implementation, but within the life of the Headwaters RMP and Judith Resource Area RMP.

Across all alternatives and the Proposed Plan Amendment, management actions would result in various short-term effects, such as increased localized soil erosion, fugitive dust emission, vegetation loss or damage, and wildlife disturbance. Surface-disturbing activities, including utility construction and mineral resource development would result in the greatest potential for impacts on long-term productivity. Management prescriptions and RDFs are intended to minimize the effect of short-term commitments and reverse change over the long term. These prescriptions and the associated reduction of impacts would be greatest under Alternative C and are present to a lesser extent under

Alternative B for resources such as vegetation and wildlife habitat. However, BLM-administered lands are managed to foster multiple uses, and some impacts on long-term productivity could occur.

The short-term use of potential habitat for energy and minerals, and development in ROWs could also affect the long-term sustainability of some special status species. Special status species could be affected by habitat fragmentation associated with short-term resource uses and road construction and use.