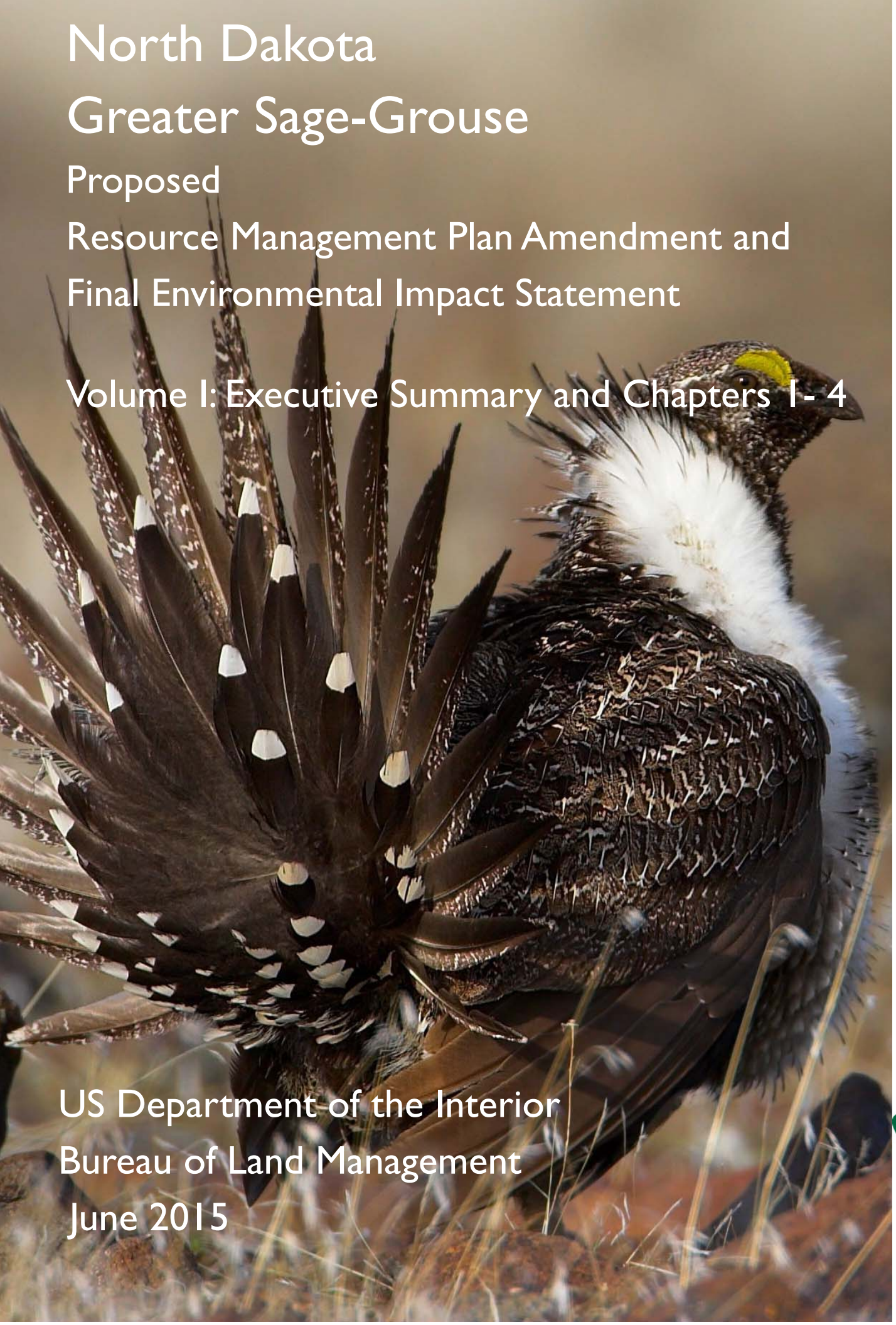
North Dakota Greater Sage-Grouse

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-15/008+1610

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Cover Photo: Steve Ting

North Dakota Greater Sage-Grouse
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Final Environmental Impact Statement

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DOI-BLM-MT-C030-2013-120-EIS

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: This 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: North Dakota Game and Fish Department, US Fish and Wildlife Service, Bowman County Commissioners, and Bowman-Slope Conservation District. The Final EIS considers and analyzes four alternatives, and the Proposed Plan Amendment, which address future management of approximately 30,030 acres of federal surface and 396,053 acres of federal mineral estate in southwestern North Dakota administered by the BLM's North Dakota Field Office (NDFO).

   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 North Dakota RMP, 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 North Dakota 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 agency's' 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 North Dakota 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 North Dakota website: http://www.blm.gov/mt/st/en/fo/north_dakota_field.html.

6. For further information contact:

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United States Department of the Interior

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5001 Southgate Drive
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In Reply Refer To:
1610 (MT930)

June 2015

Dear Reader:

Enclosed is the North Dakota 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 North Dakota RMP 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 September 27, 2013. The PRMPA/FEIS contains the Proposed Plan Amendment, a summary of changes made between the DRMPA/DEIS and PRMPA/FEIS, impacts of the Proposed Plan Amendment, 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, and correspondence).

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://www.blm.gov/mt/st/en/fo/north_dakota_field.html.

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 North Dakota Proposed Plan provides a layered management approach that offers the highest level of protection for Greater Sage-Grouse (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, 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 resource management 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" (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 Forest Service as a cooperating agency, is preparing 15 environmental impact statements (EISs), with associated plan amendments and revisions. The North Dakota Greater Sage-Grouse Resource Management Plan Amendment (RMPA)/EIS does not address National Forest System Lands; however, the Dakota-Prairie Grasslands is developing a Draft EIS to address GRSG conservation. 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 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 and 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 and 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, CO. February 2013.

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

Figure ES-1

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 North Dakota sub-regional GRSG planning area covers all or portions of Bowman, Slope, and Golden Valley Counties in southwestern North Dakota. While the planning area consists of all lands regardless of ownership, decisions resulting from this land use plan amendment 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 North Dakota Planning Area, and **Figure ES-2**, Greater Sage-Grouse Habitat Management Areas – North Dakota GRGS RMPA/EIS). PHMA and GHMA are defined as follows:

- PHMA (32,900 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 (80 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 North Dakota Greater Sage-Grouse RMPA/EIS does not establish any additional management for these lands (approximately 50 surface acres); these lands would be managed according to the existing, underlying land use plan for the area.

Table ES-1
Habitat Management Areas in the North Dakota Planning Area

Habitat Management Area	Acres of BLM-Administered Lands	Percent of BLM-Administered Lands in Planning Area
PHMA	32,900	99.6
GHMA	80	0.4
Other BLM-administered Lands	0	0

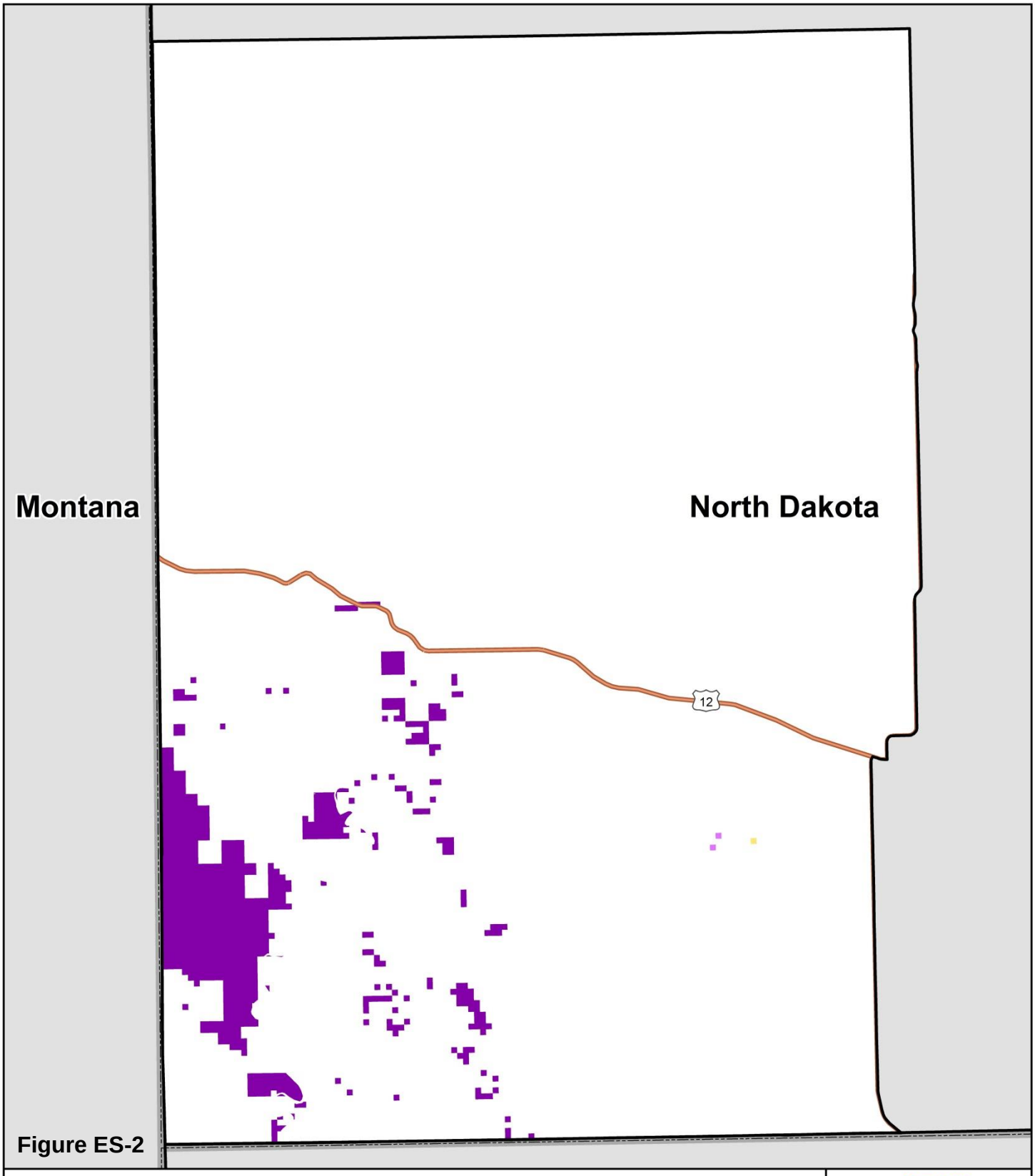

Figure ES-2

Greater Sage-Grouse Habitat Management Areas - North Dakota GRSG RMPA/EIS

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

0 2.5 5 Miles

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.

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

- 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
- Disease—Loss of GRSG to disease, primarily West Nile virus
- Hard rock mining/coal strip mining—Fragmentation of GRSG habitat due to mineral exploration and development
- 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
- Water development—Fragmentation of GRSG habitat due to range improvements

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. The Proposed Plan (see **Section ES.6**, Greater Sage-Grouse Habitat Management Proposed Plan and Environmental Effects, and **Section 2.62**, 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 with one public open house in Bowman on January 17. 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 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 North Dakota 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 four 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 North Dakota 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 September 27, 2013. The NOA initiated a 90-day public comment period. Due to the lapse in appropriations and the resulting federal government shutdown, the Draft RMPA/EIS was not available on the BLM website from October 1 through October 16, 2013. Accordingly, the close of the comment period was extended to January 13, 2014. The BLM also held one public comment open house in Bowman for the Draft RMPA/EIS in October 2013.

Comment Analysis

During the Draft RMPA/EIS public comment period, the BLM received written comments by mail and e-mail and 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 L**, 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 is based on the conservation measures developed by the BLM National Technical Team (NTT) planning effort described in Instruction Memorandum No. WO-2012-044. As directed in the memorandum, the conservation measures developed by the NTT must be considered and analyzed, as appropriate, through the land use planning and NEPA processes by all BLM state and field offices that contain occupied GRSG habitat. 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 fluid mineral leasing, 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 prohibit all future ROWs, fluid mineral leasing, 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 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 agency'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 ROW development in PHMA (wind energy authorizations would be excluded from PHMA and avoidance in GHMA), applying no surface occupancy stipulations to fluid mineral development in PHMA, 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, sagebrush canopy cover would not be reduced less than 8 percent, unless a fuels management objective were to require additional reduction in sagebrush cover. 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 North Dakota 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 agency's 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 North Dakota 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 North Dakota 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 no surface occupancy stipulations, with limited exceptions, to fluid mineral development in PHMA 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.

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

Table ES-2
Key Components of the North Dakota Proposed Plan Addressing COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Component of the North Dakota Proposed Plan
All threats	• 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. • Prioritize the leasing and development of fluid mineral resources outside of 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—	• PHMA: Open to fluid mineral leasing subject to No Surface Occupancy

Table ES-2
Key Components of the North Dakota Proposed Plan Addressing COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Component of the North Dakota Proposed Plan
fluid minerals	(NSO) stipulation, without waiver or modification, and with limited exception. • GHMA: Open to fluid mineral leasing subject to Controlled Surface Use (CSU) stipulation.
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 solar 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	• Apply RDFs to locatable minerals consistent with applicable law.
Mining—nonenergy leasable minerals	• PHMA: Closed area (not available for nonenergy leasable minerals).
Mining—salable minerals	• PHMA: Closed area (not available for salable minerals).
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 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 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.

Table ES-2
Key Components of the North Dakota Proposed Plan Addressing COT Report Threats

Threats to GRSG and its Habitat (from COT Report)	Key Component of the North Dakota Proposed Plan
Recreation	• PHMA: Do not construct new recreation facilities. • Allow special recreation permits 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.
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 US 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 North Dakota Greater Sage-Grouse RMPA/EIS achieves consistent, range-wide conservation objectives, as outlined below. Additionally, the North Dakota Greater Sage-Grouse RMPA/EIS aligns with the State of North Dakota'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 North Dakota Greater Sage-Grouse RMPA/EIS minimizes surface disturbance on over 30,000 acres of BLM-administered lands by allocating lands as PHMA and GHMA with decisions that aim to conserve GRSG habitat.

The limitations on timing and density of energy development, along with the disturbance cap, lek buffers, and management on BLM-administered lands and federal mineral estate, would act in concert to promote GRSG conservation and reduce the disturbance from energy development. 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 North Dakota 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. As a result, the restoration and management of vegetation actions would focus on GRSG. The Proposed Plan 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.

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 North Dakota 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. This is meant 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 improve the BLM's ability to protect sagebrush-steppe from damaging wildfires.

TABLE OF CONTENTS

Chapter Page

VOLUME I

ABSTRACT

DEAR READER LETTER

EXECUTIVE SUMMARY

1. INTRODUCTION 1-1

1.1 Introduction 1-1
1.2 Purpose and Need 1-4
1.3 Proposed Action 1-4
1.4 Description of the Greater Sage-Grouse Planning Area 1-5
1.4.1 Overview 1-5
1.5 BLM Planning Process 1-6
1.5.1 Implementation of Land Use Plans 1-7
1.5.2 Monitoring 1-7
1.6 Scoping and Identification of Issues 1-8
1.6.1 The Scoping Process 1-8
1.6.2 Scoping Comments 1-9
1.6.3 Issues Identified 1-9
1.6.4 Issues Considered but Not Further Analyzed 1-10
1.6.5 Issues Beyond the Scope of the Plan 1-12
1.7 Development of Planning Criteria 1-13
1.8 Relationship to Other Policies, Plans, and Programs 1-15
1.8.1 National Greater Sage-Grouse Planning Strategy 1-16
1.8.2 Instruction Memorandum No. 2012-043, *Greater Sage-Grouse Interim Management Policies and Procedures* 1-17
1.8.3 National Level Programmatic EISs and Agreements 1-18
1.8.4 Relevant Plan Amendments 1-18
1.8.5 National Grasslands Leasing Decisions 1-18
1.8.6 Greater Sage-Grouse (*Centrocercus urophasianus*) Conservation Objectives Final Report 1-19
1.8.7 Summary of Science, Activities, Programs, and Policies that Influence the Range-Wide Conservation of Greater Sage-Grouse (*Centrocercus urophasianus*) 1-20
1.8.8 Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota 1-20
1.8.9 Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota 1-20
1.8.10 County Plans 1-21
1.8.11 Secretarial Order 3336 1-21
1.9 Description of the Public Comment Process and Development of the Proposed RMPA/Final EIS 1-22
1.10 Changes from Draft RMPA to the Proposed RMPA 1-22

2. PROPOSED ACTION AND ALTERNATIVES 2-1

2.1 Changes Between the Draft EIS and Final EIS 2-1
2.2 Introduction 2-3
2.3 Introduction to Draft Alternatives 2-4
2.3.1 Components of Alternatives 2-4
2.3.2 Purpose of Alternatives Development 2-4
2.4 Alternatives Development for the North Dakota Greater Sage-Grouse Plan Amendment 2-5
2.4.1 Develop a Reasonable Range of Alternatives 2-5
2.4.2 Resulting Range of Alternatives in Draft RMPA/EIS 2-6
2.5 BLM Resource Programs for Addressing GRSG Threats 2-6
2.6 Proposed Plan Amendment 2-7
2.6.1 Development of Proposed RMPA 2-7
2.6.2 Proposed Plan Amendment 2-10
2.7 Adaptive Management, Monitoring, and Mitigation 2-28
2.7.1 Adaptive Management Plan 2-28
2.7.2 Monitoring for the Greater Sage-Grouse Planning Strategy 2-29
2.7.3 Regional Mitigation 2-30
2.8 Draft RMP/EIS Alternatives 2-33
2.8.1 Alternative A (No Action) 2-33
2.8.2 Management Common to Action Alternatives 2-33
2.8.3 Alternative B 2-34
2.8.4 Alternative C 2-36
2.8.5 Alternative D 2-37
2.9 Summary Comparison of Proposed Plan Amendment and Draft Alternatives 2-39
2.10 Detailed Description of Draft Alternatives 2-43
2.10.1 How to Read Table 2-4 2-43
2.11 Alternatives Eliminated from Detailed Analysis 2-63
2.11.1 National Technical Team Conservation Measures Not Applicable to North Dakota 2-63
2.11.2 Eliminate Livestock Grazing from BLM-Administered Lands 2-63
2.12 Summary Comparison of Environmental Consequences 2-65

3. AFFECTED ENVIRONMENT 3-1

3.1 Changes Between the Draft EIS and Final EIS 3-1
3.2 Introduction 3-1
3.3 Organization of Chapter 3 3-2
3.3.1 WAFWA Management Zone Data 3-4
3.4 Special Status Species—Greater Sage-Grouse 3-5
3.4.1 Conditions of the Planning Area 3-6
3.4.2 Conditions on BLM-Administered Lands 3-14
3.4.3 Trends 3-15
3.5 Lands and Realty 3-15
3.5.1 Conditions of the Planning Area 3-18
3.5.2 Conditions on BLM-Administered Lands 3-20
3.5.3 Trends 3-22
3.6 Vegetation (Including Noxious Weeds; Riparian and Wetlands) 3-22
3.6.1 Conditions of the Planning Area 3-23
3.6.2 Conditions on BLM-Administered Lands 3-26
3.6.3 Trends 3-28

3.7 Wildland Fire Management and Ecology 3-29
3.7.1 Conditions of the Planning Area 3-30
3.7.2 Conditions on BLM-Administered Lands 3-31
3.7.3 Trends 3-32
3.8 Fluid Minerals 3-33
3.8.1 Conditions of the Planning Area 3-33
3.8.2 Conditions on BLM-Administered Lands 3-37
3.8.3 Trends 3-42
3.9 Coal 3-43
3.9.1 Conditions of the Planning Area 3-43
3.9.2 Conditions on BLM-Administered Lands 3-44
3.9.3 Trends 3-44
3.10 Locatable Minerals 3-44
3.10.1 Conditions of the Planning Area 3-45
3.10.2 Conditions on BLM-Administered Lands 3-45
3.10.3 Trends 3-45
3.11 Mineral Materials 3-45
3.11.1 Conditions of the Planning Area 3-46
3.11.2 Conditions on BLM-Administered Lands 3-46
3.11.3 Trends 3-46
3.12 Comprehensive Travel and Transportation Management 3-46
3.12.1 Conditions of the Planning Area 3-46
3.12.2 Conditions on BLM-Administered Lands 3-48
3.12.3 Trends 3-49
3.13 Recreation 3-49
3.13.1 Conditions of the Planning Area 3-49
3.13.2 Conditions on BLM-Administered Lands 3-50
3.13.3 Trends 3-51
3.14 Range Management 3-51
3.14.1 Conditions of the Planning Area 3-52
3.14.2 Conditions on BLM-Administered Lands 3-53
3.14.3 Trends 3-57
3.15 Areas of Critical Environmental Concern 3-57
3.15.1 Conditions of the Planning Area 3-58
3.15.2 Conditions on BLM-Administered Lands 3-58
3.16 Air Resources 3-58
3.16.1 Conditions of the Planning Area 3-58
3.16.2 Conditions on BLM-Administered Lands 3-62
3.16.3 Trends 3-62
3.17 Climate 3-63
3.17.1 Conditions of the Planning Area 3-63
3.17.2 Conditions on BLM-Administered Lands 3-64
3.17.3 Trends 3-64
3.18 Soil Resources 3-65
3.18.1 Conditions of the Planning Area 3-66
3.18.2 Conditions on BLM-Administered Lands 3-66
3.18.3 Trends 3-67
3.19 Water Resources 3-68
3.19.1 Conditions of the Planning Area 3-68
3.19.2 Conditions on BLM-Administered Lands 3-68

3.19.3 Trends 3-72
3.20 Special Status Species – Other Species of Issue 3-72
3.20.1 Conditions of the Planning Area 3-73
3.20.2 Conditions on BLM-Administered Lands 3-74
3.20.3 Trends 3-74
3.21 Renewable Energy 3-82
3.21.1 Conditions of the Planning Area 3-83
3.21.2 Conditions on BLM-Administered Lands 3-84
3.21.3 Trends 3-84
3.22 Social and Economic Conditions 3-84
3.22.1 Existing Conditions 3-85
3.23 Environmental Justice 3-93

4. ENVIRONMENTAL CONSEQUENCES 4-1

4.1 Changes Between the Draft EIS and Final EIS 4-1
4.2 Introduction 4-1
4.2.1 Analytical Assumptions 4-3
4.2.2 General Methodology for Analyzing Impacts 4-7
4.2.3 Incomplete or Unavailable Information 4-8
4.3 Special Status Species—Greater Sage-Grouse 4-9
4.3.1 Methods and Assumptions 4-9
4.3.2 Nature and Type of Effects 4-10
4.3.3 Alternative A 4-16
4.3.4 Impacts Common to Alternatives B-D and the Proposed Plan Amendment 4-21
4.3.5 Alternative B 4-21
4.3.6 Alternative C 4-27
4.3.7 Alternative D 4-31
4.3.8 Proposed Plan Amendment 4-36
4.3.9 Impacts Summary 4-40
4.4 Lands and Realty 4-48
4.4.1 Methods and Assumptions 4-48
4.4.2 Nature and Type of Effects 4-49
4.4.3 Impacts Common to All Alternatives 4-50
4.4.4 Alternative A 4-52
4.4.5 Alternative B 4-52
4.4.6 Alternative C 4-53
4.4.7 Alternative D 4-54
4.4.8 Proposed Plan Amendment 4-54
4.5 Vegetation (Including Noxious Weeds; Riparian and Wetlands) 4-55
4.5.1 Methods and Assumptions 4-55
4.5.2 Nature and Type of Effects 4-57
4.5.3 Impacts Common to All Alternatives 4-62
4.5.4 Alternative A 4-62
4.5.5 Impacts Common to Alternatives B, C, and D and the Proposed Plan Amendment 4-65
4.5.6 Alternative B 4-66
4.5.7 Alternative C 4-68
4.5.8 Alternative D 4-71
4.5.9 Proposed Plan Amendment 4-73

4.6 Wildland Fire Management and Ecology 4-75
4.6.1 Methods and Assumptions 4-75
4.6.2 Nature and Type of Effects 4-76
4.6.3 Impacts Common to All Alternatives 4-78
4.6.4 Alternative A 4-79
4.6.5 Impacts Common to Alternatives B, C, and D and the Proposed Plan Amendment 4-81
4.6.6 Alternative B 4-81
4.6.7 Alternative C 4-84
4.6.8 Alternative D 4-85
4.6.9 Proposed Plan Amendment 4-87
4.7 Fluid Minerals 4-89
4.7.1 Methods and Assumptions 4-89
4.7.2 Nature and Type of Effects 4-91
4.7.3 Impacts Common to All Alternatives 4-93
4.7.4 Alternative A 4-93
4.7.5 Alternative B 4-97
4.7.6 Alternative C 4-100
4.7.7 Alternative D 4-103
4.7.8 Proposed Plan Amendment 4-107
4.8 Coal 4-107
4.9 Locatable Minerals 4-108
4.10 Mineral Materials 4-108
4.10.1 Methods and Assumptions 4-108
4.10.2 Nature and Type of Effects 4-109
4.10.3 Impacts Common to All Alternatives 4-110
4.10.4 Alternative A 4-110
4.10.5 Alternative B 4-110
4.10.6 Alternative C 4-111
4.10.7 Alternative D 4-112
4.10.8 Proposed Plan Amendment 4-112
4.11 Comprehensive Travel and Transportation Management 4-112
4.11.1 Methods and Assumptions 4-113
4.11.2 Nature and Type of Effects 4-114
4.11.3 Impacts Common to All Alternatives 4-114
4.11.4 Alternative A 4-115
4.11.5 Alternative B 4-115
4.11.6 Alternative C 4-115
4.11.7 Alternative D 4-116
4.11.8 Proposed Plan Amendment 4-116
4.12 Recreation 4-116
4.12.1 Methods and Assumptions 4-116
4.12.2 Nature and Type of Effects 4-117
4.12.3 Impacts Common to All Alternatives 4-119
4.12.4 Alternative A 4-119
4.12.5 Alternative B 4-120
4.12.6 Alternative C 4-122
4.12.7 Alternative D 4-123
4.12.8 Proposed Plan Amendment 4-123
4.13 Range Management 4-125

4.13.1 Methods and Assumptions 4-125
4.13.2 Nature and Type of Effects 4-126
4.13.3 Impacts Common to All Alternatives 4-130
4.13.4 Alternative A 4-130
4.13.5 Alternative B 4-133
4.13.6 Alternative C 4-136
4.13.7 Alternative D 4-139
4.13.8 Proposed Plan Amendment 4-141
4.14 Areas of Critical Environmental Concern 4-143
4.14.1 Methods and Assumptions 4-143
4.14.2 Nature and Type of Effects 4-144
4.14.3 Impacts Common to All Alternatives 4-144
4.14.4 Alternative A 4-145
4.14.5 Alternative B 4-145
4.14.6 Alternative C 4-145
4.14.7 Alternative D 4-146
4.14.8 Proposed Plan Amendment 4-146
4.15 Air Resources 4-146
4.15.1 Methods and Assumptions 4-146
4.15.2 Nature and Type of Effects 4-147
4.15.3 Impacts Common to All Alternatives 4-147
4.15.4 Alternative A 4-147
4.15.5 Alternative B 4-148
4.15.6 Alternative C 4-149
4.15.7 Alternative D 4-149
4.15.8 Proposed Plan Amendment 4-150
4.16 Climate 4-150
4.16.1 Methods and Assumptions 4-150
4.16.2 Nature and Type of Effects 4-151
4.16.3 Impacts Common to All Alternatives 4-151
4.16.4 Alternative A 4-151
4.16.5 Alternative B 4-152
4.16.6 Alternative C 4-153
4.16.7 Alternative D 4-153
4.16.8 Proposed Plan Amendment 4-154
4.17 Soil Resources 4-154
4.17.1 Methods and Assumptions 4-154
4.17.2 Nature and Type of Effects 4-155
4.17.3 Impacts Common to All Alternatives 4-156
4.17.4 Alternative A 4-157
4.17.5 Alternative B 4-158
4.17.6 Alternative C 4-159
4.17.7 Alternative D 4-161
4.17.8 Proposed Plan Amendment 4-162
4.18 Water Resources 4-164
4.18.1 Methods and Assumptions 4-164
4.18.2 Nature and Type of Effects 4-165
4.18.3 Impacts Common to All Alternatives 4-167
4.18.4 Alternative A 4-168
4.18.5 Alternative B 4-169

4.18.6 Alternative C 4-171
4.18.7 Alternative D 4-172
4.18.8 Proposed Plan Amendment 4-174
4.19 Special Status Species—Other Species of Issue 4-175
4.19.1 Methods and Assumptions 4-175
4.19.2 Nature and Type of Effects 4-177
4.19.3 Impacts Common to All Alternatives 4-179
4.19.4 Alternative A 4-179
4.19.5 Alternative B 4-181
4.19.6 Alternative C 4-184
4.19.7 Alternative D 4-185
4.19.8 Proposed Plan Amendment 4-187
4.20 Renewable Energy 4-190
4.20.1 Methods and Assumptions 4-190
4.20.2 Nature and Type of Effects 4-191
4.20.3 Impacts Common to All Alternatives 4-191
4.20.4 Alternative A 4-192
4.20.5 Alternative B 4-192
4.20.6 Alternative C 4-193
4.20.7 Alternative D 4-194
4.20.8 Proposed Plan Amendment 4-195
4.21 Social and Economic Conditions 4-195
4.21.1 Methods and Assumptions 4-195
4.21.2 Alternative A 4-195
4.21.3 Alternative B 4-198
4.21.4 Alternative C 4-200
4.21.5 Alternative D and the Proposed Plan Amendment 4-201
4.22 Environmental Justice 4-202
4.23 Unavoidable Adverse Impacts 4-203
4.24 Irreversible and Irretrievable Commitment of Resources 4-204
4.25 Relationship Between Local Short-term Uses and Long-term Productivity 4-205

TABLES

Page

1-1 Land Ownership within the Planning Area 1-5
1-2 Range-Wide Planning Issues for the North Dakota Field Office 1-10
2-1 USFWS Threats to GRSG and Their Habitat and Applicable BLM Resource Program Areas Addressing these Threats 2-8
2-2 Habitat Objectives 2-11
2-3 Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives 2-40
2-4 Description of Alternatives A, B, C, and D 2-45
2-5 Summary of Impacts on GRSG in North Dakota 2-65
2-6 Summary Comparison of Environmental Consequences 2-69
3-1 Priority Habitat and General Habitat Occurring on BLM-Administered Lands and non-BLM-Administered Lands in the Planning Area 3-8
3-2 Average Range of Vital Rates for GRSG, range-wide and in Montana 3-13
3-3 Surface Ownership within the Planning Area 3-18
3-4 GRSG Habitat within City Limits 3-18

3-5 Transmission Lines within GRSG Habitat....3-19
3-6 Communication Towers within GRSG Habitat....3-19
3-7 Vertical Obstructions within GRSG Habitat....3-20
3-8 Wind Turbines within GRSG Habitat....3-20
3-9 Active ROW Authorizations within the Planning Area....3-21
3-10 Vegetation Communities within GRSG Habitat on BLM-Administered Lands....3-26
3-11 PFC Assessment for Riparian Habitat on BLM-Administered Lands....3-27
3-12 PFC Assessment for Wetland Habitat on BLM-Administered Lands....3-27
3-13 Wildland Fire within GRSG Habitat....3-30
3-14 Planning Area Fire Regime Condition Class....3-32
3-15 Oil and Gas Activity by Field in the Planning Area....3-34
3-16 Open to Oil and Gas Leasing within GRSG Habitat....3-35
3-17 Closed to Oil and Gas Leasing within GRSG Habitat....3-35
3-18 Oil and Gas Leases within GRSG Habitat....3-36
3-19 Oil and Gas Leases Held by Production within GRSG Habitat....3-36
3-20 Oil and Gas Wells within GRSG Habitat....3-37
3-21 Federal Mineral Status in the North Dakota Planning Area....3-37
3-22 Oil and Gas Federal Mineral Status in the North Dakota Decision Area....3-38
3-23 Oil and Gas Potential in Relation to GRSG PH and GH....3-38
3-24 Existing Oil and Gas Leases on Federal Mineral Estate....3-39
3-25 Drilling Activity within GRSG Habitat[1]....3-40
3-26 Oil and Gas Leasing Categories in PH and GH....3-41
3-27 Coal Potential within GRSG Habitat....3-43
3-28 Surface Coal Leases within GRSG Habitat....3-44
3-29 Miles of Roads within GRSG Habitat....3-47
3-30 Acres of Roads within GRSG Habitat....3-47
3-31 Miles of Railroads within GRSG Habitat....3-48
3-32 Acres of Railroads within GRSG Habitat....3-48
3-33 Recreation Activities and Participants[1]....3-50
3-34 Grazing Allotments within GRSG Habitat....3-53
3-35 Fences within GRSG Habitat....3-53
3-36 North Dakota Field Office Planning Area – Grazing Allocation on BLM-Administered Lands....3-54
3-37 North Dakota Field Office Planning Area – AUMs by Allotment*....3-54
3-38 North Dakota Field Office Planning Area – Allotments and AUMs by Habitat Category....3-56
3-39 North Dakota Field Office Planning Area – Land Health Assessment....3-56
3-40 Air Quality Monitor Values in Billings and Dunn Counties (2009-2011)....3-59
3-41 Air Quality Index Report (2009-2011)....3-60
3-42 Annual Average Deposition (2004-2011)....3-61
3-43 Major Soil Orders on BLM-Administered Lands....3-66
3-44 Summary of NRCS Farmlands on BLM-administered Lands....3-67
3-45 Streams on BLM-Administered Lands in the Planning Area....3-69
3-46 Federally Listed Species with the Potential to Inhabit the Planning Area....3-75
3-47 North Dakota Field Office BLM Sensitive Species with the Potential to Inhabit the Planning Area....3-76
3-48 Wind Potential on Slopes <15% on BLM-administered Lands....3-84
3-49 Cattle and Sheep Inventory and Estimated Annual Forage Requirement in Impact Area Counties....3-89
3-50 Population by Race and Ethnicity (2010)....3-94

4-1 Estimated Number of Wells and Associated Disturbance 4-6
4-2 Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative A 4-18
4-3 Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative B 4-23
4-4 Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative C 4-28
4-5 Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative D and Proposed Plan Amendment 4-33
4-6 Comparison of Alleviated Threats to GRSG in North Dakota by Alternative 4-41
4-7 Comparison of Lands and Realty Indicators by Alternative 4-48
4-8 ROW Exclusion and Avoidance Areas in GRSG Habitat (PHMA and GHMA) 4-51
4-9 Comparison of Vegetation Indicators by Alternative 4-56
4-10 Acres Open to and Unallocated for Grazing under All Alternatives 4-62
4-11 ROW Exclusion and Avoidance Areas in GRSG Habitat under each Alternative 4-63
4-12 Acres Leased for Minerals or Available for Leasing in Sagebrush Habitat under each Alternative 4-64
4-13 Comparison of Wildland Fire Management and Ecology Indicators by Alternative 4-76
4-14 Comparison of Lands and Realty Actions Across Alternatives 4-79
4-15 Relative Comparison of Fuels Treatment and Fire Suppression Costs Across Alternatives 4-81
4-16 Comparison of Fluid Minerals Indicators by Alternative 4-90
4-17 Oil and Gas Leasing Categories, Alternative A[1] 4-95
4-18 Oil and Gas Leasing Categories, Alternative B[1] 4-98
4-19 Oil and Gas Leasing Categories, Alternative C[1] 4-101
4-20 Oil and Gas Leasing Categories, Alternative D and Proposed Plan Amendment 4-105
4-21 Comparison of Mineral Materials Indicators by Alternative 4-109
4-22 Comparison of Comprehensive Travel and Transportation Management Indicators by Alternative 4-113
4-23 Areas Open/Closed to New Road Construction by Alternative 4-114
4-24 Comparison of Recreation Indicators by Alternative 4-117
4-25 Comparison of Range Management Indicators by Alternative 4-125
4-26 Fluid Mineral Impacts on Range Management by Alternative 4-132
4-27 Comparison of ACEC Indicators by Alternative 4-144
4-28 ACECs by Alternative 4-145
4-29 Comparison of Air Resource Indicators by Alternative 4-146
4-30 Comparison of Climate Change Indicators by Alternative 4-151
4-31 Comparison of Soils Resources Indicators by Alternative 4-155
4-32 Quantitative Impact Summary by Alternative for Soils 4-157
4-33 Comparison of Water Resources Indicators by Alternative 4-164
4-34 Quantitative Impact Summary by Alternative for Water Resources 4-168
4-35 Comparison of Special Status Species-Other Indicators by Alternative 4-176
4-36 BLM-Administered Lands Managed as ROW Exclusion and Avoidance Areas 4-192
4-37 "Good" or Better Wind Potential That Would Be Managed as ROW Exclusion and Avoidance Areas 4-192
4-38 Wind Potential Affected by Alternatives B and D and Proposed Plan Amendment 4-193
4-39 Wind Potential Affected By Alternative C 4-194
4-40 Employment Generated from Grazing on Allotments Covered under the RMPA 4-196
4-41 Labor Income Generated from Grazing on Allotments Covered under the RMPA 4-196

4-42 Employment Generated from Oil and Gas Exploration and Development on BLM in the Decision Area 4-197
4-43 Labor Income Generated from Oil and Gas Exploration and Development on BLM in the Decision Area 4-198

DIAGRAMS

Page

1-1 BLM and Forest Service GRSG Planning Strategy Sub-region/EIS Boundaries 1-17
3-1 Population Change for the Three-County Impact Area 3-86
3-2 Employment Distribution in the Three-County Impact Area and North Dakota 3-87
3-3 Oil Production in the Three-County Impact Area and North Dakota 3-91

FIGURES *(Figures are within Appendix A)*

1-1 Project Planning Area
2-1 Travel and Transportation Management, Alternatives A-D & Proposed Plan
2-2 Major Rights-Of-Way, Proposed Plan
2-3 Minor Rights-Of-Way, Proposed Plan
2-4 Retention/Disposal, Alternative C & Proposed Plan
2-5 Grazing Allotments, Alternatives A, B, D & Proposed Plan
2-6 Unleased Fluid Mineral Leasing Categories, Alternative D & Proposed Plan
2-7 Coal Resources, Alternative D & Proposed Plan
2-8 Locatable Minerals, Alternatives A, D & Proposed Plan
2-9 Mineral Materials, Alternatives B, D & Proposed Plan
2-10 Grazing Allotments, Alternatives C
2-11 Rights-of-Way Alternative A
2-12 Rights-of-Way Alternative B
2-13 Rights-of-Way Alternative C
2-14 Rights-of-Way Alternative D
2-15 Retention/Disposal Alternative A
2-16 Retention/Disposal Alternative B and D
2-17 Unleased Fluid Mineral Leasing Categories Alternative A
2-18 Unleased Fluid Mineral Leasing Categories Alternative B
2-19 Unleased Fluid Mineral Leasing Categories Alternative C
2-20 Coal Resources Alternative A
2-21 Coal Resources Alternative B
2-22 Coal Resources Alternative C
2-23 Locatable Minerals, Alternative B
2-24 Locatable Minerals Alternative C
2-25 Mineral Materials Alternative A
2-26 Mineral Materials Alternative C
2-27 ACEC Alternative C
3-1 North Dakota Preliminary Sage-Grouse Habitat
3-2 Greater Sage-Grouse Distribution and Preliminary Priority Habitat
3-3 Greater Sage-Grouse Habitat (Planning Area)
3-4 Greater Sage-Grouse Habitat (BLM-Administered Lands)
3-5 Surface and Mineral Management Status
3-6 Planning Area Fire Regime Condition Class

3-7 Oil and Gas Potential
3-8 Transportation Routes
3-9 Planning Area Grazing Allotments

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VOLUME II

5. CUMULATIVE IMPACTS 5-1

5.1 Changes Between Draft and Final EIS 5-1
5.2 Introduction 5-1
5.2.1 Cumulative Analysis Methodology 5-2
5.2.2 Past, Present, and Reasonably Foreseeable Future Actions 5-2
5.3 Special Status Species—Greater Sage-Grouse 5-5
5.3.1 Methods 5-6
5.3.2 Assumptions 5-9
5.3.3 Existing Conditions in WAFWA MZ I and the North Dakota RMPA Planning Area 5-10
5.3.4 Regional Efforts to Manage Threats to GRSG 5-12
5.3.5 Relevant Cumulative Actions 5-20
5.3.6 Threats to GRSG in Management Zone I 5-21
5.3.7 Conclusions 5-53
5.3.8 Reasonably Foreseeable Future Actions in MZ I Likely to Impact GRSG Habitat 5-60
5.4 Lands and Realty 5-64
5.5 Vegetation (Including Noxious Weeds; Riparian and Wetlands) 5-65
5.5.1 Alternative A 5-65
5.5.2 Alternative B 5-66
5.5.3 Alternative C 5-67
5.5.4 Alternative D 5-67
5.5.5 Proposed Plan Amendment 5-68
5.6 Wildland Fire Management and Ecology 5-68
5.7 Fluid Minerals 5-69
5.8 Coal 5-70
5.9 Locatable Minerals 5-70
5.10 Mineral Materials 5-70
5.11 Comprehensive Travel and Transportation Management 5-71
5.12 Recreation 5-71
5.13 Range Management 5-72
5.14 Areas of Critical Environmental Concern 5-73
5.15 Air Quality 5-74
5.16 Climate 5-74
5.17 Soil Resources 5-75
5.18 Water Resources 5-77
5.19 Special Status Species—Other Species of Issue 5-78
5.20 Renewable Energy 5-80
5.21 Social and Economic Conditions 5-81
5.22 Environmental Justice 5-82

6. CONSULTATION AND COORDINATION 6-1

6.1 Changes Between the Draft EIS and Final EIS 6-1
6.2 Consultation and Coordination 6-1
6.3 Cooperating Agencies 6-2
6.4 Coordination and Consistency 6-4
6.5 Public Involvement 6-4

6.5.1 Scoping Process 6-5
6.5.2 Public Comment Period on the Draft RMPA and EIS 6-6
6.5.3 Summary of Comments Received on the Draft RMPA/EIS 6-6
6.5.4 Future Public Involvement 6-12
6.6 List of Preparers 6-13

7. REFERENCES 7-1

7.1 Chapters 1-6 References 7-1
7.2 Greater Sage-Grouse Cumulative Effects Analysis References (Section 5.3 in Chapter 5) 7-17

GLOSSARY GLOSSARY-1

INDEX INDEX-1

TABLES

Page

5-1 Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario 5-3
5-2 Management Jurisdiction in MZ I by Acres of Priority and General Habitats 5-11
5-3 Acres Open and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ I 5-25
5-4 Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ I 5-26
5-5 Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ I 5-30
5-6 Acres Open and Recommended for Withdrawal from Mineral Entry in GRSG Habitat in MZ I 5-32
5-7 Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ I 5-34
5-8 Acres of Rights-of-Way Management in GRSG Habitat in MZ I 5-36
5-9 Acres of Wind Energy Management Designations in GRSG Habitat in MZ I 5-38
5-10 Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ I 5-43
5-11 Acres Identified for Retention and Disposal in GRSG Habitat in MZ I 5-47
5-12 Acres of Travel Management Designations in GRSG Habitat in MZ I 5-51
5-13 Reasonably Foreseeable Future Projects Occurring Within MZ I 5-61
6-1 Cooperating Agencies 6-3
6-2 Number of Unique Submissions and Comments by Commenter Affiliation 6-10
6-3 Summary of Comments Received on Draft RMPA/EIS by Category 6-11
6-4 Overview of Comments by Category 6-12

APPENDICES

A Figures
B Greater Sage-Grouse Habitat Required Design Features
C Oil and Gas Stipulations
D Area of Critical Environmental Concern Evaluation of Relevance and Importance Criteria
E Regional Mitigation Strategy
F The Greater Sage-Grouse Monitoring Framework
G Land Pattern Review and Land Adjustment
H Drought Policy
I GRSG Wildfire and Invasive Species Habitat Assessment
J Applying Lek Buffer Distances When Approving Actions
K Greater Sage-Grouse Disturbance Caps
L Response to Comments on the Draft Resource Management Plan Amendment/Environmental Impact Statement

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
AQRV	air quality related value
AUM	animal unit month
bbls	million barrels
BER	Baseline Environmental Report
BLM	United States Department of the Interior, 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
CO	carbon monoxide
COA	conditions of approval
COT	Conservation Objectives Team
CSU	controlled surface use
DOI	Department of the Interior
EIS	environmental impact statement
EPA	US 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
Forest Service	United States Department of Agriculture, Forest Service
FRCC	fire regime condition classes
ft	feet
GHMA	general habitat management area
GHG	greenhouse gas
GIS	geographic information systems
GRSG	Greater Sage-Grouse
ha	hectare
HAF	Habitat Assessment Framework
IM	Instruction Memorandum
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change

kg	kilogram
kV	kilovolt
kWh/m^2/day	kilowatt hours per square meter per day
LUP	land use plan
m	meter
MCF	thousand cubic feet
$\mu g/m^3$	micrograms per cubic meter
MOU	memorandum of understanding
MW	megawatt
MZ	Management Zone
NAAQS	National Ambient Air Quality Standards
NDDoH	North Dakota Department of Health
NDFO	North Dakota Field Office
NDGFD	North Dakota Game and Fish Department
NEPA	National Environmental Policy Act of 1969, as amended
NH_4	ammonium
NO_2	nitrogen dioxide
NO_3	nitrates
NOC	National Operations Center
NO_x	nitrogen oxides
NRCS	National Resource Conservation Service
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
ppb	parts per billion
ppm	parts per million
RDF	required design feature
RFD	reasonable foreseeable development
RMP	resource management plan
RMPA	resource management plan amendment
ROD	Record of Decision
ROW	right-of-way
SGI	Sage-Grouse Initiative
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide

SO_4	sulfates
SRP	special recreation permit
SUA	special use authorization
SRMA	Special Recreation Management Area
T&E	threatened and endangered
TL	timing limitation
TPI	total personal income
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USG	unhealthy for sensitive groups
USGS	US Geological Survey
WAFWA	Western Association of Fish and Wildlife Agencies
WAPA	Western Area Power Administration

Chapter 1
Introduction

TABLE OF CONTENTS

Chapter Page

1. INTRODUCTION 1-1

1.1 Introduction 1-1
1.2 Purpose and Need 1-4
1.3 Proposed Action 1-4
1.4 Description of the Greater Sage-Grouse Planning Area 1-5
1.4.1 Overview 1-5
1.5 BLM Planning Process 1-6
1.5.1 Implementation of Land Use Plans 1-7
1.5.2 Monitoring 1-7
1.6 Scoping and Identification of Issues 1-8
1.6.1 The Scoping Process 1-8
1.6.2 Scoping Comments 1-9
1.6.3 Issues Identified 1-9
1.6.4 Issues Considered but Not Further Analyzed 1-10
1.6.5 Issues Beyond the Scope of the Plan 1-12
1.7 Development of Planning Criteria 1-13
1.8 Relationship to Other Policies, Plans, and Programs 1-15
1.8.1 National Greater Sage-Grouse Planning Strategy 1-16
1.8.2 Instruction Memorandum No. 2012-043, *Greater Sage-Grouse Interim Management Policies and Procedures* 1-17
1.8.3 National Level Programmatic EISs and Agreements 1-18
1.8.4 Relevant Plan Amendments 1-18
1.8.5 National Grasslands Leasing Decisions 1-18
1.8.6 Greater Sage-Grouse (*Centrocercus urophasianus*) Conservation Objectives Final Report 1-19
1.8.7 Summary of Science, Activities, Programs, and Policies that Influence the Range-Wide Conservation of Greater Sage-Grouse (*Centrocercus urophasianus*) 1-20
1.8.8 Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota 1-20
1.8.9 Off-Highway Vehicle Record of Decision and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota 1-20
1.8.10 County Plans 1-21
1.8.11 Secretarial Order 3336 1-21
1.9 Description of the Public Comment Process and Development of the Proposed RMPA/Final EIS 1-22
1.10 Changes from Draft RMPA to the Proposed RMPA 1-22

TABLES

Page

1-1 Land Ownership within the Planning Area 1-5
1-2 Range-Wide Planning Issues for the North Dakota Field Office 1-10

DIAGRAMS

Page

1-1 BLM and Forest Service GRSG Planning Strategy Sub-region/EIS Boundaries.....1-17

FIGURES *(see Appendix A)*

1-1 Project Planning Area

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 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 its being listed 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 to RMPs throughout the range of the GRSG.

Consistent with 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, and Colorado and in portions of Montana and Utah. The Great Basin Region consists of land use plans in California, Nevada, Oregon, and Idaho and in portions of Utah and Montana.

As identified above, this change in direction 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 this document, the USFWS 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 plans cited above, proposes to address both listing factors A and D (above) and proposes to provide consistency in the management of GRSG habitat.

This plan amendment addresses GRSG habitat within the BLM North Dakota Field Office (NDFO). The BLM Montana State Office (which includes North and South Dakota) has mapped this habitat preliminarily, in coordination with the North Dakota Game and Fish Department (NDGFD). 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, and 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 NDFO, approximately 3 percent of GRSG habitat is on BLM-administered lands. Changes in management of GRSG habitats are needed to avoid the continued decline of populations that are anticipated across the species' range. 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 not recognize areas within the North Dakota 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 Draft 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 J**, 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 I**) 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.

1.2 PURPOSE AND NEED

The BLM is preparing RMP amendments (RMPAs) with associated EISs for RMPs containing GRSG habitat. This effort responds to the USFWS's March 2010 "warranted, but precluded" ESA listing petition decision for GRSG. 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 (BLM plans being amended 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 **Chapter 2**, Proposed Action and Alternatives, to show what threats are being addressed in the range of alternatives for this RMPA/EIS.

The purpose for the RMPAs 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 North Dakota 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 North Dakota portion of WAFWA Management Zone (MZ) 1 (Stiver et al. 2006). Overall, MZ 1 includes all of Montana (except the Dillon Field Office), North Dakota, South Dakota, and northeastern Wyoming. However, this RMPA provides management direction only for the NDFO.

Proposed amendments to the North Dakota RMP/EIS and Record of Decision (ROD) (BLM 1988a) would include allowable uses and management actions for select resources and resource uses. Allowable uses are those that 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 measures that will guide future and day-to-day activities to conserve GRSG and GRSG habitat. In addition, this amendment

identifies required design features (RDFs) and best management practices (BMPs). Implementation decisions generally constitute site-specific on-the-ground actions and are not addressed in the North Dakota Greater Sage-Grouse RMPA/EIS.

The decisions to be made 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 North Dakota Greater Sage-Grouse RMPA/EIS is composed of BLM-administered lands, National Forest System lands, North Dakota school trust lands, USFWS-managed lands, and private lands (**Table 1-1**). These lands are in Bowman, Slope, and Golden Valley Counties in southwestern North Dakota (**Figure 1-1**, **Appendix A**, Figures).

Table 1-1
Land Ownership within the Planning Area

	Bowman County		Slope County		Golden Valley County		Planning Area		
	PH Acres	GH Acres	PH Acres	GH Acres	PH Acres	GH Acres	Planning Area Acres[1]	PH Acres	PH Acres
Surface Ownership									
BLM	32,900	80	0	0	0	0	33,030	32,900	80
Forest Service	0	11	56,691	26,608	9,858	3,244	140,432	66,549	29,863
North Dakota School Trust	15,281	5,047	5,318	5,824	951	0	40,894	21,550	10,871
Private	213,230	111,508	102,105	88,140	19,987	1,368	741,607	335,322	201,016
Water	2,778	2	1,926	469	45	0	6,416	4,749	471
USFWS	0	0	0	0	0	0	638	0	0
Total	**264,189**	**116,648**	**166,040**	**121,041**	**30,841**	**4,612**	**963,017**	**461,070**	**242,301**
Federal Mineral Estate[2]									
Total	**68,232**	**39,815**	**81,988**	**65,869**	**17,071**	**4,221**	**396,053**	**167,291**	**109,905**

Source: BLM 2012a
[1]Planning area acres include additional acres that are not PH or GH on BLM-administered lands.
[2]Federal mineral estate under BLM jurisdiction that may lie beneath other surface ownership.

The planning area incorporates the PH, the historic GRSG distribution zone (GH), as well as additional lands not designated as PH or GH. Though the planning area includes private lands, the decision area for this amendment

includes only BLM-managed federal surface and mineral estates. Accordingly, 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. Unlike other RMPAs, or revisions, that are part of the National Greater Sage-Grouse Planning Strategy, for this amendment, the US Department of Agriculture (USDA), Forest Service (Forest Service) is not a cooperating agency; therefore, the North Dakota Greater Sage-Grouse RMPA/EIS does not address a range of alternatives for Forest Service surface/federal minerals.

The current GRSG habitat on BLM-administered lands in the NDFO consists of 32,900 acres of PH (7 percent of all PH in the planning area) and 80 acres of GH (less than 1 percent of all GH in the planning area). PH and GH were mapped in cooperation with the NDGFD. **Table 1-1** provides acres of PH and GH by landowner, and **Figure 1-1** (**Appendix A**) includes areas mapped as PH and GH.

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.

The BLM uses a nine-step planning process 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 2005). The planning process is designed to identify the uses of BLM-administered lands desired by the public, and to consider these uses to the extent that 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 amendment. An amendment is initiated by the need to consider monitoring and evaluation findings, new data, new or revised policy, or a change in circumstances. It may also be initiated by 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 document per the National Environmental Policy Act of 1969, as amended (NEPA), the amending process follows the same procedure required for preparation and approval of the plan, but the focus is 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 (e.g., decision record) is signed, most of the land use plan decisions in the plan 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 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 focus on single resource programs (e.g., habitat management plans, allotment management plans, 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; and (4) developing an outreach strategy to support implementation.

Future proposed actions that need a level of analysis beyond that contained in this RMPA/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 North Dakota RMP (as amended by this Greater Sage-Grouse 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. For more information on monitoring in the North Dakota Greater Sage-Grouse RMPA/EIS, see **Section**

2.7.2, Monitoring for the Greater Sage-Grouse Planning Strategy, and **Appendix F**, The Greater Sage-Grouse Monitoring Framework.

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 plan amendment. 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 was initiated on December 9, 2011, with the publication in the *Federal Register* of a notice of intent to begin a planning effort. The scoping period was extended through a notice of extension, published February 10, 2012, and 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 plan amendment and to assist in formulating reasonable alternatives.

The scoping process opened dialogue between the BLM and the public about managing GRSG and their 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 Bowman, North Dakota on January 17, 2012. In addition, news releases notified the public of the scoping period and invited them 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 North Dakota Greater Sage-Grouse RMPA/EIS.

The *National Greater Sage-Grouse Planning Strategy Scoping Summary Report* (BLM 2012b) was developed from this scoping effort, is available at the project website for the national conservation effort: 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 North Dakota.

1.6.2 Scoping Comments

A total of 272 unique written submissions for the Rocky Mountain Region, which includes North Dakota, and 585 unique written submissions for the Great Basin Region were received during the public scoping period. Submissions included a total of 7,472 unique comments. In addition to unique submissions, 30,397 form letters were received.

In the *National Greater Sage-Grouse Planning Strategy Scoping Summary Report*, North Dakota and South Dakota are combined for the analysis. The majority of the 7,472 unique comments received (5,253) were applicable range-wide. In total, 1,196 unique comments were specific to the Rocky Mountain Region, and of these, 14 were specific to North Dakota and South Dakota.

Commenter Affiliation

Individual members of the public did not submit any comments specific to North Dakota and South Dakota during the scoping period; representatives from the commercial sector accounted for 25 percent of the commenters and nonprofit or citizen groups represented 63 percent. Federal and local government agencies submitted no comments, and state government agencies represented 12 percent of commenters.

Number of Comments by Process Category

Of the 14 comments received specific to North Dakota and South Dakota, nine (64 percent) were related to a planning issue that is addressed in the North Dakota Greater Sage-Grouse RMPA/EIS. These issues are summarized in **Section 1.6.3**, Issues Identified, and are discussed in Chapter 3 of the *National Greater Sage-Grouse Planning Strategy Scoping Summary Report*. It should be noted that some comments addressed multiple planning issues. In addition, 5 comments (36 percent) were related to issues that are addressed in the North Dakota Greater Sage-Grouse RMPA/EIS but do not fall within a specific planning issue category. These comments included general comments on the BLM planning process, alternatives development, collaboration, and requirements of NEPA and other regulations.

1.6.3 Issues Identified

Issues to be addressed in the North Dakota 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* and other resource and use issues outlined in the *BLM Land Use Planning Handbook and Manual* (H-1610-1; BLM 2005) were considered in developing the alternatives brought forward for analysis. Range-wide issues identified in the Scoping Summary Report that are applicable for North Dakota are included in **Table 1-2**.

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

Issue	Planning Issue Category	Planning Issue
1.	Greater Sage-Grouse and habitat	How would the BLM use the best available science to delineate 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 BLM-administered 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 be designated by the BLM 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 North and South Dakota

Issues discussed in the comments for North Dakota and South Dakota were GRSG habitat, energy and mineral development, livestock grazing, and water resources (as related to West Nile virus and GRSG). 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, federal law requires them, or 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.

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

- **Hunting Greater 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 state wildlife agencies. Some states still allow limited GRSG hunting; however, the NDGFD has not had a hunting season for GRSG for the past seven years (including 2014). Comments regarding hunting relate to state-regulated actions and are outside the scope of the plan amendment.
- **Predator control—**Many commenters stated that predator control was needed to protect GRSG from predation. The State of North Dakota possesses primary authority and responsibility for managing the wildlife within the state, while the BLM is responsible for managing habitat. Consistent with a memorandum of understanding (MOU) between the BLM and USDA, Animal and Plant Health Inspection Service-Wildlife Services, the BLM would continue to work with the NDGFD to meet state wildlife population objectives. Predator control is allowed on BLM-administered lands and is regulated by the NDGFD; comments concerning predator control therefore relate to state-regulated actions and are outside the scope of the plan amendment. The BLM will continue to work with agencies, such as the NDGFD, 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.
- **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. As these comments relate to decisions under the purview of the USFWS, they are not addressed in this plan amendment.
- **Elimination of livestock grazing—**Commenters asked that grazing be limited or completely stopped on all National System of Public Lands managed 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 amendment and are not made in this planning effort.

However, for the purposes of this document, the reduction of livestock (i.e., permitted grazing use) in GRSG habitat within the field office is considered in an alternative. 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 North Dakota 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 plan amendment.

Range-Wide Issues Not Carried Forward

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

- **Fish and Wildlife—**GRSG are addressed under the topic of special status species, along with other relevant special status species, but general fish and wildlife management is not an issue for this plan amendment.
- **Water and Soil—**Management of soil and water is not a main issue that would drive alternatives design for this amendment; however, management activities that impact these resources are addressed in this EIS (e.g., oil and gas, and grazing).
- **Wild Horses and Burros—**There are no wild horses and burros, or wild horse and burro management areas in the NDFO; therefore, this issue is not relevant to this plan amendment.

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 in the planning process (i.e. issues relating to addressing the threats to GRSG). They include decisions that are not under the BLM's jurisdiction or that are beyond the capability of the BLM to resolve as part of the plan amendment. Issues identified in this category include the following:

- New wilderness or Wilderness Study Area proposals
- Eliminating grazing, mineral development, and off-highway vehicle (OHV) use on all BLM-administered lands

- Activities and uses beyond the jurisdiction of the BLM
- 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 NDFO beginning in 1978. The initial phase of inventories resulted in all lands within North Dakota being dropped from further wilderness consideration (the only solid block of BLM-administered lands within the planning area acres is also a developed oil and gas field).

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 are prepared to ensure decision making is tailored to the issues and to ensure that the BLM avoids unnecessary data collection and analysis.

- 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's *Summary of Science, Activities, Programs and Policies that Influence the Rangewide Conservation of Greater Sage-Grouse* (Centrocercus urophasianus) (Manier et al. 2013), and any other appropriate resources to identify GRSG habitat requirements and BMPs.
- The approved RMPAs will be consistent with the BLM's National Sage-Grouse Conservation Strategy.
- The approved RMPAs 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" for affected resource programs (BLM 2005); the 2008 BLM NEPA Handbook (H-1790-1; BLM 2008a); and all other applicable BLM policies and guidance.

- The RMPAs 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 RMPAs will recognize valid existing rights.
- Lands addressed in the RMPAs will be BLM-administered lands (including surface estate/split estate lands) managed by the BLM in GRSG habitats. Any decisions in the RMPAs/revisions will apply only to BLM-administered lands.
- The BLM will use a collaborative and multijurisdictional 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 the results of inventory, monitoring, and coordination to determine appropriate local and regional management strategies that will enhance or restore GRSG habitat.
- For BLM-administered lands, all activities and uses within GRSG habitats will follow existing land health standards. Guidelines for livestock grazing and other programs that have developed guidelines 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, seeks to resolve inconsistencies between state, local, and tribal plans, and provides ample opportunities for state, local, and tribal governments to comment on the development of amendments or revisions.
- Reasonable foreseeable development (RFD) scenarios and planning for fluid minerals will follow BLM Handbook H-1624-1 (BLM 1990)

and current fluid minerals manual guidance for fluid mineral (oil and gas, coal-bed methane, oil shale) and geothermal resources.

- The RMPAs will be developed using an interdisciplinary approach to prepare RFD scenarios, 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 that 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 North Dakota RMP for such other resources as 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 NDFO are managed according to the North Dakota RMP/EIS and ROD (BLM 1988a). This RMPA is a necessary step in the overall process of managing BLM-administered lands, specifically to include new guidance concerning the conservation of GRSG habitat. As a result, this planning process must recognize the many ongoing programs, plans, and policies that are being implemented by the BLM or other land managers and government agencies. The BLM will 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 North Dakota Greater Sage-Grouse RMPA/EIS has not identified any inconsistencies with state or local plans in the planning area.

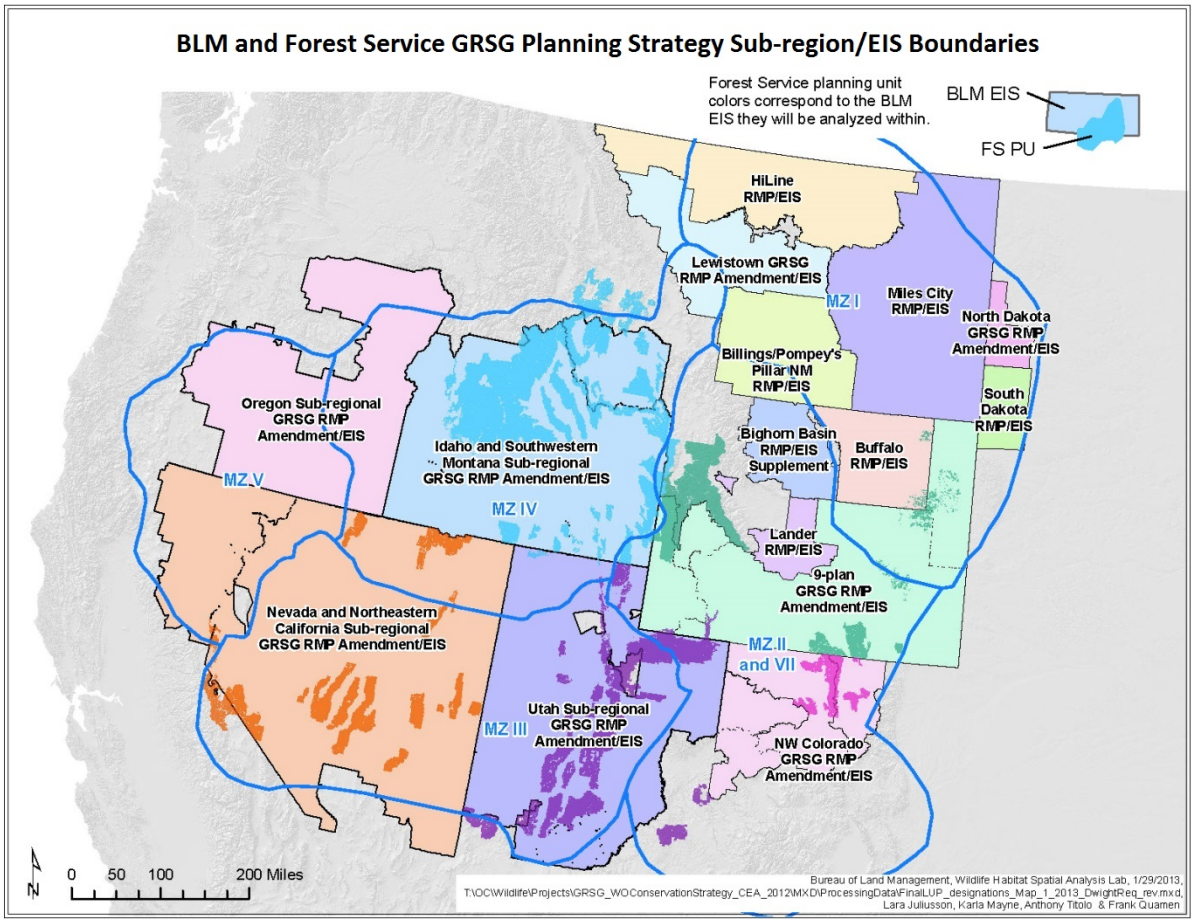
1.8.1 National Greater Sage-Grouse Planning Strategy

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, northeast Utah, Wyoming, Montana (other than the southwest portion), South Dakota, and North Dakota in the Rocky Mountain Region (see **Diagram 1-1**). 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 North Dakota Greater Sage-Grouse RMPA/EIS is 1 of 15 separate EISs that are 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.

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



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

Instruction Memorandum No. 2012-043, *Greater Sage-Grouse Interim Management Policies and Procedures* 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 2012e). This direction ensures that interim conservation policies and procedures are implemented when field offices authorize or carry out activities on public 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 NDFO before the North Dakota Greater Sage-Grouse RMPA/EIS can be completed.

1.8.3 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 2007)
- National-level MOUs

1.8.4 Relevant Plan Amendments

- *Final Environmental Impact Statement for the Northern Great Plains Management Plans Revision* (Forest Service 2001)
- *Fire/Fuels Management Plan Environmental Assessment/Plan Amendment for Montana and the Dakotas* (BLM 2003a)
- *Montana/Dakotas Standards for Rangeland Health and Guidelines for Livestock Grazing Management* (BLM 1997)

1.8.5 National Grasslands Leasing Decisions

In June 2003, the Dakota Prairie Grasslands/Montana State Office Oil and Gas Leasing ROD (BLM 2003b) was signed. This ROD documented the Forest Service's decision concerning which specific lands (Forest Service surface/federal mineral) it authorized the BLM to offer for lease. The ROD incorporated the lease terms and stipulations determined necessary to mitigate effects on surface resources. This ROD covers the Little Missouri and Cedar River National Grasslands of the Dakota Prairie Grasslands. It also documented the BLM's decision to offer and issue leases on the lands that are included in the Forest Service's decision, and on all nonfederal surface/federal minerals (split estate) lands within the administrative boundary of the oil and gas leasing project area.

Where the surface is administered by the Forest Service and the mineral estate is also federally owned, the Forest Service and the BLM share the responsibility for enforcing mineral leasing policies and regulations. Where the surface is not in federal ownership but the minerals are federally owned, the BLM manages the mineral estate. Each lease may contain special stipulations in accordance with federal regulations and as identified in the 2003 ROD.

For the nonfederal surface and federal minerals, the adoption by the BLM of the same lease stipulations and mitigation measures selected by the Forest Service was to ensure consistency in managing lands and resources within the boundaries of the Dakota Prairie Grasslands. Simultaneously, it incorporates nonfederal surface owner interests. This was an effort to collectively address impacts and apply lease stipulations consistently, based on resource considerations, within the grasslands boundary.

North Dakota Greater Sage-Grouse RMPA/EIS—The planning area for the North Dakota Greater Sage-Grouse RMPA/EIS includes portions of the Dakota Prairie Grassland National Forest. However, the North Dakota Greater Sage-Grouse RMPA/EIS does not address a range of alternatives for Forest Service surface/federal minerals. The NDFO and the Dakota Prairie Grasslands National Forest have been coordinating regarding GRSG management within the National Grasslands; however, the Forest Service will be preparing a separate analysis of GRSG in a plan amendment/EIS. This analysis will not be completed in time to include in this planning process.

The 2003 ROD will continue to define the current management for oil and gas leasing on Forest Service surface; the decisions that the BLM made in regard to the split estate lands (nonfederal surface/federal minerals) will vary among the alternatives (with the 2003 ROD decision being the No Action Alternative). This results in all action alternatives having management actions for split estate lands within the grasslands boundary that will be different than the current management on National Forest System lands.

1.8.6 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 recommend the degree to which the threats to GRSG need to be reduced or ameliorated in order to conserve GRSG so they 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/Forest Service planning decisions analyzed in the RMPAs/EISs 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 website:

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 COT report also 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 (PACs) across the landscape that are considered "necessary to maintain redundant, representative, and resilient populations" are identified

within the COT report by the USFWS and the respective state wildlife management agencies. In the North Dakota RMPA/EIS, the PACs consist of a total 461,070 acres. Under the Proposed Plan Amendment, the PACs are the same boundary of the PHMA managed by the BLM.

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

To augment this RMPA/EIS at a biologically meaningful scale for GRSG, the USGS produced for the BLM (Manier et al. 2013) the *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), this 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.

1.8.8 Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota

The purpose and need for the North Dakota Greater Sage-Grouse RMPA/EIS is consistent with the goal of the *Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota* (NDGFD 2005) which is to provide for long-term conservation and enhancement of sagebrush steppe/mixed-grass prairie habitats in North Dakota in a manner that will support a self-sustaining GRSG population, a diversity and abundance of other wildlife species, and human uses. This RMPA/EIS also addresses many of the threats and conservation strategies identified in the NDGFD GRSG Management Plan, with the exception of items such as conversion of private lands to cropland, harvest management, and weather. The COT report also contains similar threats/conservation strategies as the NDGFD GRSG Management Plan.

1.8.9 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 ROD and Proposed Plan Amendment for Montana, North Dakota, and Portions of South Dakota was signed in 2003 (BLM 2003c). Therefore, travel in the NDFO planning area is already "managed as limited" and this designation will remain the same among all alternatives in the North Dakota 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.

1.8.10 County Plans

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

- Bowman County Comprehensive Plan Update: 2012 (Bowman County 2012)
- Slope County Comprehensive Plan (Slope County 2010)
- Golden Valley County Comprehensive Plan Update: 2012 (Golden Valley County 2012)

The primary goals, objectives, and strategies common to these plans that would be relevant to the alternatives being analyzed in the North Dakota Greater Sage-Grouse RMPA/EIS relate to maintaining the farming and ranching sectors, and also maintaining the environmental integrity while encouraging the wise and proper development of natural resources. The county plans recognize the importance of their natural areas and provide strategies or objectives that support the proper planning for resource development.

1.8.11 Secretarial Order 3336

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, GRSG 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 Proposed RMPA/Final EIS and improve our ability to protect sagebrush-steppe from damaging wildfires.

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 September 27, 2013 (78 *Federal Register* 59713-59714), initiating a 90-day public comment period. Due to the lapse in appropriations and the resulting Federal government shutdown, the Draft RMPA/EIS was not available on the BLM website from October 1 through October 16, 2013. Accordingly, the close of the comment period was extended to January 13, 2014. The BLM issued a news release on September 27, 2013, announcing the release of the Draft RMPA/EIS, which provided the date and time of the public commenting open house. On October 17, 2013, the BLM issued another press release that also provided the date and time of the public commenting open house (October 22, 2013), and announced the extension of the public commenting period to January 13, 2014. The BLM also distributed a postcard via US mail and e-mail to individuals on the BLM mailing list, which provided the date and location of the public open house.

During the public comment period, the BLM hosted an open house in Bowman, North Dakota on October 22, 2013. The public open house provided an opportunity for the public to ask questions and submit comments. BLM managers, resource specialists, and other representatives of the BLM were present during the open house to discuss and answer questions. A total of 22 unique comment letters, forms, and emails were received during the 90-day public comment period. These documents resulted in 92 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 North Dakota 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 from Draft RMPA to the Proposed RMPA

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 North Dakota 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.
  - 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.
- 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 set forth in this Proposed RMPA/Final EIS 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—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. Due to low GRSG population numbers, the limited amount and quality of PHMA managed by the BLM, and limited decision space for management of valid existing rights, the North Dakota Greater Sage-Grouse Proposed RMPA/Final EIS will not include an adaptive management strategy in the Proposed Plan Amendment.
- 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 F**, The Greater Sage-Grouse Monitoring Framework, and **Appendix K**, Greater Sage-Grouse Disturbance Caps) in the Proposed RMPA/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 2-3** 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 existing conditions was added in **Section 3.4.1**, Conditions of the Planning Area (Special Status Species—Greater Sage-Grouse). Range-wide and Montana-specific average vitality rates for GRSG are provided in **Table 3-2**. A discussion of the current land cover in the planning area and on BLM-administered lands was added in **Section 3.4.2**, Conditions on BLM-Administered Lands (Special Status Species—Greater Sage-Grouse). This new section also references two new maps (**Figure 3-3**, Greater Sage-Grouse Habitat [Planning Area] and **Figure 3-4**, Greater Sage-Grouse Habitat [BLM-Administered Lands]). These were prepared to illustrate the current land cover in the planning area and on BLM-administered lands. A discussion of cheatgrass in the planning area was added to **Section 3.6.3**, Trends (Vegetation).

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** (Proposed Action and Alternatives) were incorporated into **Chapter 4**. The analysis shown under the draft alternatives may be referenced 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 4.2.1,** Analytical Assumptions, was updated to include an additional assumption describing how climate change could affect BLM decisions made as part of this planning process. **Section 4.3,** Special Status Species—Greater Sage-Grouse**,** was updated to include the following: potential impacts on GRSG from converting private rangeland to agricultural land were added to the analysis of impacts from land tenure decisions; additional impacts on GRSG from predation; potential impacts on GRSG and GRSG habitat from excluding livestock grazing from BLM-administered lands; and discussion of potential impacts on GRSG populations from conifer encroachment.

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 Proposed RMPA/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. Chapter 5 of the Draft RMPA/EIS included a qualitative analysis and identified that a quantitative analysis would be completed for the Proposed RMPA/Final EIS at the WAFWA Management Zone.

Public Comment on Draft RMPA/EIS—The BLM updated the Proposed RMPA/Final EIS based on public comment received on the Draft RMPA/EIS (see **Appendix L,** 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) if 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. For example, changes to the allocations of oil and gas and lands and realty were within the range of alternatives analyzed (see above description for Chapter 2 changes).

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. The impacts disclosed in the Proposed RMPA/Final EIS are similar or identical to those described Draft RMP/EIS. Therefore, a supplemental EIS is not required for this RMPA/EIS.

Chapter 2

Proposed Action and Alternatives

TABLE OF CONTENTS

Chapter Page

2. PROPOSED ACTION AND ALTERNATIVES 2-1

2.1 Changes Between the Draft EIS and Final EIS 2-1
2.2 Introduction 2-3
2.3 Introduction to Draft Alternatives 2-4
2.3.1 Components of Alternatives 2-4
2.3.2 Purpose of Alternatives Development 2-4
2.4 Alternatives Development for the North Dakota Greater Sage-Grouse Plan Amendment 2-5
2.4.1 Develop a Reasonable Range of Alternatives 2-5
2.4.2 Resulting Range of Alternatives in Draft RMPA/EIS 2-6
2.5 BLM Resource Programs for Addressing GRSG Threats 2-6
2.6 Proposed Plan Amendment 2-7
2.6.1 Development of Proposed RMPA 2-7
2.6.2 Proposed Plan Amendment 2-10
2.7 Adaptive Management, Monitoring, and Mitigation 2-28
2.7.1 Adaptive Management Plan 2-28
2.7.2 Monitoring for the Greater Sage-Grouse Planning Strategy 2-29
2.7.3 Regional Mitigation 2-30
2.8 Draft RMP/EIS Alternatives 2-33
2.8.1 Alternative A (No Action) 2-33
2.8.2 Management Common to Action Alternatives 2-33
2.8.3 Alternative B 2-34
2.8.4 Alternative C 2-36
2.8.5 Alternative D 2-37
2.9 Summary Comparison of Proposed Plan Amendment and Draft Alternatives 2-39
2.10 Detailed Description of Draft Alternatives 2-43
2.10.1 How to Read Table 2-4 2-43
2.11 Alternatives Eliminated from Detailed Analysis 2-63
2.11.1 National Technical Team Conservation Measures Not Applicable t o North Dakota 2-63
2.11.2 Eliminate Livestock Grazing from BLM-Administered Lands 2-63
2.12 Summary Comparison of Environmental Consequences 2-65

TABLES

Page

2-1 USFWS Threats to GRSG and Their Habitat and Applicable BLM Resource Program Areas Addressing these Threats 2-8
2-2 Habitat Objectives 2-11
2-3 Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives 2-40
2-4 Description of Alternatives A, B, C, and D 2-45
2-5 Summary of Impacts on GRSG in North Dakota 2-65
2-6 Summary Comparison of Environmental Consequences 2-69

FIGURES *(see Appendix A)*

2-1 Travel and Transportation Management, Alternatives A-D & Proposed Plan
2-2 Major Rights-Of-Way, Proposed Plan
2-3 Minor Rights-Of-Way, Proposed Plan
2-4 Retention/Disposal, Alternative C & Proposed Plan
2-5 Grazing Allotments, Alternatives A, B, D & Proposed Plan
2-6 Unleased Fluid Mineral Leasing Categories, Alternative D & Proposed Plan
2-7 Coal Resources, Alternative D & Proposed Plan
2-8 Locatable Minerals, Alternatives A, D & Proposed Plan
2-9 Mineral Materials, Alternatives B, D & Proposed Plan
2-10 Grazing Allotments, Alternatives C
2-11 Rights-of-Way Alternative A
2-12 Rights-of-Way Alternative B
2-13 Rights-of-Way Alternative C
2-14 Rights-of-Way Alternative D
2-15 Retention/Disposal Alternative A
2-16 Retention/Disposal Alternative B and D
2-17 Unleased Fluid Mineral Leasing Categories Alternative A
2-18 Unleased Fluid Mineral Leasing Categories Alternative B
2-19 Unleased Fluid Mineral Leasing Categories Alternative C
2-20 Coal Resources Alternative A
2-21 Coal Resources Alternative B
2-22 Coal Resources Alternative C
2-23 Locatable Minerals, Alternative B
2-24 Locatable Minerals Alternative C
2-25 Mineral Materials Alternative A
2-26 Mineral Materials Alternative C
2-27 ACEC Alternative C

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 North Dakota 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.
  - 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.
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- 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—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. Due to low GRSG population numbers, the limited amount and quality of PHMA managed by the BLM, and limited decision space for management of valid existing rights, the North Dakota Greater Sage-Grouse Proposed RMPA/Final EIS will not include an adaptive management strategy in the Proposed Plan Amendment.
- 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 F**, The Greater Sage-Grouse Monitoring Framework, and **Appendix K**, Greater Sage-Grouse Disturbance Caps) in the Proposed RMPA/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 2-3 in the Draft RMPA/EIS).

2.2 INTRODUCTION

The North Dakota Greater Sage-Grouse RMPA/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 draft 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 Proposed RMPA/Final 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 RMPA/EIS and the Proposed RMPA/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 are within the range of alternatives analyzed in the Draft RMPA/EIS. The various parts of the separate alternatives that were analyzed in the Draft RMPA/EIS can be "mixed and matched" to develop an alternative—known as the Proposed Plan Amendment—in the Proposed RMPA/Final EIS, as long as the reasons for doing so are explained (40 CFR, Part 1506.2[b]).

2.3 INTRODUCTION TO DRAFT 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 alternative 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 North Dakota Greater Sage-Grouse RMPA/EIS are discussed below.

2.4 ALTERNATIVES DEVELOPMENT FOR THE NORTH DAKOTA GREATER SAGE-GROUSE PLAN AMENDMENT

The North Dakota 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 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 will specifically address 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 Develop a Reasonable Range of Alternatives

Based on scoping and collaboration efforts, the BLM finalized their 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 23, 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. The first action alternative (Alternative B) is based on *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011).
- One alternative (Alternative C) is based on a proposed alternatives submitted by conservation groups.

- Customized the goals, objectives, and actions from the NTT-based alternative (Alternative B) to develop a third action alternative (Alternative D) 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 (identified in **Section 1.6.3**);
- Fulfill the purpose and need for the RMPA (outlined in **Section 1.2**); and
- Meet the multiple use mandate of the FLPMA (43 CFR, Part 1716).

2.4.2 Resulting Range of Alternatives in Draft RMPA/EIS

The three resulting 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 is met in varying degrees, 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 to GRSG and its habitat. The USFWS threats do not necessarily align with BLM resource program areas, and are often integrated into several different agency resource program areas. **Table 2-1**, USFWS

Threats to GRSG and Their Habitat, Applicable BLM and Forest Service Resource Program Areas Addressing these Threats, 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 North Dakota Greater Sage-Grouse RMPA/EIS.

2.6 PROPOSED PLAN AMENDMENT

2.6.1 Development of Proposed RMPA

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 BLM Proposed Plan Amendment incorporates documents for conserving GRSG that have been released since the publication of the Draft RMPA/EIS. For example, this Proposed Plan Amendment considers the USGS's November 21, 2014 report Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Manier et al. 2014).

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), which are PHMA with additional management. There are no areas in the North Dakota Greater Sage-Grouse planning area identified as SFAs.

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, mitigation approaches, and lek buffer-distances throughout the range. These overlapping

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 Proposed Plan Amendment Resource Program Addressing Threat (see Section 2.6.2 for Program Direction)
Wildland Fire	Fire	Wildland Fire Management
Invasive Species	Nonnative, Invasive Plant Species	Vegetation Management; Range Management; Wildland Fire Management; Recreation
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	Vegetation Management; Wildland Fire Management
Grazing	Grazing	Range Management; Special Status Species; Vegetation Management
See *Grazing Management (above)*	Range Management Structures	Range Management
Conifer Encroachment	Pinyon and/or Juniper Expansion	Wildland Fire Management; Vegetation Management
Agriculture and Urbanization	Agricultural Conversion and Ex-Urban Development	Lands and Realty
Hard Rock Mining	Mining	Lands and Realty; Locatable Minerals; Salable Minerals; Nonenergy Leasable Minerals
See Infrastructure, Roads	Recreation	Recreation; Trails and Travel Management
Infrastructure - Power lines/pipelines - Roads - Communication sites - Railroads Range improvements (see below)	Infrastructure	Lands and Realty; Trails and Travel 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 Amendment addressing this threat.*
Weather	No similar threat identified	*There is no BLM resource program in the Proposed Plan Amendment addressing this threat.*
Predation	No similar threat identified	All applicable programs

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 Proposed Plan Amendment Resource Program Addressing Threat (see Section 2.6.2 for Program Direction)
Disease	No similar threat identified	All applicable programs
Hunting	No similar threat identified	*There is no BLM resource program in the Proposed Plan Amendment addressing this threat.*
Contaminants	No similar threat identified	*There is no BLM resource program in the Proposed Plan Amendment addressing this threat.*

Source: USFWS 2010, 2013

and reinforcing conservation measures would work in concert to improve GRSG habitat conditions 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. Manage PHMA so that discrete anthropogenic disturbances cover less than 3% of the total GRSG habitat.

Objective SS-1.2—Habitat Delineation: Delineate PHMA to encompass the 100% Breeding Bird Density map: 32,900 BLM surface acres (7% of total PHMA acres). Since mapping 75% of breeding bird density map misses the majority of GRSG habitat in North Dakota, 100% was used. See **Figure 1-1** (**Appendix A**).

Objective SS-1.3—Habitat Delineation: Delineate GHMA to encompass the remainder of the habitat: 80 BLM surface acres.

Objective SS-1.4—These 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.

The habitat objectives would be part of the GRSG habitat assessment to be used during land health evaluations (see Monitoring Framework, **Appendix F**). 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 2-2**.

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 AND NESTING (Seasonal Use Period March 1 - June 15)			
Lek Security	Proximity of trees	.388 miles avoidance of coniferous habitats	Doherty, K. E. 2008. *Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts*. (Doctoral dissertation, the University of (Montana) Missoula. Internet website: http://etd.lib.umt.edu/theses/available/etd-03262009-132629/unrestricted/doherty.pdf.
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 feet (ft.) (100 meters [m]) of an occupied lek	*Sage-Grouse Habitat Assessment Framework, Multi-scale Habitat Assessment Tool* (unpublished report). August 2010. BLM, Idaho State Office. Boise.
Cover	% of seasonal habitat meeting desired conditions	80% of the nesting habitat within 3.1 miles of GRSG leks meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.)	Knick, S. T. and J. W. Connelly, 2011. *Greater Sage-grouse, Ecology and Conservation of a Landscape Species and its Habitats*. Studies in Avian Biology No. 38. A Publication of the Cooper Ornithological Society, University of California Press. Berkeley. pp. 1–9. Stiver, S. J., E. T. Rinkes, D. E. Naugle, 2010. *Sage-Grouse Habitat Assessment Framework.* US Bureau of Land Management, Idaho State Office, Boise.
	Sagebrush cover	≥5-25%	Herman—Brunson, K. M. 2007. *Nesting and Brood-rearing success and habitat selection of Greater Sage-Grouse and associated survival of hens and broods at the edge of their historic distribution.* Master's thesis, South Dakota State University, Brookings. Swanson, C. C. 2009. *Ecology of Greater Sage-grouse in the Dakotas.* Doctor of Philosophy, South Dakota State University, Brookings. Doherty, K. E., Naugle, D. E., Walker, B. L. 2010. *Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales.* The Journal of Wildlife Management 74 (7):1544-1553. 2010.

Table 2-2
Habitat Objectives

Attribute	Indicators	Desired Condition	Reference
	Sagebrush height	7-30 inches	Swanson, C. C. 2009. *Ecology of Greater Sage-grouse in the Dakotas.* Doctor of Philosophy, South Dakota State University, Brookings. Holloran, M. J., Heath, B. J., Lyon, A. G. 2005. *Greater Sage-Grouse Nesting Habitat Selection and Success in Wyoming.* Journal of Wildlife Management 69 (2):638-649. Herman—Brunson, K. M. 2007. *Nesting and Brood-rearing success and habitat selection of Greater Sage-Grouse and associated survival of hens and broods at the edge of their historic distribution.* Master's thesis, South Dakota State University, Brookings.
	Predominant sagebrush shape	Predominately spreading shape	Stiver, S. J., E. T. Rinkes, D. E. Naugle, 2010. *Sage-Grouse Habitat Assessment Framework.* US Bureau of Land Management, Idaho State Office, Boise.
	Perennial grass cover	≥10% Not Continuous	Doherty, K. E., Beck, J. L., Naugle, D. E. 2011. *Comparing Ecological Site Descriptions to Habitat Characteristics Influencing Greater Sage-Grouse Nest Site Occurrence and Success.* Rangeland Ecol Management 64:344-341 1 July 2011 1 DOI:10.2111?REM-D-10-00120.1 Holloran, M. J., Heath, B. J., Lyon, A. G. 2005. "Greater Sage-Grouse Nesting Habitat Selection and Success in Wyoming." *Journal of Wildlife Management* 69 (2):638-649. 2005. Doherty, K. E., Naugle, D. E., Walker, B. L. 2010. "Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales." *The Journal of Wildlife Management* 74 (7):1544-1553. 2010 Hagen, C. A., Connelly, J. W., Schroedeer, M. A. 2007. *A Meta-analysis of Greater Sage-grouse Centrocercus urophasianus Nesting and Brood-rearing Habitats.* Wildlife Biology, 13 (sp1):42-50.
	Perennial grass and forb height	Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches[1]	K. E. Doherty, K. E. Naugle, J. D. Tack, B. L. Walker, J. M. Graham and J. L. Beck. *Linking conservation actions to demography: grass height explains variation in greater sage-grouse nest survival.* Wildlife Biology 20 (6):320-326. 2014.

Table 2-2
Habitat Objectives

Attribute	Indicators	Desired Condition	Reference
	Perennial forb cover	≥5% Not Continuous	Doherty, K. E., Beck, J. L., Naugle, D. E. 2011. *Comparing Ecological Site Descriptions to Habitat Characteristics Influencing Greater Sage-Grouse Nest Site Occurrence and Success.* Rangeland Ecol Management 64:344-341 1 July 2011 1 DOI:10.2111?REM-D-10-00120.1 Holloran, M. J., Heath, B. J., Lyon, A. G. 2005. *Greater Sage-Grouse Nesting Habitat Selection and Success in Wyoming.* Journal of Wildlife Management 69 (2):638-649. Doherty, K. E., Naugle, D. E., Walker, B. L. 2010. *Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales.* The Journal of Wildlife Management 74 (7):1544-1553. Hagen, C. A., Connelly, J. W., Schroedeer, M. A. 2007. *A Meta-analysis of Greater Sage-grouse Centrocercus urophasianus Nesting and Brood-rearing Habitats.* Wildlife Biology, 13 (sp1):42-50.
BROOD-REARING/SUMMER (Seasonal Use Period June 16-October 31)			
Cover	% of seasonal habitat meeting desired condition	>40% of the brood-rearing/summer habitat meets recommended brood habitat characteristics where appropriate, relative to site potential and seasonal precipitation.	Stiver, S. J., E. T. Rinkes, D. E. Naugle, 2010. *Sage-Grouse Habitat Assessment Framework.* US Bureau of Land Management, Idaho State Office, Boise.

Table 2-2
Habitat Objectives

Attribute	Indicators	Desired Condition	Reference
	Sagebrush cover	≥5 %	Herman—Brunson, K. M. 2007. *Nesting and Brood-rearing success and habitat selection of Greater Sage-Grouse and associated survival of hens and broods at the edge of their historic distribution.* Master's thesis, South Dakota State University, Brookings. Swanson, C. C. 2009. *Ecology of Greater Sage-grouse in the Dakotas.* Doctor of Philosophy, South Dakota State University, Brookings. Doherty, K. E., Naugle, D. E., Walker, B. L. 2010. *Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales.* The Journal of Wildlife Management 74 (7):1544-1553. Hagen, C. A., Connelly, J. W., Schroedeer, M. A. 2007. *A Meta-analysis of Greater Sage-grouse Centrocercus urophasianus Nesting and Brood-rearing Habitats.* Wildlife Biology, 13 (sp1):42-50. Doherty, K. E., Beck, J. L., Naugle, D. E. 2011. *Comparing Ecological Site Descriptions to Habitat Characteristics Influencing Greater Sage-Grouse Nest Site Occurrence and Success.* Rangeland Ecol Management 64:344-341 1 July 2011 1 DOI:10.2111?REM-D-10-00120.1.
	Sagebrush height	7-30 inches	Herman—Brunson, K. M. 2007. *Nesting and Brood-rearing success and habitat selection of Greater Sage-Grouse and associated survival of hens and broods at the edge of their historic distribution.* Master's thesis, South Dakota State University, Brookings. Doherty, K. E., Beck, J. L., Naugle, D. E. 2011. *Comparing Ecological Site Descriptions to Habitat Characteristics Influencing Greater Sage-Grouse Nest Site Occurrence and Success.* Rangeland Ecol Management 64:344-341 1 July 2011 1 DOI:10.2111?REM-D-10-00120.1. Holloran, M. J., Heath, B. J., Lyon, A. G. 2005. *Greater Sage-Grouse Nesting Habitat Selection and Success in Wyoming.* Journal of Wildlife Management 69 (2):638-649. Schroeder et al. 1999. *Greater Sage-Grouse (Centrocercus urophasianus*) [Internet website], The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Accessed February 22, 2011. Available at: Birds of North America Online: http://bna.birds.cornell.edu/bna/species/425/articles/introduction

Table 2-2
Habitat Objectives

Attribute	Indicators	Desired Condition	Reference
	Perennial grass and forbs	≥20% Forbs 6-16%	Doherty, K. E., Beck, J. L., Naugle, D. E. 2011. *Comparing Ecological Site Descriptions to Habitat Characteristics Influencing Greater Sage-Grouse Nest Site Occurrence and Success.* Rangeland Ecol Management 64:344-341 1 July 2011 1 DOI:10.2111?REM-D-10-00120.1. Holloran, M. J., Heath, B. J., Lyon, A. G. 2005. *Greater Sage-Grouse Nesting Habitat Selection and Success in Wyoming.* Journal of Wildlife Management 69 (2):638-649. Doherty, K. E., Naugle, D. E., Walker, B. L. 2010. *Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales.* The Journal of Wildlife Management 74 (7):1544-1553. Herman—Brunson, K. M. 2007. *Nesting and Brood-rearing success and habitat selection of Greater Sage-Grouse and associated survival of hens and broods at the edge of their historic distribution.* Master's thesis, South Dakota State University, Brooking.
	Riparian areas/mesic meadows	Proper Functioning Condition	BLM, 1997c. *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.* August 7, 1997. BLM, Montana State Office. Billings. Prichard, D., F. Berg, S. Leonard, M. Manning, W. Hagenbuck, R. Krapf, C. Noble, J. Staats, and R. Leinard. 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. Prichard, D., 1998. *Riparian Area Management, A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic Areas (TR 1737-15).* Prepared for the United States Department of the Interior and the United States Department of Agriculture. BLM, National Applied Resource Sciences Center. Denver, Colorado.
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present.	Stiver, S. J., E. T. Rinkes, D. E. Naugle, 2010. *Sage-Grouse Habitat Assessment Framework.* US Bureau of Land Management, Idaho State Office, Boise. Doherty, K. E., Beck, J. L., Naugle, D. E. 2011. *Comparing Ecological Site Descriptions to Habitat Characteristics Influencing Greater Sage-Grouse Nest Site Occurrence and Success.* Rangeland Ecol Management 64:344-341 1 July 2011 1 DOI:10.2111?REM-D-10-00120.1.

Table 2-2
Habitat Objectives

Attribute	Indicators	Desired Condition	Reference
WINTER (Seasonal Use Period November 1-February 28)			
Cover and Food	% of seasonal habitat meeting desired conditions	>80% of wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.).	Stiver, S. J., E. T. Rinkes, D. E. Naugle, 2010. *Sage-Grouse Habitat Assessment Framework.* US Bureau of Land Management, Idaho State Office, Boise.
	Sagebrush cover above snow	≥10%	Schroeder et al. 1999. *Greater Sage-Grouse (Centrocercus urophasianus*) [Internet website], The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Accessed February 22, 2011. Internet website: *Birds of North America* Online: http://bna.birds.cornell.edu/bna/species/425/articles/introduction Swanson, C. C. 2009. *Ecology of Greater Sage-grouse in the Dakotas.* Doctor of Philosophy, South Dakota State University, Brookings.
	Sagebrush height above snow	≥ 6 inches	(Schroeder et al. 1999. *Greater Sage-Grouse (Centrocercus urophasianus*) [Internet website], The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Accessed February 22, 2011. Available at: Birds of North America Online: http://bna.birds.cornell.edu/bna/species/425/articles/introduction Doherty, K. E., Beck, J. L., Naugle, D. E. 2011. *Comparing Ecological Site Descriptions to Habitat Characteristics Influencing Greater Sage-Grouse Nest Site Occurrence and Success.* Rangeland Ecol Management 64:344-341 1 July 2011 1 DOI:10.2111?REM-D-10-00120.1. Swanson, C. C. 2009. *Ecology of Greater Sage-grouse in the Dakotas.* Doctor of Philosophy, South Dakota State University, Brookings.

[1]Specific height requirements needed to meet the objective would be set at the time of watershed assessments.

Action SS-1.1—Protect PHMA from anthropogenic disturbances that would reduce distribution or abundance of GRSG. 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 identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Open File Report 2014-1239) in accordance with **Appendix J**.

Action SS-1.2—If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given Biologically Significant Unit, 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.)

Action SS-1.3—If the 3% anthropogenic disturbance cap is 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, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap.

Action SS-1.4—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 will 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.

Travel and Transportation Management (TM)

Management Actions

Action TM-1.1— In PHMA and GHMA, limit OHV 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. See **Figure 2-1**, Travel and Transportation Management—Alternatives A-D and Proposed Plan (**Appendix A**).

Action TM-1.2—In PHMA, travel management would evaluate the need for permanent, or seasonal, road or area closures where vehicle use is causing or would cause adverse effects upon habitat.

Action TM-1.3—In PHMA and GHMA, complete activity level travel plans within 5 years of the ROD. During activity level planning, where appropriate, designate routes in PHMA and GHMA with current administrative/agency purpose or need to administrative access only.

Action TM-1.4—In PHMA, limit route construction to realignments of existing designated 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. Allow new routes/realignments in PHMA and GHMA during site-specific travel planning if it improves GRSG habitat and resource conditions.

Action TM-1.5—In PHMA, 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 constructed to the absolute minimum standard necessary.

Action TM-1.6—In PHMA and GHMA, 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, is necessary for motorist safety, or eliminates the need to construct a new road.

Action TM-1.7—When travel management plans are complete, conduct restoration of roads, primitive roads and trails in PHMA and GHMA.

Action TM-1.8—When reseeding roads, primitive roads and trails in PHMA and GHMA, use appropriate seed mixes and consider the use of transplanted sagebrush.

Action TM-1.9—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 BLM Authorized Officer to resolve management conflicts and protect persons, property, and public lands and resources. Where a BLM 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—Only allow Special Recreation Permits (SRP) that would have neutral or beneficial effects on PHMA.

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)

Management Actions

Rights-of-Way

Action LR-1.1—PHMA would be managed as ROW avoidance area for high-voltage transmission lines (100 kilovolt [kV] and over) and large pipelines (24 inches in width and over). See **Figure 2-2**, Major Rights-of-Way—Proposed Plan (**Appendix A**).

- Where new ROWs are required, co-locate new rights-of-way (ROW) within existing ROWs or where it best minimizes impacts on GRSG and GRSG habitat.

Action LR-1.2—PHMA would be managed as ROW avoidance area for minor ROWs (including communication sites and towers). See **Figure 2-3**, Minor Rights-of-Way—Proposed Plan (**Appendix A**).

Action LR-1.3—Make PHMA exclusion area for new ROW wind and solar energy authorizations.

Action LR-1.4—When addressing ROW authorizations in PHMA identify and evaluate opportunities to remove, bury or modify existing power lines within PHMA.

Action LR-1.5—In PHMA, where existing leases or ROWs have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features and restoring the habitat.

Action LR-1.6—GHMA would be managed as ROW avoidance area for high-voltage transmission lines (100kV and over) and large pipelines (24 inches in width and over).

Action LR-1.7—Minor 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 LR-1.8—Make GHMA avoidance area for new wind and solar energy authorizations.

Action LR-1.9 - Where new ROWs are necessary in GHMA, co-locate new ROWs within existing ROWs where possible.

Action LR-1.10—PHMA would be avoidance areas for leases/land use authorizations, which could be for agricultural, occupancy, or filming. Leases/land use authorizations 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.

Land Tenure Adjustment

Action LR-1.11—Lands classified as PHMA and GHMA for GRSG would be retained in federal management unless: (1) the BLM can demonstrate that disposal of the lands would provide a net conservation gain to GRSG or (2) the BLM can demonstrate that the disposal of the lands would have no direct or indirect adverse impact on conservation of GRSG. See **Figure 2-4**, Retention/Disposal—Alternative C and Proposed Plan (**Appendix A**).

Action LR-1.12—PHMA would be a priority in consideration of land acquisitions. Consider GRSG for all land tenure actions.

Recommend Land Withdrawals

Action LR-1.13—No withdrawn from minerals on BLM surface.

Action LR-1.14—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.)

Range Management (RM)

Management Actions

Action RM-1.1—Grazing would be allowed on all lands identified as suitable (approximately 32,945 acres). See **Figure 2-5**, Grazing Allotments—Alternatives A, B, D and Proposed Plan Amendment (**Appendix A**).

Action RM-1.2—Allocate up to an estimated 5,780 animal unit months (AUM) to livestock in the long term (livestock use set at 25% of average annual forage production).

Action RM-1.3—Within PHMA, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through allotment management plans (AMP) or permit renewals. Develop standards with State of North Dakota and USFWS.

Action RM-1.4—In PHMA, work cooperatively on integrated ranch planning within GRSG habitat so operations with deeded/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 (such as fire) and legal obligations.

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 PHMA, focusing on those containing riparian areas, including wet meadows, would 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.

Action RM-1.6—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. Local objectives would be developed at the field office level in partnership with NDGFD and USFWS, and incorporated into AMPs or livestock grazing permits as appropriate incorporating best available science.

Action RM-1.7—At the time a permittee or lessee voluntarily relinquishes a 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.

Implementation Management Action After Land Health Evaluations

Action RM-1.8—Develop specific objectives to conserve, enhance or restore PHMA based on ecological site descriptions (ESD) 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 RM-1.9—In PHMA, manage for vegetation composition and structure consistent with GRSG seasonal habitat objectives. ESDs can help determine whether or not the GRSG seasonal habitat objectives are consistent with the ecological site potential within the reference state. GRSG seasonal habitat objectives and ecological site potential within reference states are not always going to be the same.

Action RM-1.10—In PHMA, implement management actions (grazing decisions, AMP/Conservation Plan development, or other agreements) to modify grazing management to meet State of North Dakota seasonal GRSG habitat requirements, where allotment evaluations indicate land health assessments are not being met due to livestock. Consider singly, or in combination, changes in:

1. Season or timing of use;
2. Numbers of livestock (includes temporary non-use or livestock removal);
3. Distribution of livestock use;
4. Intensity of use; and
5. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats).

Action RM-1.11—During drought periods, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Management would continue to be in accordance with the Montana-Dakotas Drought Policy (**Appendix H**, Drought Policy).

Riparian Areas and Wet Meadows

Action RM-1.12—Where riparian and wetland areas are already meeting standards, they would be maintained in that condition or better. Where a site's capability is less than proper functioning condition (PFC), BLM would manage to achieve or move towards capability.

- 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.

Action RM-1.13—In PHMA, where riparian areas and wet meadows meet PFC, strive to move towards GRSG habitat objectives within capabilities of the reference state vegetation relative to the ESD.

- Example: Within PHMA, reduce where necessary hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Utilize fencing/herding techniques, seasonal use, or livestock distribution changes where necessary to reduce pressure on riparian or wet meadow vegetation used by GRSG in the hot season (summer).

Action RM-1.14—Authorize new water development for diversion from spring or seep source only when PHMA would be maintained or benefit from the development. This includes developing new water sources for livestock as part of an AMP/Conservation Plan to improve GRSG habitat.

Action RM-1.15—Analyze springs, seeps and associated pipelines at time of grazing lease renewal 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.

Treatments to Increase Forage for Livestock/Wild Ungulates

Action RM-1.16—In PHMA, allow treatments that conserve, enhance or restore GRSG habitat as well as other priority species habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat).

Action RM-1.17—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.

Structural Range Improvement and Livestock Management Tools

Action RM-1.18—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 objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable 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 RM-1.19—When developing or modifying water developments in PHMA, use applicable RDFs (**Appendix B**, Greater Sage-Grouse Habitat Required Design Features) to mitigate potential impacts from West Nile virus.

Action RM-1.20—In PHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) during grazing lease renewal process to make sure they conserve, enhance or restore GRSG habitat.

- To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas within PHMA based on proximity to lek, lek size, and topography.
- Monitor for, and treat invasive species associated with existing range improvements.

Fluid Minerals (FM)

Management Objectives

Objective FM-1.1—Priority would be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority would be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities would be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR, Part 3162.3-1(h).

Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM would work with the lessees, operators, or other project proponents to avoid, minimize, and apply compensatory mitigation for adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM would work with the lessee, operator, or project proponent in developing an application for permit to drill (APD) for the lease to avoid and minimize impacts on GRSG or its habitat and would ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases.

Management Actions

Unleased Federal Fluid Mineral Estate

Action FM-1.1—Open to oil and gas leasing and development; however, surface occupancy and use would be prohibited within PHMA (NSO). Upon expiration or termination of existing leases, apply NSO. See **Figure 2-6**, Unleased Fluid Mineral Leasing Categories—Alternative D and Proposed Plan (**Appendix A**).

No waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation would be granted.

The BLM Authorized Officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action:

(i) Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or,

(ii) Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG.

Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMPA. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits would endure for the duration of the proposed action's impacts.

Any exceptions to this lease stipulation may be approved by the BLM Authorized Officer only with the concurrence of the State Director. The BLM Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception would not be granted. Approved exceptions would be made publically available at least quarterly.

Action FM-1.2—In GHMA, surface occupancy and use would be subject to special operating constraints (controlled surface use [CSU]) (**Appendix C**, Oil and Gas Stipulations).

Action FM-1.3—Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA.

Action FM-1.4—Allow geophysical operations by existing roads and trails, or helicopter-portable drilling methods, and in accordance with seasonal timing restrictions and/or other restrictions that may apply.

Leased Federal Fluid Mineral Estate

Action FM-1.5—During implementation level review and decisions, (e.g., approval of an APD and Sundry Notice) and upon completion 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: (1) Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights; and (2) Whether the action is in conformance with the approved RMP.

Conservation Measure #1: The following operating constraints would be applied to existing leases as COA in PHMA and GHMA. Exceptions may be granted by the BLM Authorized Officer if an environmental review demonstrates that effects could be mitigated to an acceptable level, habitat for the species is not present in the area, or portions of the area can be occupied without affecting a particular species. Exceptions may also be granted where the short-term effects 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.

a. Surface disturbing/disruptive activities would prevent 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.
b. Manage water developments to reduce the spread of West Nile virus within GRSG habitat areas.
c. Site and/or minimize linear ROW to reduce disturbance to sagebrush habitats.
d. Maximize placement of new utility developments (power lines, pipelines, etc.) and transportation routes in existing ROWs.
e. Power lines would be buried, eliminated, designed or sited in a manner which does not impact GRSG.
f. Placement of other high profile structures, exceeding 10 feet in height, would be eliminated, designed or sited in a manner which does not impact GRSG.
g. Remote monitoring of production facilities must be utilized and all permit applications must contain a plan to reduce the frequency of vehicle use.
h. Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, top-soiling and re-vegetating cut and fill slopes. Utilize native grass species mix which includes sagebrush and forbs.
i. Restore disturbed areas at final reclamation to pre-disturbance conditions or desired plant community. Utilize native grass species mix which includes sagebrush and forbs.
j. Permanent (longer than 2 months) structures which create movement must be designed or sited to minimize impacts on GRSG.
k. 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.

Conservation Measure #2: Make applicable RDFs (**Appendix B**) mandatory as COA within PHMA.

Solid Minerals (SM)
Management Actions
Coal
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). See **Figure 2-7**, Coal Resources—Alternative D and Proposed Plan (**Appendix A**).
Action SM-1.2—*Sub-surface mines* - Grant no new mining leases unless all surface disturbances (appurtenant facilities) are placed outside of PHMA.
Action SM-1.3—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. • Use additional, effective mitigation to offset impacts as appropriate (determined by local options/needs).
Locatable Minerals
Action SM-1.4—In PHMA, proposed actions under Plan of Operations and Notices would be analyzed on a case-by-case basis in cooperation with the State of North Dakota, and RDFs (**Appendix B**) would be applied to the extent consistent with applicable law. See **Figure 2-8**, Locatable Minerals—Alternatives A, D and Proposed Plan (**Appendix A**). *Note: Locatable mineral exploration and development under the mining laws are not discretionary actions; however, Notices and Plan of Operation are reviewed to prevent unnecessary or undue degradation to resources.*
Mineral Materials
Action SM-1.5—Close PHMA to mineral material sales. See **Figure 2-9**, Mineral Materials—Alternatives B, D and Proposed Plan (**Appendix A**).
Action SM-1.6—In PHMA, restore salable mineral pits[1] no longer in use to meet GRSG habitat conservation objectives.
Nonenergy Leasable Minerals
Action SM-1.7—Close PHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine.
Action SM-1.8 —For existing nonenergy leasable mineral leases in PHMA, follow the same RDFs applied to fluid minerals (**Appendix B**), when wells are used for solution mining.

[1]Although there are no authorized mineral pits in the planning area, any trespass pits found in the planning area would be subject to restoration.

Mineral Split Estate

Action SM-1.9—Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs 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.

Action SM-1.10—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.

Fire and Fuels Management (FF)

Management Actions

Fuels Management

Action FF-1.1—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 a priority area.
- If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan 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;
    - a risk assessment to address how potential threats to GRSG habitat would be minimized.
- Prescribed fire as a vegetation or fuels treatment shall 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 shall 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.
- 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, non-native 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 pre-treatment 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.

Action FF-1.2—Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area.

Action FF-1.3—In PHMA, 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 FF-1.4—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 I**, GRSG Wildfire and Invasive Species Habitat Assessment).

Fire Operations

Action FF-1.5—In PHMA, prioritize suppression, immediately after life and property, to conserve the habitat. See **Appendix I**, which would be completed to help further refine fire management actions once this plan is completed.

Action FF-1.6—In GHMA, prioritize suppression where wildfires threaten PHMA.

Action FF-1.7—Follow the most current BMPs/RDFs for fire and fuels (**Appendix B**).

Emergency Stabilization and Rehabilitation

Action FF-1.8—In PHMA, prioritize native seed allocation for use in GRSG habitat in years when preferred native seed is in short supply. This may require reallocation of 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, non-native seeds may be used as long as they meet GRSG habitat conservation objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.

Action FF-1.9—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, etc., to achieve and maintain the desired condition of ES&R projects to benefit GRSG.

Action FF-1.10—In PHMA, consider potential changes in climate when proposing post-fire seedings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed.

Habitat Restoration/Vegetation Management (HV)

Management Objectives

Objective HV-1.1—In all 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)

Management Actions
Action HV-1.1—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 RMRS-GTR-326: Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and greater sage-grouse: A strategic multi-scale approach (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.
Action HV-1.2—Consideration for other threatened, endangered or sensitive species would be evaluated in addition to GRSG when prioritizing restoration projects.
Action HV-1.3—Include GRSG habitat parameters as defined by State of North Dakota Sage-Grouse conservation plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within PHMA the highest restoration priority, along with other priority species habitat.
Action HV-1.4—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, non-native seeds may be used as long as they support GRSG habitat objectives.
Action HV-1.5—Design post restoration management to ensure long-term persistence in PHMA. This could include changes in livestock grazing management, travel management, etc., to achieve and maintain the desired condition of the restoration effort that benefits GRSG.
Action HV-1.6—In PHMA, consider potential changes in climate when proposing restoration seedings when using native plants. Consider collection from the warmer component of the species current range when selecting native species.
Action HV-1.7—In PHMA, restore native (or desirable) plants and create landscape patterns which most benefit GRSG, as well as other priority species.
Action HV-1.8—Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) a high priority for restoration efforts in PHMA. Prioritize areas for juniper removal to benefit GRSG habitat.
Action HV-1.9—In PHMA 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.

Required Design Features

RDFs are means, measures, or practices intended to reduce or avoid adverse environmental impacts. This RMPA/EIS proposes a suite of design features that would establish the minimum specifications for water developments, certain mineral development, and fire and fuels management and would mitigate adverse impacts. These design features would be required to provide a greater level of regulatory certainty than through implementing BMPs.

In general, the design features 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., when 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 design features 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 B**.

2.7 ADAPTIVE MANAGEMENT, MONITORING, AND MITIGATION

2.7.1 Adaptive Management Plan

Due to low GRSG population numbers, the limited amount and quality of PHMA managed by the BLM, and limited decision space for management of valid existing rights, the North Dakota Greater Sage-Grouse Proposed RMPA/Final EIS will not include an adaptive management strategy in the Proposed Plan Amendment. The populations and habitats would be reviewed regularly occur and if a significant decline in GRSG or habitat is identified during the life of the plan, the BLM would work with the USFWS and NDGFD to identify the cause and would discuss ways to address the declines (see **Appendix F**).

The primary management threat to GRSG in the planning area is oil and gas development. Since population levels are so low, and habitat is limited, the action alternatives all constrained uses in PHMA. Examples are applying NSO stipulations under Alternative D and the Proposed Plan Amendment and no leasing under Alternatives B and C.

However, the difference in area of long-term surface disturbance between Alternatives B and C, and between Alternative D and the Proposed Plan Amendment is only 54 acres for BLM-administered minerals. This is because a large percentage of PHMA is underlain by private mineral estate, much of the federal mineral estate is already leased, and much of that is held by production (85 percent of the high potential federal mineral estate in PHMA is leased).

The following is from the Department of the Interior's Technical Guide on Adaptive Management, page 15:

> Adaptive management should only be considered in situations where management actions substantially influence the outcome. In certain situations, a management agency can only partially influence the resource system. For example, if an agency manages a relatively small area surrounded by private land, and the adaptive management project applies only to the agency-managed land, management activities on the private land may well dominate the effect of agency actions. In such a situation, adaptive management is unlikely to be useful.

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 will 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 F**. This framework describes the process that the BLM would use to monitor implementation and effectiveness of RMP decisions under Alternatives B, C, D, and the Proposed Plan Amendment. 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; and analysis and reporting method. 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 will 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 will 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 Amendment's goal outlined in **Section 2.6.2**, the intent of the North Dakota RMPA is to provide a net conservation gain to the species. In all GRSG habitat, 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. 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 F-2 in **Appendix F**. 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."

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 E**, Regional Mitigation Strategy).

Greater Sage-Grouse Conservation Team

The BLM would establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, 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 (hereafter, 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 Monitoring section). Subsequently, the Team would use these data to either modify the appropriate Regional Mitigation Strategy.

The BLM would invite governmental and Tribal partners to participate in this Team, including the NDGFD and USFWS, in compliance with the exemptions provided for committees defined in the Federal Advisory Committee Act (FACA) and the regulations that implement that act. 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, and 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 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 and 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 E**.

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. Some alternatives have been refined based on public comment. Under Alternatives B and C, surface coal mining in PHMA was revised from being found unsuitable to being found available for further consideration of coal leasing. Alternative C was revised to include a summary list of the conservation actions/constraints provided in other management actions to protect GRSG habitat that would apply to the ACEC. No new conservation actions/constraints were developed.

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 1988 North Dakota RMP 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, ROW development, and livestock grazing would also remain the same. The BLM would not modify existing or establish additional criteria to guide the identification of site-specific use levels for implementation activities.

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 the North Dakota RMP for other resources (e.g., cultural and riparian), 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

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) 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 RMPA/EIS proposes a suite of design features that would establish the minimum specifications for water developments, certain mineral development, and fire and fuels management and would mitigate adverse impacts. These design features would be required to provide a greater level of regulatory certainty than through implementing BMPs.

In general, the design features 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., when 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 design features 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 B**.

Table 2-3, Comparative Summary of Allocation Decisions of the Proposed Plan Amendment and Draft Alternatives, summarizes select proposed decisions and **Table 2-4**, Description of Alternatives A, B, C, and D, includes details of all proposed decisions. **Appendix B** provides RDFs and **Appendix C** describes stipulations for oil and gas leasing and surface-disturbing activities.

2.8.3 Alternative B

GRSG conservation measures in *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011) were used to form 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 a NTT in August 2011. The BLM's objective was to provide a starting point to be used in BLM's RMPs to conserve and restore the GRSG and its habitat long term and range-wide on BLM-administered lands. Conservation measures under Alternative B are focused on PHMA (areas that have the highest conservation value for 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 of approximately 33,030 acres 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 areas for new land use authorizations (approximately 32,900 acres) and GHMA would be designated as ROW avoidance areas for new land use authorizations (approximately 80 acres). PHMA would be retention. Lands within PHMA would be recommended for mineral withdrawal, and other withdrawals in PHMA would need to be consistent with GRSG conservation measures.

Range Management. Grazing would be allowed on all lands identified as suitable (approximately 32,945 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 would implement actions to modify grazing management to meet GRSG habitat requirements. Within PHMA, Alternative B would only allow treatments that conserve, enhance, or restore GRSG habitat for increasing forage for livestock. Structural range improvements and livestock management tools in PHMA would need to be designed to conserve, enhance, or restore GRSG habitat through and improved grazing management system relative to GRSG objectives.

Energy and Mineral Development. PHMA would be closed to fluid mineral leasing (approximately 61,197 acres), and existing parcels in PHMA would not be eligible for leasing nominations following expiration or termination. However, helicopter exploration would be allowed in PHMA, only in accordance with applicable restrictions. Existing leases in PHMA would be subject to conservation measures through RMP implementation decisions and on completion of the environmental record of review. Surface coal mining would be restricted (approximately 87,443 acres), and no subsurface coal mining disturbances or facilities would be allowed in PHMA. All PHMA (approximately 46,397 acres) would be closed to mineral materials 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 by less than 15 percent, unless a fuels management objective were to require additional reduction in sagebrush cover to meet strategic protection of PHMA and to conserve habitat quality for the species.

Habitat Restoration/Vegetation Management. The BLM would prioritize implementation of restoration projects. Decisions would be 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 the highest restoration priority.

Special designations. GRSG habitat would not be designated as an ACEC. PHMA and GHMA 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 opportunities 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. Similar to Alternative B, Alternative C would limit motorized travel to existing roads, primitive roads, and trails at a minimum of approximately 33,030 acres. Route construction in PHMA and GHMA would be limited to realignments of existing designated routes. Alternative C would have the most restrictive requirements for constructing routes to existing valid rights, requiring a four-mile buffer from leks (GRSG display and breeding grounds). 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.

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

Lands and Realty. Under Alternative C, PHMA and GHMA would be designated as ROW exclusion areas of approximately 32,980 acres. Lands within PHMA and GHMA would be recommended for mineral withdrawal, and other withdrawals in PHMA and GHMA would need to be consistent with GRSG conservation measures. Alternative C would have the most restrictions on ROW development and withdrawals.

Range Management. Alternative C would allow livestock grazing on all lands identified as suitable (approximately 32,945 acres). However, livestock grazing would be reduced on all grazing allotments within the Big Gumbo area (large block of BLM-administered land shown in **Figure 2-10**, Grazing Allotments—Alternative C, **Appendix A**) by 50 percent. 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. Alternative C would provide the most restrictions on forage treatments and range improvements by allowing only treatments or improvements that conserve, enhance, or restore GRSG habitat in both PHMA and GHMA.

Energy and Mineral Development. Under Alternative C, PHMA and GHMA would be closed to fluid mineral leasing (approximately 66,293 acres); existing parcels in PHMA would not be eligible for leasing nominations following expiration or termination. Helicopter exploration would be allowed in PHMA and GHMA only in accordance with applicable restrictions. Existing leases in PHMA and GHMA would be subject to conservation measures as COAs, during the project and well permitting stages, and through RMP decisions on completion of the environmental record of review. Management of coal, mineral materials, nonenergy leasable minerals, and locatable minerals would be similar to that under Alternative B except applied to GHMA as well as PHMA. Surface and subsurface coal mining would be restricted (approximately 166,207 acres). Alternative C would have the most restrictions on energy and mineral development.

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 implementation of restoration projects. This would be based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. The BLM would make meeting habitat restoration within PHMA and GHMA the highest priority. Alternative C would provide the most opportunities for restoration and vegetation management.

Special Designations. All PHMA would be designated as an ACEC to protect GRSG habitat (32,900 acres; see **Appendix D**, 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 under this alternative 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, wildlife, and fish habitat. This alternative incorporates local adjustments to *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011) 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 B, Alternative D would limit OHV travel to existing roads, primitive roads, and trails at a minimum of approximately 33,030 acres. Similar to Alternative B, route construction in PHMA and GHMA would be limited to realignments of existing designated routes. However, construction of access to valid existing rights would be less restrictive. Alternative D would emphasize restoration of nondesignated roads, primitive roads, and trails in both PHMA and GHMA.

Recreation. Recreation management would be the same as Alternative B.

Lands and Realty. Under Alternative D, PHMA would be designated as ROW avoidance areas of approximately 32,900 acres; wind energy authorizations would be excluded from PHMA and avoidance in GHMA. GHMA would be open to ROW development and would be evaluated on a case-by-case basis. No lands would be recommended for mineral withdrawal.

Range Management. Grazing would be allowed on all lands identified as suitable (approximately 32,945 acres). Within PHMA, GRSG habitat objectives and management considerations developed with the NDGFD and USFWS would be incorporated into all BLM grazing allotments through AMPs or permit renewals. Similar to Alternative B, the BLM would prioritize completion of land health assessments in PHMA, and Alternative D would allow forage treatments and range improvements in PHMA that conserve, enhance, or restore GRSG habitat.

Energy and Mineral Development. PHMA and GHMA would be open to oil and gas leasing and development; however, surface occupancy and use would be prohibited within PHMA (NSO) and have specific constraints in GHMA (CSU). Geophysical exploration and development restrictions would be applied to protect leks. Existing leases in PHMA and GHMA would be subject to conservation measures through RMP implementation decisions and on completion of the environmental record of review. Operating constraints would also be applied to existing leases as COAs. Surface mining of coal in PHMA would be considered unsuitable (approximately 87,443 acres). Subsurface coal mining disturbances and facilities would be allowed in PHMA only if facilities could not be located outside these areas. Management of mineral materials, nonenergy leasable minerals, and locatable minerals would be similar to that under Alternative B.

Fire and Fuels Management. This would be similar to management under Alternative B; however, sagebrush canopy cover would not be reduced less than eight percent, unless a fuels management objective were to require additional reduction in sagebrush cover. This would be required to meet strategic protection of PHMA and to conserve habitat quality for the species.

Habitat Restoration/Vegetation Management. This would be similar to management under Alternative B; however, the BLM would prioritize

implementation of restoration projects to include reducing conifer encroachment as well as benefiting other priority species. The BLM would make meeting habitat restoration objectives within PHMA the highest restoration priority, along with other priority species.

Special Designations. GRSG habitat would not be designated as an ACEC. PHMA would be protected and managed consistent with the identified management actions and constraints.

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 Proposed RMPA/Final EIS. Combined with the appendices and maps, **Table 2-3** 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 2-3
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 (with no PHMA/GHMA delineation) (acres)	**33,030**	**50**	**50**	**50**	**50**
PHMA—All ownerships (acres)	0	461,070	461,070	461,070	461,070
PHMA—BLM (acres)	**0**	**32,900**	**32,900**	**32,900**	**32,900**
GHMA—All ownerships (acres)	0	242,301	242,301	242,301	242,301
GHMA—BLM (acres)	**0**	**80**	**80**	**80**	**80**
Livestock Grazing (BLM surface)					
AUMs	5,780	5,780	3,739	5,780	5,780
Open for all classes of livestock grazing (acres)	32,945	32,945	32,945	32,945	32,945
Not allocated to livestock grazing (acres)	85	85	85	85	85
Comprehensive Travel and Transportation Management (BLM surface acres)					
Limited to existing routes for OHVs	33,030	33,030	33,030	33,030	33,030
Lands and Realty (BLM surface acres)					
ROW exclusion areas	0	32,900	32,980	0	0
ROW avoidance areas	0	80	0	32,900	32,900[1]
Available for disposal	3,436	80	0	80	80

Table 2-3
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
Coal (acres)					
Available for further consideration of coal leasing with surface restrictions	0	87,443	166,207	87,443	87,443
Available for further consideration of coal leasing	242,743	155,300	76,536	155,300	155,300
Fluid Mineral Leasing (Federal minerals under BLM, School Trust land, Private surface acres)					
Closed to fluid mineral leasing (no lease)	0	61,197	66,293	0	0
Open to fluid mineral leasing	73,435	12,238	7,142	73,435	73,435
Standard terms and conditions (i.e., not subject to NSO or CSU stipulations)	25,130	12,238	7,142	7,142	7,142
NSO	9,780	0	0	61,197	61,197
CSU	21,235	0	0	5,096	5,096
Timing limitation (TL)	38,504	0	0	0	0
Locatable Minerals, Mineral Materials, and Nonenergy Solid Leasable Minerals (Federal minerals under BLM, School Trust land, Private surface acres)					
Recommend for withdrawal from locatable mineral entry	0	46,397	49,970	0	0
Open to locatable mineral exploration or development	56,681	10,284	6,711	56,681	56,681
Closed to mineral materials disposal	0	46,397	49,970	46,397	46,397

Table 2-3
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
Open for consideration for mineral materials disposal	56,681	10,284	6,711	10,284	10,284
Closed to nonenergy solid leasable mineral exploration and development	0	46,397	49,970	0	0
Open for consideration of nonenergy solid leasable mineral exploration or development	56,681	10,284	6,711	56,681	56,681
Areas of Critical Environmental Concern (acres)					
Greater Sage-Grouse ACEC	0	0	32,900	0	0

[1]Wind authorizations are excluded from PHMA and avoidance in GHMA.

2.10 DETAILED DESCRIPTION OF DRAFT ALTERNATIVES

2.10.1 How to Read Table 2-4

The following describes how **Table 2-4**, 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 2005). 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 uses, or 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 (NSO and CSU, which fall under the allowable uses category) 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 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
RMPA 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.			
Objectives: • Maintain or improve breeding habitat and/or nest sites for threatened and endangered (T&E) species and migratory birds of high federal interest. • Improve nesting and winter habitat for GRSG.	Objective: • Protect PHMA from anthropogenic (human-caused) disturbances that would reduce distribution or abundance of GRSG. o Manage or restore PHMA so that at least 70% of the land cover provides adequate sagebrush habitat to meet GRSG needs. o Manage PHMA so that discrete anthropogenic disturbances cover less than 3% of the total GRSG habitat.	Objective: • Protect PHMA from anthropogenic disturbances that would reduce distribution or abundance of GRSG.	Objective: • Same as Alternative C.
Habitat Delineation: No similar delineation.	Habitat Delineation: Delineate PHMA[2] to encompass the 100% Breeding Bird Density map: 32,900 BLM surface acres (7% of total PHMA acres[3]). Since mapping 75% of breeding bird density map misses the majority of GRSG habitat in North Dakota, 100% was used. See **Figure 1-1** (**Appendix A**).	Habitat Delineation: Same as Alternative B.	Habitat Delineation: Same as Alternative B.
Habitat Delineation: No similar delineation.	Habitat Delineation: Delineate GHMA to encompass the remainder of the habitat: 80 BLM surface acres.	Habitat Delineation: Same as Alternative B.	Habitat Delineation: Same as Alternative B.
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 2003c). See **Figure 2-1** (**Appendix A**).	Action: In PHMA and GHMA, 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. See **Figure 2-1** (**Appendix A**).	Action: Same as Alternative B. See **Figure 2-1** (**Appendix A**).	Action: Same as Alternative B. See **Figure 2-1** (**Appendix A**).
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 2003c).	Action: In PHMA, travel management would evaluate the need for permanent or seasonal road or area closures.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: In PHMA, travel management would evaluate the need for permanent, or seasonal, road or area closures where vehicle use is causing or would cause adverse effects upon habitat.
Action: Through site-specific planning, the BLM would designate roads and trails for motorized use. Roads and	Action: In PHMA, complete activity level travel plans within 5 years of the ROD. During activity level planning,	Action: Same as Alternative B, except applies to both	Action: Same as Alternative C.

[1]Goals and objectives for resources and resource uses are based on the 1988 North Dakota RMP and ROD, along with associated amendments, activity and implementation level plans, and other management decision documents. Sources for management actions are provided where applicable.
[2]For the alternatives, the terms PHMA and GHMA are being used; PH and GH habitats were mapped in each state for interim management, and are explained in **Chapter 3**, Affected Environment.
[3]See **Table 1-1**, Land Ownership within the Planning Area, for a summary of acres in planning area.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
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 2003c).	where appropriate, designate routes in PHMA with current administrative/agency purpose or need to administrative access only.	PHMA and GHMA.	
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, eliminates the need to construct a new road, or is necessary for motorist safety.	Action: In PHMA and GHMA, limit route construction to realignments of existing designated 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. Mitigate any impacts with methods that have been demonstrated to be effective to offset the loss of GRSG habitat.	Action: In PHMA, limit route construction to realignments of existing designated 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. Allow new routes/realignments in PHMA and GHMA during site-specific travel planning if it improves GRSG habitat and resource conditions.
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 constructed 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 necessary to offset the resulting loss of GRSG habitat (see Objectives).	Action: Same as Alternative B, except applies to PHMA and GHMA - using a 4-mile buffer from leks to determine road route.	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 constructed 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, is necessary for motorist safety, or 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: Same as Alternative B, except applies to PHMA and GHMA.
Action: No similar action.	Action: In PHMA, conduct restoration of roads, primitive roads and trails not designated in travel management plans.	Action: Same as Alternative B except, applies to both PHMA and GHMA.	Action: Same as Alternative B, except applies to PHMA and GHMA—when travel plans are complete.
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 in PHMA and GHMA, primitive roads and trails, use appropriate native seed mixes and require the use of transplanted sagebrush.	Action: Same as Alternative B, except applies to PHMA and GHMA.
Recreation			
Action: Approve or deny use authorization as requested by the public for all competitive recreational and commercial uses, and as required for private and group uses; provide special designations as needed to preserve future options (BLM 1988a).	Action: Only allow SRPs that would have neutral or beneficial effects on PHMA.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Lands and Realty			
Rights-of-Way			
Action: 33,030 acres of BLM-administered land surface are open for consideration of ROWs (67,571 acres in the North Dakota RMP for the entire NDFO). ROWs on the following areas would be avoided unless there is no reasonable alternative: environmental sensitive areas such as crucial wildlife habitats, wetlands, slump areas, and extensive wooded areas (BLM 1988a). See **Figure 2-11**, Rights-of-Way—Alternative A (**Appendix A**).	Action: PHMA would be managed as exclusion area for new ROW authorizations. See **Figure 2-12**, Rights-of-Way—Alternative B (**Appendix A**). Consider the following: • Subject to valid existing rights: where new ROWs associated with valid existing rights are required, co-locate 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 cannot be accessed via existing roads, then build any new road constructed 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 effective mitigation necessary to offset the resulting loss of GRSG habitat.	Action: PHMA and GHMA would be managed as exclusion areas for new ROW authorizations. See **Figure 2-13**, Rights-of-Way—Alternative C (**Appendix A**). Consider the following: • Subject to valid existing rights: where new ROWs associated with valid existing rights are required, co-locate 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 cannot be accessed via existing roads, then build any new road constructed 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. Action: Do not site wind energy development in PHMA and GHMA.	Action: PHMA would be managed as ROW avoidance area. See **Figure 2-14**, Rights-of-Way—Alternative D (**Appendix A**). • Where new ROWs are required, co-locate new ROWs within existing ROWs or where it best minimizes impacts on GRSG and GRSG habitat. Action: Make PHMA exclusion area for new ROW wind energy authorizations.
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 existing power lines within PHMA.
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 (road, fence, well, etc.) 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: Same as Alternative B.
Action: 33,030 acres of BLM-administered land surface (67,571 in the North Dakota RMP for the entire NDFO) are open for consideration of ROWs. ROWs on the following areas would be avoided unless there is no reasonable alternative: environmental sensitive areas such as crucial wildlife habitats, wetlands, slump areas, and extensive wooded areas (BLM 1988a).	Action: Make GHMA avoidance areas for new ROWs.	Action: See above (GHMA ROW exclusion areas).	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.
Action: ROWs would be placed within or adjacent to existing ROW whenever possible given engineering and environmental constraints (BLM 1988a).	Action: Where new ROWs are necessary in GHMA, co-locate new ROWs within existing ROWs where possible.	Action: No similar action.	Action: Same as Alternative B.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Action: In the planning area, 33,030 acres of BLM-administered land surface (67,571 in the North Dakota RMP for the entire NDFO) are open for consideration for authorized uses.	Action: No similar action.	Action: No similar action.	Action: PHMA would be avoidance areas for leases/land use authorizations, which could be for agricultural, occupancy, or filming. Leases/land use authorizations 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.
Land Tenure Adjustment			
Action: Evaluate lands for possible disposal or exchange giving high relative weight for retention to lands that have T&E species or habitats, contain high-quality riparian habitat, or contain plant and animal populations of exemplary natural communities of high interest to the state (BLM 1988a). See **Figure 2-15**, Retention/Disposal—Alternative A (**Appendix A**). Action: Public land in the Big Gumbo consolidation area is available for exchange only (BLM 1988a). Action: 3,436 acres of BLM-administered surface are available for disposal in the planning area (BLM 1988a).	Action: Retain public ownership of PHMA. See **Figure 2-16**, Retention/Disposal—Alternatives B and D (**Appendix A**). 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 would 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). See **Figure 2-4** (**Appendix A**).	Action: Same as Alternative B. See **Figure 2-16** (**Appendix A**).
Action: Follow the State Director criteria for acquisition (**Appendix G**, Land Pattern Review and Land Adjustment); this includes criteria for Special Status Species.	Action: Where suitable conservation actions cannot be achieved in PHMA, seek to acquire school trust and private lands with intact subsurface mineral estate by donation, purchase or exchange in order to best conserve, enhance or restore GRSG habitat.	Action: Strive to acquire important private lands in ACECs (PHMA). Acquisition would be prioritized over easements.	Action: PHMA would be a priority in consideration of land acquisitions. Consider GRSG for all land tenure actions.
Recommend Land Withdrawals			
Action: No areas currently withdrawn from minerals on BLM surface.	Action: Recommend lands within PHMA for mineral withdrawal.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative A.
Action: Review withdrawals to determine whether, and for how long, the withdrawal would be consistent with the objective of the programs for which the lands were withdrawn and for consistency with other relevant programs. Revoke those not needed (BLM 1988a).	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: Grazing would be allowed on all lands identified as suitable (approximately 32,945 acres) (BLM 1988a). See **Figure 2-5** (**Appendix A**).	Action: Maintain retirement of permitted grazing use as an option in PHMA when the current permittee is willing to retire grazing on all or part of an allotment. Analyze the	Action: Maintain retirement of permitted grazing use as an option in PHMA and GHMA when the current permittee is willing to retire grazing on all or part of an allotment.	Action: Same as Alternative A. See **Figure 2-5** (**Appendix A**).

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Action: Allocate up to an estimated 5,780 AUMs to livestock in the long term (BLM 1988a). (Livestock use is set at 25% of average annual forage production.)	adverse impacts of no livestock use on wildfire and invasive species threats in evaluating retirement proposals. See **Figure 2-5** (**Appendix A**). Action: Allocate up to an estimated 5,780 AUMs to livestock in the long term.	Action: Livestock grazing would be reduced on all grazing allotments within the Big Gumbo area by 50% (2,041 AUMs reduced). See **Figure 2-10** (**Appendix A**). Action: Allocate up to an estimated 3,739 AUMs to livestock in the long term.	
Action: Montana/Dakotas Standards for Rangeland Health Standards #5: Habitats are maintained and/or restored, where appropriate, for healthy, productive and diverse populations of native plant and animal species (BLM 1997).	Action: Within PHMA, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through AMPs or permit renewals.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B except develop standards with State of North Dakota and USFWS. Within PHMA, incorporate State of North Dakota GRSG habitat objectives and management considerations into all BLM grazing allotments through AMPs or permit renewals.
Action: No similar action.	Action: In PHMA, work cooperatively on integrated ranch planning within GRSG habitat so operations with deeded/BLM allotments can be planned as single units.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Action: Areas with Category I allotments are the highest priority for processing authorizations, actively managing uses, and monitoring achievement of land health standards (BLM IM 2009-018, Process for Setting Priorities for Issuing Grazing Permits and Leases) (BLM 2008b).	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 ESDs to conduct land health assessments to determine if standards of rangeland health are being met.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Prioritize completion of land health assessments and processing grazing permits within PHMA, other priority species habitat areas, and important riparian habitat. Focus this process on allotments that have the best opportunities for conserving, enhancing or restoring habitat for GRSG or other priority species including T&E species. Utilize ESDs and other tools (e.g., PFC protocols, water quality information, and vegetation, habitat, riparian, monitoring data) to conduct land health assessments to determine if standards of rangeland health are being met.
Action: No specific GRSG habitat objectives in North Dakota RMP. Montana/Dakotas Standards for Rangeland Health Standards #5: Habitats are maintained and/or restored, where appropriate, for healthy, productive and diverse populations of native plant and animal species (BLM 1997). As indicated by: • Plants and animals are diverse, vigorous and reproducing satisfactorily. • Spatial distribution of species is suitable to ensure reproductive capability; these species may include special status species (threatened, endangered, candidate, species of special concern). • Species diversity (plants, animals, insects, and microbes) is present. • Connectivity of habitat or presence of corridors to prevent habitat fragmentation.	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. If local/state seasonal habitat objectives are not available, use GRSG habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	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. Local objectives would be developed at the field office level in partnership with NDGFD and USFWS, and incorporated into AMPs or livestock grazing permits as appropriate incorporating best available science.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Implementation Management Action After Land Health Evaluations			
Action: No similar action.	Action: 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: Same as Alternative B.
Action: No similar action.	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 GRSG seasonal habitat objectives. ESDs can help determine whether or not the GRSG seasonal habitat objectives are consistent with the ecological site potential within the reference state. GRSG seasonal habitat objectives and ecological site potential within reference states are not always going to be the same.
Action: Implement grazing systems where necessary as determined from monitoring results (BLM 1988a).	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 (Connelly et al. 2011a). Consider singly, or in combination, changes in: 1. Season or timing of use; 2. Numbers of livestock (includes temporary non-use or livestock removal); 3. Distribution of livestock use; 4. Intensity of use; and 5. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, goats).	Action: In PHMA and GHMA, Implement management actions (grazing decisions, AMP/Conservation Plan development, or other plans or agreements) to modify grazing management to meet seasonal GRSG habitat requirements (Connelly et al. 2011a). Consider singly, or in combination, changes in: 1. Season, timing, and/or frequency of livestock use; 2. Numbers/AUMs of livestock (includes temporary non-use or livestock removal); 3. Distribution of livestock use; 4. Intensity of livestock use; and 5. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats).	Action: In PHMA, implement management actions (grazing decisions, AMP/Conservation Plan development, or other agreements) to modify grazing management to meet State of North Dakota seasonal GRSG habitat requirements, where allotment evaluations indicate land health assessments are not being met due to livestock. Consider singly, or in combination, changes in: 1. Season or timing of use; 2. Numbers of livestock (includes temporary non-use or livestock removal); 3. Distribution of livestock use; 4. Intensity of use; and 5. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats).
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 can 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 conditions (BLM 2004a; **Appendix H**).	Action: During drought periods, 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: During drought periods, prioritize evaluating effects of the drought in PHMA and GHMA relative to their biological needs, as well as drought effects on un-grazed reference areas. Since there is a lag in vegetation recovery following drought, ensure that post-drought management allows for vegetation recovery that meets GRSG needs in GRSG habitat areas based on GRSG habitat objectives.	Action: During drought periods, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Management would continue to be in accordance with the Montana-Dakotas Drought Policy (**Appendix H**).

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Riparian Areas and Wet Meadows			
Action: Improve functioning-at-risk and non-functioning riparian areas and wetlands towards PFC. Maintain PFC riparian and wetland areas.	Action: Manage riparian areas and wet meadows for PFC within PHMA. • 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 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. • Within 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 mortality during the late brood-rearing period.	Action: Where riparian and wetland areas are already meeting standards, they would be maintained in that condition or better. Where a site's capability is less than PFC, BLM would manage to achieve or move towards capability. • 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.
Action: Maintain PFC riparian and wetland areas.	Action: In PHMA, where riparian areas and wet meadows meet PFC, strive to attain reference state vegetation relative to the ESD. • Example: Within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Utilize fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in the hot season (summer).	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: In PHMA, where riparian areas and wet meadows meet PFC, strive to move towards GRSG habitat objectives within capabilities of the reference state vegetation relative to the ESD. • Example: Within PHMA, reduce where necessary hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Utilize fencing/herding techniques, seasonal use, or livestock distribution changes where necessary to reduce pressure on riparian or wet meadow vegetation used by GRSG in the hot season (summer).
Action: Water sources would be developed where needed (as indicated by monitoring) to improve livestock distribution and wildlife habitat. Development of range improvements on erodible soils would be avoided during the period April through June (BLM 1988a).	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: Authorize new water development for diversion from spring or seep source only when PHMA would be maintained or benefit from the development. This includes developing new water sources for livestock as part of an AMP/Conservation Plan to improve GRSG habitat.
Action: Water sources would be developed where needed (as indicated by monitoring) to improve livestock distribution and wildlife habitat (BLM 1988a).	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 at time of grazing lease renewal 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.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Treatments to Increase Forage for Livestock/Wild Ungulates			
Action: Conduct land treatments where outlined in activity plans as necessary for effective range management (600 acres were tentatively identified for treatments in North Dakota Grazing EIS; BLM 1988a). Action: Certain pesticides, biological and other control means are authorized on BLM-administered lands (BLM 2007).	Action: In PHMA, only allow treatments that conserve, enhance or restore GRSG habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat).	Action: In PHMA and GHMA, ensure that vegetation treatments create landscape patterns which most benefit GRSG. Only allow treatments that are demonstrated to benefit GRSG and retain sagebrush height and cover consistent with GRSG habitat objectives (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat).	Action: In PHMA, allow treatments that conserve, enhance or restore GRSG habitat as well as other priority species habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat).
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 currently 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: Same as Alternative B.
Structural Range Improvement and Livestock Management Tools			
Action: Management fences would be constructed where necessary to support grazing systems or treatments. All fences would be designed to protect and/or benefit wildlife. Development of range improvements on erodible soils would be avoided during the period April through June (BLM 1988a). Action: Waters necessary for wildlife and adversely affected by uncontrolled livestock use would be fenced. Gaps would be provided for livestock use. Development of range improvements on erodible soils would be avoided during the period April through June (BLM 1988a).	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 objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable 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: Avoid all new structural range developments and location of supplements (salt or protein blocks) in PHMA and GHMA unless independent peer-reviewed studies show that the range improvement structure or nutrient supplement placement benefits GRSG. Structural range developments, in this context, include but are not limited to cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable 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. Consider the comparative cost of changing grazing management instead of constructing additional range developments.	Action: Same as Alternative B.
Action: Water sources would be developed where needed (as indicated by monitoring) to improve livestock distribution and wildlife habitat (BLM 1988a).	Action: When developing or modifying water developments in PHMA, use applicable RDFs (**Appendix B**) to mitigate potential impacts from West Nile virus.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Action: Management fences would be constructed where necessary to support grazing systems or treatments. All fences would be designed to protect and/or benefit wildlife. Development of range improvements on erodible soils would be avoided during the period April through June (BLM 1988a).	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 mortality, remove, modify or mark fences in high risk areas within PHMA based on proximity to lek, lek size, and topography. • 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 high risk areas of moderate or high risk of GRSG strikes within PHMA based on proximity to lek, lek size, and topography • Monitor for, and treat invasive species associated with existing range improvements.	Action: In PHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) during grazing lease renewal process to make sure they conserve, enhance or restore GRSG habitat. • To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas within PHMA based on proximity to lek, lek size, and topography. • Monitor for, and treat invasive species associated with existing range improvements.
FLUID MINERALS			
Unleased Federal Fluid Mineral Estate			
Action: Make available for leasing, under necessary special stipulations and Montana BLM Standard Stipulations, 206,811 acres[4] of Federal oil and gas (BLM 1988a). See **Appendix C** for stipulations. See **Figure 2-17**, Unleased Fluid Mineral Leasing Categories—Alternative A (**Appendix A**).	Action: Close PHMA to fluid mineral leasing. Upon expiration or termination of existing leases, do not accept nominations/expressions of interest for parcels within priority areas. See **Figure 2-18**, Unleased Fluid Mineral Leasing Categories—Alternative B (**Appendix A**).	Actions: Close PHMA and GHMA to fluid mineral leasing. Upon expiration or termination of existing leases, do not accept nominations/expressions of interest for parcels within PHMA or GHMA. See **Figure 2-19**, Unleased Fluid Mineral Leasing Categories—Alternative C (**Appendix A**).	Action: Open to oil and gas leasing and development; however, surface occupancy and use would be prohibited within PHMA (NSO). Upon expiration or termination of existing leases, apply NSO. See **Figure 2-6** (**Appendix A**). Action: In GHMA surface occupancy and use would be subject to special operating constraints (CSU) (**Appendix C**).
Action: No similar action.	Action: Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA. Action: Allow geophysical operations only by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other restrictions that may apply.	Action: Allow geophysical exploration within PHMA and GHMA to obtain exploratory information for areas outside of and adjacent to GRSG habitat areas. Action: Only allow geophysical operations by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and/or other restrictions that may apply. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood rearing and winter habitats during their season of use by GRSG.	Action: Same as Alternative B.
Leased Federal Fluid Mineral Estate			
Action: Review all lands (206,811 acres) that fall within identified resource concern areas (Map 4 of North Dakota RMP) and attach necessary oil and gas stipulations (BLM 1988a). Action: No seismic exploration, construction, or other	Action: In PHMA, apply the following conservation measures through RMP implementation decisions (e.g., approval of an APD, Sundry Notice) and upon completion of the environmental record of review (43 CFR, Part 3162.5), including appropriate documentation of	Action: In PHMA and GHMA, apply the following conservation measures as COA at the project and well permitting stages, and through RMP implementation decisions and upon completion of the environmental record of review (43 CFR, Part 3162.5), including	Action: During implementation level review and decisions, (e.g., approval of an APD, Sundry Notice) and upon completion of the environmental record of review (43 CFR, Part 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among

[4]These acres are from the 1988 North Dakota ROD (BLM 1988a) and include all federal minerals. See **Table 2-3** and **Section 3.8**, Fluid Minerals, for current acres and breakdown by surface ownership.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
development allowed within 2 miles of strutting grounds between March 1 and June 15. NSO within 0.25 mile of active GRSG strutting grounds (BLM 1988a). Action: TL within 2 miles of GRSG display grounds (from 3/1-6/15). NSO within 0.25 mile of center of GRSG display grounds (BLM 2003b). Action: Also follow standards and guidelines found in *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development.* (DOI and USDA 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 to public lands or other resources. BMPs may be incorporated as a COA (Source—Onshore Oil and Gas Order Number 1, II. Definitions [43 CFR, Part 3160]).*	compliance with NEPA. In this process evaluate, among other things: (1) Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights; and (2) Whether the action is in conformance with the approved RMP. Conservation Measure #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 around the lek, and limit permitted disturbances to 1 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 1 per section with no more than 3% surface disturbance 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. Conservation Measure #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. Conservation Measure #3: Closely examine the applicability of categorical exclusions in PHMA. If extraordinary circumstances review is applicable, BLM would determine whether or not those circumstances exist. Conservation Measure #4: Complete Master Development Plans in lieu of APD-by-APD processing for all but wildcat wells. Conservation Measure #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 Objectives). o When necessary, conduct additional, effective mitigation in 1) PHMA or—less preferably—2) GHMA (dependent upon the area-specific ability to increase GRSG	appropriate documentation of compliance with NEPA. In this process evaluate, among other things: (1) Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights; and (2) Whether the action is in conformance with the approved RMP. Conservation Measure #1: Same as Alternative B, except applies to both PHMA and GHMA. Conservation Measure #2: Apply a seasonal restriction on exploratory drilling that prohibits surface-disturbing activities during the nesting and brood-rearing season in PHMA and GHMA during this period. This seasonal restriction shall also to apply to related activities that are disruptive to GRSG, including vehicle traffic and other human presence. Conservation Measure #3: Same as Alternative B, except applies to both PHMA and GHMA. Conservation Measure #4: Same as Alternative B, except applies to both PHMA and GHMA. Conservation Measure #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 Objectives). o When necessary, conduct additional, effective mitigation in PHMA and GHMA (dependent upon the area-specific ability to increase GRSG populations). o Conduct additional, effective mitigation first 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, per 2006 WAFWA Strategy—pg. 2-17. Conservation Measure #6: Same as Alternative B, except applies to both PHMA and GHMA. Conservation Measure #7: Same as Alternative B, except applies to both PHMA and GHMA. Conservation Measure #8: Same as Alternative B, except applies to both PHMA and GHMA. Conservation Measure #9: Same as Alternative B, except applies to both PHMA and GHMA.	other things: (1) Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights; and (2) Whether the action is in conformance with the approved RMP. Conservation Measure #1: The following operating constraints would be applied to existing leases as COA in PHMA and GHMA. Exceptions may be granted by the BLM Authorized Officer if an environmental review demonstrates that effects could be mitigated to an acceptable level, habitat for the species is not present in the area, or portions of the area can be occupied without affecting a particular species. Exceptions may also be granted where the short-term effects 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. a) Surface disturbing/disruptive activities would prevent 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. b) Continuous noise (related to long-term operations and/or activities) would be no greater than 49 decibels at 0.25 mile from the perimeter of the lek. c) Temporary noise (related to installation, maintenance, one-time use, emergency operations, etc.) exceeding 49 decibels at 0.25 mile from the perimeter of a lek or surface disturbing/disruptive activities may be allowed, but only from 10 a.m. to 4 p.m. between March 15 and May 15. d) Manage water developments to reduce the spread of West Nile virus within GRSG habitat areas. e) Site and/or minimize linear ROW to reduce disturbance to sagebrush habitats. f) Maximize placement of new utility developments (power lines, pipelines, etc.) and transportation routes in existing ROWs. g) Power lines would be buried, eliminated, designed or sited in a manner which does not impact

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
	populations). o Conduct additional, effective mitigation first 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, per 2006 WAFWA Strategy—pg. 2-17. Conservation Measure #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. Conservation Measure #7: Identify areas where acquisitions (including subsurface mineral rights) or conservation easements, would benefit GRSG habitat. Conservation Measure #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 the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM would perform the work. Conservation Measure #9: Make applicable RDFs (**Appendix B**) mandatory as COA within PHMA.		GRSG. h) Placement of other high profile structures, exceeding 10 feet in height, would be eliminated, designed or sited in a manner which does not impact GRSG. i) Remote monitoring of production facilities must be utilized and all permit applications must contain a plan to reduce the frequency of vehicle use. j) Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, top-soiling and re-vegetating cut and fill slopes. Utilize native grass species mix which includes sagebrush and forbs. k) Restore disturbed areas at final reclamation to pre-disturbance conditions or desired plant community. Utilize native grass species mix which includes sagebrush and forbs. l) Permanent (longer than 2 months) structures which create movement must be designed or sited to minimize impacts on GRSG. m) Consider use of off-site mitigation within the same PHMA (e.g., creation of sagebrush habitat, improving brood rearing habitat, purchase conservation easements) with proponent dollars to offset habitat losses (Washington Office -IM 2013-14[BLM 2012e]). n) Consider creation of 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 based on the estimated cost of habitat treatments or other mitigation needed to maintain the functions of impacted habitats. Off-site mitigation would only be considered 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. Conservation Measure #2: Make applicable RDFs (**Appendix B**) mandatory as COA within PHMA.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Solid Minerals			
Coal			
No similar action. The North Dakota RMP examined 24 Coal Screening Areas as having coal development potential (none of these 1,009,648 acres evaluated were within the planning area). Although the planning area was not identified as having coal development potential, it was also not identified as unsuitable; therefore, any applications for coal leasing would require additional site-specific NEPA to determine suitability. See **Figure 2-20**, Coal Resources—Alternative A (**Appendix A**).	Action: In PHMA, apply the requirement of 43 CFR, Part 3461 to determine unsuitability; then, if criteria set forth in 43 CFR, Part 3461.5 are met, find unsuitable all surface mining of coal. See **Figure 2-21**, Coal Resources—Alternative B (**Appendix A**).	Action: In PHMA, apply the requirement of 43 CFR, Part 3461 to determine unsuitability; then, if criteria set forth in 43 CFR, Part 3461.5 are met, find unsuitable all surface mining of coal. See **Figure 2-22**, Coal Resources—Alternative C (**Appendix A**).	Action: In PHMA, apply the requirement of 43 CFR, Part 3461 to determine unsuitability; then, if criteria set forth in 43 CFR, Part 3461.5 are met, find unsuitable all surface mining of coal. See **Figure 2-7** (**Appendix A**).
Action: Although the planning area was not identified as having coal development potential, it was also not identified as unsuitable; therefore, any applications for coal leasing would require additional site-specific NEPA.	Action: *Sub-surface mines* - Grant no new mining leases unless all surface disturbances (appurtenant facilities) are placed outside of PHMA.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Sub-surface mines - Grant no new mining leases unless all surface disturbances (appurtenant facilities) are placed outside of PHMA. Action: Place any new appurtenant facilities associated with Federal coal lease outside of PHMA. Where new appurtenant facilities cannot be located outside the PHMA, co-locate new facilities within existing disturbed areas. If this is not possible, then build any new appurtenant facilities to the absolute minimum standard necessary.
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. • Use additional, effective mitigation to offset impacts as appropriate (determined by local options/needs).	Action: No similar action.	Action: Same as Alternative B.
Locatable Minerals			
Action: All the federally-reserved locatable mineral deposits, excluding acquired minerals and minerals that are withdrawn to protect resource values and uses, are open to mineral entry (BLM 1988a). See **Figure 2-8** (**Appendix A**). Action: Manage the locatable, salable, and nonenergy leasable minerals program to at least the minimum acceptable levels addressed in the maintenance and operations guidelines, as established for the Montana BLM organization (BLM 1988a).	Action: In PHMA, propose withdrawal from mineral entry based on risk to the GRSG and its habitat from conflicting locatable mineral potential and development. See **Figure 2-23**, Locatable Minerals—Alternative B (**Appendix A**). • Make any existing claims within the withdrawal area subject to validity exams or buy out. Include claims that have been subsequently determined to be null and void in the proposed withdrawal. • In Plan of Operations required prior to any proposed surface disturbing activities, include the	Action: Same as Alternative B, except applies to both PHMA and GHMA. See **Figure 2-24**, Locatable Minerals—Alternative C (**Appendix A**).	Action: In PHMA, proposed actions under Plan of Operations and Notices would be analyzed on a case-by-case basis in cooperation with the State of North Dakota, and RDFs (**Appendix B**) needed to prevent unnecessary or undue degradation would be applied to the extent consistent with applicable law. See **Figure 2-8** (**Appendix A**). *Note: Locatable mineral exploration and development under the mining laws are not authorized under the discretion of the Field Manager, but Notices and Plan*

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
	following: o Additional, effective mitigation in perpetuity for conservation (In accordance with existing policy, Washington Office IM 2008-204 [BLM 2008c]). Example: purchase private land and mineral rights or severed subsurface mineral rights within the priority area and deed to US Government). o Consider seasonal restrictions if deemed effective. Action: RDFs needed to prevent unnecessary or undue degradation would be applied to the extent consistent with applicable law (**Appendix B**).		*of Operation are reviewed to prevent unnecessary or undue degradation to resources.*
Mineral Materials			
Action: All the federally-reserved salable and nonenergy leasable mineral deposits are available for application (BLM 1988a). See **Figure 2-25**, Mineral Materials—Alternative A (**Appendix A**).	Action: Close PHMA to mineral material sales. See **Figure 2-9** (**Appendix A**).	Action: Same as Alternative B, except applies to both PHMA and GHMA. See **Figure 2-26**, Mineral Materials—Alternative C (**Appendix A**).	Action: Same as Alternative B. See **Figure 2-9** (**Appendix A**).
Action: No North Dakota RMP direction; however, under the provisions of US 43 CFR, Part 3601.40-43, BLM may require submission of mining and reclamation plans before beginning any environmental review or issuing a mineral materials contract or permit.	Action: In PHMA, restore salable mineral pits[5] 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.
Nonenergy Leasable Minerals			
Action All the federally-reserved salable and nonenergy leasable mineral deposits are available for application (BLM 1988a).	Action: Close PHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Action: Manage the locatable, salable, and nonenergy leasable minerals program to at least the minimum acceptable levels addressed in the maintenance and operations guidelines, as established for the Montana BLM organization (BLM 1988a).	Action: For existing nonenergy leasable mineral leases in PHMA, follow the same RDFs applied to fluid minerals (**Appendix B**), when wells are used for solution mining.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Mineral Split Estate			
Action: The BLM manages 700 million acres of subsurface mineral estate nationwide, including approximately 58 million acres where the surface is privately owned. In many	Action: Where the federal government owns the mineral estate in PHMA, and the surface is in non-federal ownership, apply the conservation measures applied on	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 in non-federal ownership, apply the conservation measures applied on

[5]Although there are no authorized mineral pits in the planning area, any trespass pits found in the planning area would be subject to restoration.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
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. **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.	BLM-administered lands.		BLM-administered lands when the federal action (mineral development) occurs.
Action: No similar action.	Action: Where the federal government owns the surface, and the mineral estate is in non-federal ownership in PHMA, apply appropriate fluid mineral RDFs (**Appendix B**) to surface development.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Fire and Fuels Management			
Fuels Management			
Action: Prepare prescribed fire plans for vegetative manipulation where appropriate (BLM 1988a).	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	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% (Connelly et al. 2000; Hagen et al. 2007)	Action: Same as Alternative B, except the percent canopy cover would be 8%. Across their range, female GRSG usually select sagebrush patches for nests with shrub canopy cover of 15-25%, and avoid sparse or excessively dense patches (Connelly et.al. 2000). However, in southwestern North Dakota, hens may have to select

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
	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 a priority area. • 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 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, non-native 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 pre-treatment 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.	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 environmental assessment 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 and other xeric sagebrush species; Connelly et al. 2000; Hagen et al. 2007; Beck et al. 2009). However, if as a last resort and after all other treatment opportunities have been explored 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 (Brown 1982). • Design post fuels management projects to ensure long-term persistence of seeded or pre-treatment 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 (Eiswerth and Shonkwiler 2006).	different nest-site characteristics to maintain adequate canopy cover because of restricted patches of remaining sagebrush habitats, all of which are similar in habitat quality (Herman-Brunson 2007).

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
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: Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area.
Action: No similar action.	Action: In PHMA, 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: Same as Alternative B.
Fire Operations			
Action: Control wildfires on BLM-administered lands (BLM 1988a).	Action: In PHMA, prioritize suppression, immediately after life and property, to conserve the habitat. See **Appendix I**, 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 I**, which would be completed to help further refine fire management actions once this plan is completed.	Action: Same as Alternative B. See **Appendix I** which would be completed to help further refine fire management actions once this plan is completed.
Action: No similar action.	Action: In GHMA, prioritize suppression where wildfires threaten PHMA.	Action: No similar action.	Action: Same as Alternative B.
Action: No similar action.	Action: Follow RDFs (Washington Office IM 2013-128 [BLM 2013a]) (**Appendix B**).	Action: Same as Alternative B, except applies to both PHMA and GHMA. Follow RDFs in **Appendix B**.	Action: Follow the most current BMPs/RDFs for fire and fuels (**Appendix B**).
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 reallocation of 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, non-native seeds may be used as long as they meet GRSG habitat conservation objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.	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, etc., 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: Same as Alternative B.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Action: No similar action.	Action: In PHMA, consider potential changes in climate when proposing post-fire seedings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Habitat Restoration/Vegetation Management			
Action: Follow direction in Integrated Vegetation Management Handbook; no specific management action from North Dakota RMP.	Action: Prioritize implementation of restoration projects in PHMA based on environmental variables that improve chances for project success in areas most likely to benefit GRSG. • Prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution and/or abundance.	Action: Prioritize implementation of restoration projects in PHMA and GHMA based on environmental variables that improve chances for project success in areas most likely to benefit GRSG (Meinke et al. 2009). Action: Prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution and/or abundance and where factors causing degradation have already been addressed (e.g., changes in livestock management).	Action: Prioritize implementation of restoration projects in PHMA, including projects to reduce conifer encroachment, based on environmental variables that improve chances for project success in areas most likely to benefit GRSG as well as other priority species. • Prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution and/or abundance. Action: 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), 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: Include GRSG habitat parameters as defined by State of North Dakota Sage-Grouse conservation plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within PHMA the highest restoration priority, along with other priority species habitat.
Action: No similar action.	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, non-native seeds may be used as long as they support GRSG habitat objectives.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Action: No similar action.	Action: Design post restoration management to ensure long-term persistence in PHMA. This could include changes in livestock grazing management, travel management, etc., to achieve and maintain the desired condition of the restoration effort that benefits GRSG.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.
Action: No similar action.	Action: In PHMA, consider potential changes in climate when proposing restoration seedings when using native plants. Consider collection from the warmer component of the species current range when selecting native species.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Same as Alternative B.

Table 2-4
Description of Alternatives A, B, C, and D

Alterative A (No Action)[1]	Alternative B	Alternative C	Alternative D
Action: No similar action.	Action: In PHMA, restore native (or desirable) plants and create landscape patterns which most benefit GRSG.	Action: In PHMA and GHMA, exotic seedings would be rehabbed, inter-seeded, restored to recover sagebrush in areas to expand occupied habitats.	Action: In PHMA, restore native (or desirable) plants and create landscape patterns which most benefit GRSG, as well as other priority species.
Action: No similar action.	Action: Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) the highest priority for restoration efforts in PHMA.	Action: Same as Alternative B, except applies to both PHMA and GHMA.	Action: Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) a high priority for restoration efforts in PHMA. Prioritize areas for juniper removal to benefit GRSG habitat.
Action: No similar action.	Action: In PHMA 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 both PHMA and GHMA.	Action: Same as Alternative B.
Areas of Critical Environmental Concern			
Action: Although there are no current ACECs, the direction in the NDFO RMP is to make ACEC designations where critical resource values cannot be protected through other management actions (BLM 1988a).	Action: No ACECs would be designated in this alternative.	Action: PHMA would be designated as a GRSG ACEC to protect habitat (32,900 acres; **Appendix D**). See **Figure 2-27**, ACEC—Alternative C (**Appendix A**). Management actions for the GRSG ACEC would be the conservation actions and constraints identified in Alternative C above to protect GRSG habitat, as follows: • Limiting motorized travel to existing roads, primitive roads, and trails • Limiting route construction to realignments of existing designated routes • Limiting route construction to existing valid rights, requiring a 4-mile buffer from leks (GRSG display and breeding grounds) • Managing the ACEC as a ROW exclusion area • Reducing livestock grazing permitted AUMs by 50% on all four allotments in the Big Gumbo area, the largest piece of BLM-administered land in the ACEC • Closing the ACEC to fluid minerals leasing *(Note: BLM planning regulations require that all areas that meet the relevance and importance criteria be considered as an ACEC in at least one alternative.)*	Action: No ACECs would be designated in this alternative.

2.11 ALTERNATIVES ELIMINATED FROM DETAILED ANALYSIS

The following alternatives were considered, but not carried forward for detailed analysis because (1) they would not fulfill requirements of FLPMA or other laws or regulations, (2) they did not meet the purpose and need, (3) they were already part of a plan, policy, or administrative function, or (4) they did not fall within the limits of the planning criteria. The 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 North Dakota

No management actions from *A Report on National Greater Sage-Grouse Conservation Measures* concerning wild horse and burros are carried forward because there are no wild horses or burro herds managed by the NDFO.

2.11.2 Eliminate Livestock Grazing from BLM-Administered Lands

An alternative eliminating livestock grazing from all National System of Public Lands managed by the BLM in the planning area was not analyzed in detail. In accordance with IM 2012-169 (BLM 2012c) and BLM's Land Use Planning Handbook (BLM 2005), the BLM considered what range of alternatives was necessary to address unresolved conflicts among available resources. As a result of this process, an alternative reducing grazing use by 50 percent in the Big Gumbo area was developed in coordination with the USFWS and NDGFD. 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. Where appropriate, removal of livestock and adjustments to livestock use, have been incorporated into 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.

The North Dakota Greater Sage-Grouse RMPA/EIS planning area is located in the northwestern portion of the Great Plains Ecoregion (EPA 2011a) 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).

In addition to the inherent role of large herbivore grazing in maintaining ecosystem health within the planning area, current resource conditions on BLM-administered land, including range vegetation, watershed, and wildlife and GRSG

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 the healthy ecological systems are provided for future generations.

In particular, of the 32,945 acres in the planning area that have been assessed, 29,728 acres (90 percent) meet the Montana/Dakotas Standards for Rangeland Health and Guidelines for Livestock Grazing Management (BLM 1997). For the 3,217 acres not meeting one or more standards, current livestock uses were determined to be a causal factor on 1,309 acres. On these acres, corrective actions have been taken and progress is being made toward meeting standards. In the future, suitable measures, which could include reduction or elimination of livestock grazing, could become necessary in specific situations where livestock grazing causes or contributes to conflicts with the protection and/or management of other resource values or uses, including GRSG habitat needs. Such determinations would be made during site-specific activity planning or permit renewal and the associated environmental review. These determinations would be based on several factors, including monitoring studies, GRSG and other wildlife habitat conditions and needs, review of current range and wildlife management science, input from livestock operators and the interested public, and ability to meet the Standards for Rangeland Health.

With the exception of the Big Gumbo area, most of the BLM-administered land tracts in the planning area are small in size, isolated, and scattered. Eliminating livestock grazing on BLM-administered lands would require extensive fencing to segregate it from private and North Dakota school trust lands to prevent unauthorized livestock grazing. In some cases, maintenance of fences along public property boundaries would be very difficult and impractical due to terrain features. Additionally, the extensive fencing would create many new barriers for wildlife and GRSG movements. Also, eliminating livestock grazing on BLM-administered lands may accelerate agricultural conversion of native range and GRSG habitat on adjacent private lands as ranchers attempt to replace lost forage base.

2.12 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Table 2-5, Summary of Impacts on GRSG in North Dakota, presents a comparison summary of impacts to GRSG from management actions proposed for the four management alternatives. **Section 4.3**, Special Status Species—Greater Sage-Grouse, provides a more detailed impact analysis.

Table 2-5
Summary of Impacts on GRSG in North Dakota[1]

Resource/Resource Use	Alternatives A – D and Proposed Plan Amendment
Summary of Impacts on GRSG from Isolated/Small populations	Alternative A does not delineate any PHMA or GHMA; however, all action alternatives and the Proposed Plan Amendment delineate PHMA and GHMA. The action alternatives are in agreement with the following conservation measures identified in the COT report specific to PAC: • Retain GRSG habitats within PACs. • If PACs are lost to catastrophic events, implement appropriate restoration efforts. • Restore and rehabilitate degraded GRSG habitats in PACs.
Summary of Impacts on GRSG from Agriculture/Urbanization	Across all action alternatives and the Proposed Plan Amendment, the BLM would take advantage of opportunities to consolidate GRSG habitat. Alternative A technically allows for disposal of lands; however, GRSG habitat would be considered in the analysis. Although agriculture and urbanization have been identified as threats in North Dakota, the BLM has limited management authority over those types of activities. Many of these COT objectives are outside the scope of this planning document; however, see **Chapter 5** for Sage-Grouse Initiative (SGI) projects that have been completed on private lands within the GSRG habitat. The action alternatives and the Proposed Plan Amendment are in agreement with the following conservation options identified in the COT report specific to ex-urban development: • Acquire and manage GRSG habitat to maintain intact ecosystems. • Do not relinquish BLM-administered lands for the purpose of urban development in GRSG habitat.

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

Table 2-5
Summary of Impacts on GRSG in North Dakota[1]

Resource/Resource Use	Alternatives A – D and Proposed Plan Amendment
Summary of Impacts on GRSG from Oil and Gas Development	Alternative C closes PHMA and GHMA habitats to leasing, and Alternatives B closes PHMA to leasing. PHMA is open to leasing with NSO stipulations and GHMA is open to leasing with CSU stipulations under Alternative D and the Proposed Plan Amendment. Under the Proposed Plan Amendment, priority would be given to leasing and development outside of PHMA and GHMA. Since most of the high development potential has already been leased, and due to the small amount of BLM minerals in the planning area, the surface disturbance and well densities do not change significantly among the alternatives (even between the alternatives that have no lease vs. the no-action). The action alternatives and the Proposed Plan Amendment are in agreement with the following conservation measures identified in the COT report specific to energy development: • Avoid energy development in PACs (Doherty et al. 2010). Identify areas where leasing is not acceptable, or not acceptable without stipulations for surface occupancy that maintains GRSG habitats. • If avoidance is not possible within PACs due to pre-existing valid rights, adjacent development or split estate issues, development should only occur in non-habitat areas, including all appurtenant structures, with an adequate buffer that is sufficient to preclude impacts on GRSG habitat from noise and other human activities. By limiting disturbances within PHMA (Alternative B, C and D, and the Proposed Plan Amendment) and GHMA (Alternative C), the action alternatives and Proposed Plan Amendment would work towards the objective of reducing threats to intact shrubland. Alternative C would have more restrictions on fluid mineral development than Alternatives B and D, and the Proposed Plan Amendment, and Alternative A would have the fewest restrictions of all alternatives. The Proposed Plan Amendment would provide additional protections to GRSG and habitat by implementing density and disturbance caps, lek buffers, and regional mitigation, which would further support the COT report objectives.

Table 2-5
Summary of Impacts on GRSG in North Dakota[1]

Resource/Resource Use	Alternatives A – D and Proposed Plan Amendment
Summary of Impacts on GRSG from Mining	Alternatives B and C would be more protective to GRSG and GRSG habitat than Alternatives A and D (Alternative D is the same as B except locatable minerals are not withdrawn due to the very low potential). However, all the action alternatives are in agreement with the following COT conservation option: • Avoid new mining activities and/or any associated facilities within occupied habitat, including seasonal habitats. Mineral potential is low in the planning area for mineral materials, locatable minerals, and coal. This minimizes the impacts on GRSG from these activities.
Summary of Impacts on GRSG from Infrastructure	Alternatives B, C and D, and the Proposed Plan Amendment restrict ROWs in PHMA, which responds to the need (identified in the COT report) to stop population decline and habitat loss by eliminating activities known to negatively impact GRSG and their habitats through reduction in the threat of habitat loss, degradation and fragmentation. The action alternatives are in agreement with the following conservation objectives/options identified in the COT report specific to infrastructure: • Avoid development of infrastructure within PACs (objective). • Avoid construction of these features in GRSG habitat, both within and outside of PACs. • Restrictions limiting use of roads should be enforced. Alternative A, in general, has the least protections for GRSG and GRSG habitat from development of infrastructure. All alternatives and the Proposed Plan Amendment limit OHV use to existing roads and trails, but Alternative C also contains a 4-mile buffer from leks for route construction. All action alternatives and the Proposed Plan Amendment have limitations on route construction and realignments to minimize impacts on GRSG. The Proposed Plan Amendment would provide additional protections to GRSG and habitat by implementing density and disturbance caps, buffers, and regional mitigation, which would further support the COT report objectives.

Table 2-5
Summary of Impacts on GRSG in North Dakota[1]

Resource/Resource Use	Alternatives A – D and Proposed Plan Amendment
Summary of Impacts on GRSG from Fire Management	The alternatives and Proposed Plan Amendment are in agreement with the following conservation options from the COT report: • Renew and implement IM 2011-138 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management; BLM 2011b) until a decision is made on whether or not to incorporate the measure identified in the IM into RMPs. The measures in this IM are listed in **Appendix B** of this document (B.2.4 Required Design Features for Fire and Fuels).
Summary of Impacts on GRSG from Grazing	GRSG habitat considerations within livestock grazing allotments would be similar across all action alternatives and the Proposed Plan Amendment. Range improvements are more restricted under Alternative B than under Alternative A. Under all alternatives and the Proposed Plan Amendment, grazing would be managed to achieve the standards of rangeland health. Under Alternative A, this includes a biodiversity standard; however, under the action alternatives, specific GRSG habitat objectives would be developed (in cooperation with NDGFD and USFWS). Under the action alternatives and Proposed Plan Amendment, new range improvements would be approved if they conserve, enhance, or restore GRSG habitat. Alternative C would have the most protections for GRSG and GRSG habitat because of 50% reduction of AUMs in 4 large allotments.
Summary of Impacts on GRSG from Vegetation Management	The action alternatives and Proposed Plan Amendment are in agreement with the following conservation objective/conservation measures from the COT report: • Avoid sagebrush removal or manipulation in GRSG breeding or wintering habitats (objective). • Retain all remaining large intact sagebrush patches, particularly at low elevations.
Summary of Impacts on GRSG from Recreation	There are no areas open to off-road travel within the planning area in any alternative. All alternatives are in agreement with the following conservation option from the COT report: • Close important GRSG use areas to off-road vehicle use.

Table 2-6, Summary Comparison of Environmental Consequences, presents a comparison summary of impacts from management actions proposed for the four management alternatives. **Chapter 4** provides a more detailed impact analysis.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
SPECIAL STATUS SPECIES—GREATER SAGE-GROUSE				
See **Table 2-5,** for summary of impacts on GRSG.				
LANDS AND REALTY				
No impacts; decision area would remain open to ROWs.	32,900 acres managed as ROW exclusion area and 80 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.	ROW exclusion impacts same as Alternative B but include 80 additional acres of exclusion (32,980 total acres). In addition, prohibiting new road construction within 4 miles of active leks would limit such construction to 638 acres.	32,900 acres managed as ROW avoidance area (80 acres of GHMA would also be avoidance for wind energy) 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 to avoid BLM-administered lands. Managing wind energy as ROW exclusion in PHMA (32,900 acres) would prohibit this type of ROW development.	Managing 32,900 acres (PHMA and GHMA) as ROW avoidance for major ROWs, combined with additional RDFs for certain types of ROWs, would increase application processing time and costs. This would be because of the potential need to relocate facilities or because of greater design, mitigation, and siting requirements. Minor ROWs would be less impacted because PHMA would be managed as avoidance areas and GHMA as open with the application of

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

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
				RDFs. Density and disturbance caps, regional mitigation, and lek buffers could limit future authorizations in certain areas.
VEGETATION (INCLUDING NOXIOUS WEEDS; RIPARIAN AND WETLANDS)				
No ROW exclusion or avoidance areas and few measures to preclude new land use authorizations from degrading vegetative communities due to loss, alteration, and spread of invasive weeds.	ROW exclusion areas in PHMA (32,900 acres) would preclude loss or alteration of vegetation, and spread of invasive weeds in these areas from development. ROW avoidance areas in GHMA (80 acres) would likely reduce these types of disturbances to vegetation in these areas.	ROW exclusion areas in PHMA and GHMA (32,980 acres) would preclude loss or alteration of vegetation, and spread of invasive weeds from development in these areas.	ROW avoidance areas in PHMA and GHMA (32,980 acres) (except for managing wind energy as ROW exclusion in PHMA—32,900 acres) would reduce, but not eliminate loss or alteration of vegetation, and spread of invasive weeds from development in these areas.	Impacts would be reduced or precluded by ROW avoidance areas in PHMA and GHMA (32,980 acres) for high voltage transmission lines and large pipelines, ROW avoidance areas in PHMA for minor ROWs, and ROW exclusion areas in PHMA for wind and solar energy. This would include habitat disturbance, loss of vegetation, and spread of weeds in these areas. RDFs and BMPs would further reduce impacts in these areas.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Managing vegetation and sagebrush communities by Rangeland Health Standards, and managing riparian areas for PFC would reduce impacts by livestock, such as trampling and overuse of 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 promote the health of GRSG habitats, including sagebrush steppe, riparian areas, and wet meadows.	Grazing AUMs would be reduced to increase herbaceous cover for GRSG benefit. Livestock use of riparian zones would be limited to maintain PFC and benefit wildlife habitat. The reduction in grazing AUMs could facilitate fuel buildup and reduce species diversity.	Impacts from grazing would be similar to Alternative B; however, increased management flexibility under this alternative may improve vegetation conditions by targeting those areas that need most protection.	Impacts from grazing would be similar to Alternative D. For reviewing and processing grazing permits and leases in PHMA, the BLM would prioritize reviewing and processing, particularly in areas not meeting Land Health Standards.
Restrictions on fluid mineral leasing would protect vegetation from surface disturbance in the 9,780 acres where NSO stipulations would be applied and the 21,235 acres where CSU stipulations would be applied. Approximately 816 acres of short-term disturbance and 548 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable	PHMA would be closed to fluid mineral leasing, protecting vegetation in these areas from surface disturbance. Approximately 624 acres of short-term disturbance and 476 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on vegetation.	PHMA and GHMA would be closed to fluid mineral leasing, resulting in impacts similar as under Alternative B. Acres disturbed would be the same as Alternative B. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on vegetation.	Applying NSO stipulations to fluid mineral leasing on PHMA (61,197 acres) would protect vegetation from surface disturbance. Approximately 767 acres of short-term disturbance and 530 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on vegetation.	Impacts would be similar to Alternative D; however, priority would be given to leasing and development outside of PHMA and GHMA. Acres disturbed would be the same as Alternative D. Density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for vegetation by maintaining or

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
development of oil and gas would result in minimal impacts on vegetation.				restoring habitat and by limiting habitat disturbance in certain areas.
WILDLAND FIRE MANAGEMENT AND ECOLOGY				
No ROW exclusion or avoidance areas and few measures to preclude new land use authorizations could increase fire risk as a result of development from ROW authorizations. Some restrictions on fluid mineral surface occupancy, and seismic exploration, construction, and development near strutting grounds would decrease risk of fire due to less development, fewer vehicles, and less construction equipment, resulting in less of a chance of human ignition.	Management of PHMA (32,900 acres) as an exclusion area for new ROW authorizations and limitations on fluid mineral exploration and extraction in PHMA (61,197 acres), would indirectly affect fire management through a greater decreased risk of fire due to less development, fewer vehicles, and less construction equipment, resulting in less of a chance of human ignition.	Impacts from ROWs and fluid minerals would be similar to Alternative B, but would apply to both PHMA and GHMA (32,980 acres for ROW and 66,293 acres for fluid minerals).	ROW avoidance areas in PHMA and GHMA (32,980 acres) (except for managing wind energy as ROW exclusion in PHMA) and applying fluid minerals NSO stipulations on PHMA (61,197 acres) would indirectly affect fire management through a greater decreased risk of fire due to less development, fewer vehicles, and less construction equipment, resulting in less of a chance of human ignition.	ROW restrictions would be similar to those under Alternative D, though the Proposed Plan Amendment would place a greater degree of restrictions on GHMA. This could decrease the risk of human ignition. Impacts from mineral development would also be similar to those under Alternative D. There would be some additional restrictions on access and on the construction of new recreation facilities, both of which could decrease the risk of human ignitions.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Minimal restrictions on fuels management and fire control methods; therefore, fewer impacts on fire management and lower suppression costs.	Restrictions in PHMA (32,900 acres) such as not reducing sagebrush canopy cover to less than 15%, seasonal closures, no treatments in known winter range, restrictions on the use of fire to treat sagebrush in low precipitation zones, 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 GHMA and PHMA (32,980 acres).	Impacts from seasonal closures and restrictions would be similar to Alternative B; however, fuels management projects in PHMA (32,900 acres) would be designed to incorporate greater flexibility to maximize the acreage protected.	Impacts would be similar to those under Alternative D, but additional restrictions would be placed on the use of prescribed fire under this alternative, which would increase the cost of fuels management.
FLUID MINERALS				
There would continue to be 73,435 acres (100%) of federal oil and gas mineral estate open to oil and gas leasing. The 46,110 acres with high development potential for oil and gas would remain open to leasing, 9,583 acres (21%) of which would remain subject to an NSO stipulation, 17,427 acres (38%) of which would remain subject to a CSU	Open 12,238 acres (17%) of federal oil and gas mineral estate to future oil and gas leasing, an 83% decrease from Alternative A, and 61,197 acres (83%) of federal oil and gas mineral estate would be closed (compared with 0 acres under Alternative A). Of these closed acres, 7,056 (15%) have high potential and are unleased. These unleased high potential	Open 7,142 acres (10%) of federal oil and gas mineral estate to future oil and gas leasing, a 90% decrease from Alternative A, and 66,293 acres (90%) of federal oil and gas mineral estate would be closed (compared with 0 acres under Alternative A). Of these closed acres, 7,072 (15%) have high potential and are unleased. These unleased high potential	Open 73,435 acres (100%) of federal oil and gas mineral estate to oil and gas leasing. NSO and CSU stipulations restrict future exploration by identifying where surface-disturbing activities may not occur and the manner in which they may be implemented. 61,197 acres (83%) of federal oil and gas mineral	Impacts would be similar to Alternative D, except that the lack of waivers and modifications, combined with the limited exceptions for NSO stipulations, would further restrict oil and gas activities. Applying the density and disturbance caps in PHMA could impact both new and existing

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
stipulation, and 29,840 (65%) of which would remain subject to a TL. This represents the fewest restrictions of any alternative.	acres that would be closed represent approximately 100% of all unleased high potential acres in the decision area. Existing leases in areas closed to leasing would last through their lease term but would not be renewed. As a result of these closures and lease expirations, it would be difficult to access areas of high potential within the decision area. Open 7,194 unleased acres (28% of unleased acres in the decision area) to fluid mineral leasing. This includes 25 unleased acres with high oil and gas development potential and 7,169 unleased acres with low or no known oil and gas potential. These unleased acres would be open with standard stipulations. Because they have low or no known potential, allowing leasing	acres that would be closed represent approximately 100% of all unleased high potential acres in the decision area. Existing leases in areas closed to leasing would last through their lease term but would not be renewed. As a result of these closures and lease expirations, it would be difficult to access areas of high potential within the decision area. Open 3,523 unleased acres (14% of unleased acres in the decision area) to fluid mineral leasing. All of these acres have low or no known oil and gas development potential. These unleased acres would be open with no stipulations. Because they have low or no known potential, allowing leasing on these acres would have a negligible impact on fluid mineral resources.	estate subject to NSO stipulations. Of these acres, 7,056 (15%) have high potential and are unleased. These unleased high potential acres that would be subject to NSO stipulations represent approximately 100% of all unleased high potential acres in the decision area. Over 99% of the unleased high potential acres are in PHMA. When existing leases in PHMA and GHMA are renewed, they would be subject to new stipulations, which could result in difficultly accessing areas of high potential. 3,671 unleased acres (14% of unleased acres in the decision area) would be subject to CSU stipulations. This includes 16 unleased acres with high oil and gas development potential and 3,655 unleased acres with low or no known oil and gas potential.	oil and gas activities by preventing new surface development. New oil and gas activities could be precluded if this cap were exceeded in a BSU or a proposed project analysis area. 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. Regional mitigation and lek buffers would also potentially restrict siting.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	on these acres would have a negligible impact on fluid mineral resources. All existing leases on federal oil and gas estate in PHMA would be subject to RDFs applied as COAs. These COAs would place additional limits on siting, design, and operations of fluid mineral development.	All existing leases on federal oil and gas estate in PHMA would be subject to RDFs applied as COAs. These COAs would place additional limits on siting, design, and operations of fluid mineral development.	Open 3,523 unleased acres with standard stipulations. All of these acres have low or no known oil and gas development potential, meaning this action would have a negligible impact on fluid mineral resources in the decision area.	
Geophysical exploration would continue to be allowed in the decision area.	Geophysical exploration would be allowed, except for in PHMA, where geophysical exploration would be limited to casual use (foot traffic) or helicopter-portable methods on the 61,197 acres of federal oil and gas estate but would be subject to TLs and other restrictions, reducing exploration opportunities.	Geophysical exploration would be allowed, except for in PHMA and GHMA, where geophysical exploration would be limited to casual use (foot traffic) or helicopter-portable methods on the 66,293 acres of federal oil and gas estate but would be subject to TLs and other restrictions, reducing exploration opportunities.	Geophysical exploration would be similar to Alternative B within PHMA; however, exploration could also use existing roads and trails, subject to TLs; thereby allowing more opportunities for exploration than Alternative B.	Impacts would be the same as Alternative D.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
COAL				
No impacts; entire decision area open to coal.	There are no current coal mines, and no coal development is anticipated within GRSG habitat over the life of the North Dakota RMP. As a result, coal resources in the planning area are not expected to be impacted by management actions proposed in this RMPA. However, potential future development would be restricted or precluded as a result of suitability determinations in PHMA (87,443 acres) under Alternatives B and D, and the Proposed Plan Amendment and in PHMA and GHMA (166,207 acres) in Alternative C.			
LOCATABLE MINERALS				
No impacts; entire decision are open to locatable minerals.	No locatable mineral development is anticipated within GRSG habitat over the life of the North Dakota RMP. As a result, locatable minerals in the planning area are not expected to be impacted by management actions proposed in this RMPA. However, potential future development would be precluded in PHMA (46,397 acres) in Alternative B, and PHMA and GHMA (49,970 acres) in Alternative C.			
MINERAL MATERIALS				
No closures in decision area (0 acres closed to the disposition of salable minerals), resulting in the fewest restrictions on the disposition of mineral materials.	The amount of land closed to the disposition of salable minerals would increase to 46,397 acres, resulting in more restrictions on the disposition of mineral materials.	Impacts would be similar to Alternative B, except 49,970 acres closed to the disposition of salable minerals.	Impacts would be the same as Alternative B.	Impacts would be similar as Alternative B. Applying the density and disturbance caps in PHMA and lek buffers in PHMA and GHMA could impact mineral materials development by preventing new surface development. Mineral material activities could be precluded if the cap were exceeded in a BSU or a proposed project analysis area.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
				New surface development could be restricted if the cap were exceeded. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to mineral material development.
COMPREHENSIVE TRAVEL AND TRANSPORTATION MANAGEMENT				
Motorized wheeled travel would continue to be limited to existing routes, cross-country travel would continue to be prohibited, and there would be no acres where new route construction would be prohibited.	In PHMA (32,900 acres) new roads would only be allowed where access to valid existing rights is necessary and does not currently exist; therefore, restricting new roads and/or ROWs and access in these areas.	Impacts would be similar to Alternative B. Additionally, no new road construction would be allowed within 4 miles of active GRSG leks. The 4-mile lek buffers cover 32,342 acres (98% of the decision area); meaning new road construction would be limited to 638 acres in the decision area. This would preclude the construction of new roads where they might otherwise be needed to improve access or the functionality of the route	Impacts would be similar to Alternative B.	Impacts would be similar to Alternative B. Applying the lek buffer distances and density and disturbance caps on linear features (roads) could restrict development opportunities in PHMA. Ensuring a net conservation gain to GRSG under the regional mitigation strategy may require project proponents to avoid, minimize, or

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
		network.		apply compensatory mitigation for their potential impacts.
RECREATION				
BLM would continue to manage for dispersed recreation activities, particularly big game hunting.	Only allowing SRPs that have a neutral or beneficial effect on PHMA could limit future opportunities for SRPs in PHMA (32,900 acres).	Impacts would be similar to Alternative B, but would apply to both PHMA and GHMA (32,980 acres).	Impacts would be similar to Alternative C.	Impacts would be similar to Alternative B, except that restricting new recreation facilities in PHMA could result in a long-term reduction in recreation opportunities and activities in these areas.
Motorized and non-motorized road and trail based recreation opportunities, and the overall recreation experience would be maintained into the foreseeable future.	Permanent or seasonal closure of travel routes, and limitations on new road development could impact recreation by limiting motorized travel on routes used for access to hunting, fishing, and other popular recreation activities.	Prohibition of new road construction would limit motorized recreational use to the existing network of roads and trails. There would be no opportunity to accommodate any increase in recreational use or mitigate user conflicts by adding additional routes.	Impacts would be similar to Alternative B.	Impacts would be the same as Alternative B.
Potential impacts on recreation during construction and operation of facilities in ROWs.	A long-term reduction in the amount of acres in PHMA (32,900 acres) dedicated to ROWs through exclusion areas and	Impacts from ROW development would be similar to Alternative B, but would apply to both PHMA	ROW avoidance areas in PHMA and GHMA (32,980 acres) (except for managing wind energy as ROW exclusion in PHMA—32,900	Impacts from ROW management in PHMA would be similar to those under Alternative D.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Impacts on recreation users from oil and gas development would include activities and disturbance related to exploration, development, and operations, but would likely decline as the trend for new developments continues to decline.	above-ground linear features, such as transmission lines and pipelines, would improve recreation opportunities. Closure of PHMA (61,197 acres) to fluid mineral development would eliminate the potential for new oil and gas development conflicting with recreation users.	and GHMA (32,980 acres). Impacts from fluid mineral development would be similar to Alternative B, but would apply to both PHMA and GHMA (66,293 acres).	acres) would reduce, but not eliminate development conflicting with recreation users. NSO and CSU stipulations on fluid mineral development may minimize potential impacts on recreation by reducing disturbance related to these activities.	Compared to Alternative D, impacts from ROW management in GHMA would include reduced conflict. This would be due to ROW avoidance management for high-voltage transmission lines and large pipelines; however, conflicts would still be possible from minor ROW development. An added emphasis on locating fluid minerals leasing outside of PHMA and GHMA would protect recreational activities and opportunities in these areas. Density and disturbance caps, regional mitigation, and lek buffers could limit future placement of recreation facilities in certain areas.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
				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				
Disturbance to livestock including dust, displacement, and noxious weeds, could result from development of ROWs.	Management of PHMA as ROW exclusion area (32,900 acres) could slightly reduce the potential for disturbance of livestock, which covers the majority of the allotments in the planning area (and 26 out of 27 allotments in GRSG habitat).	Impacts from grazing would be similar to Alternative B but would be applied across PHMA and GHMA (32,980 acres). Due to restrictions on ROW development and reduction of grazing in PHMA, disruption of grazing from lands and realty actions would be limited.	PHMA managed as a ROW avoidance area (32,900 acres) and additionally, as an exclusion area for new wind energy ROW authorizations would minimize surface disturbing and activities disruptive to grazing.	Impacts would be similar to those discussed under Alternative D; however, there would be a greater degree of restriction on GHMA by managing GHMA as ROW avoidance for high-voltage transmission lines and large pipelines. This would provide additional reduction in surface disturbance and activities disruptive to grazing.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
				Density and disturbance caps, lek buffers, and regional mitigation strategy would also minimize livestock grazing disturbance from ROW.
Limited reasonably foreseeable development of oil and gas would result in minimal impacts on range management. 0 acres open to grazing and closed to fluid mineral development (BLM surface and federal minerals). Potential conflict could occur with fluid mineral development.	Limited reasonably foreseeable development of oil and gas would result in minimal impacts on range management. 30,370 acres open to grazing and closed to fluid mineral development (BLM surface and federal minerals). Potential for disturbance or conflicts with livestock grazing from fluid mineral development reduced.	Limited reasonably foreseeable development of oil and gas would result in minimal impacts on range management. 30,450 acres open to grazing and closed to fluid mineral development (BLM surface and federal minerals). Potential for disturbance or conflicts with livestock grazing from fluid mineral development reduced.	Limited reasonably foreseeable development of oil and gas would result in minimal impacts on range management. 30,370 acres open to grazing and NSO for fluid mineral development (BLM surface and federal minerals). Potential for disturbance or conflicts with livestock grazing from fluid mineral development reduced.	Impacts would be the same as those under Alternative D.
Changes to grazing management would occur for areas not meeting land health standards (approximately 1,309 acres as of last assessment).	Management actions to modify grazing management to meet seasonal GRSG habitat requirements could result in increased time and costs to be permitted or impact ability to fully utilize	Permitted level of AUMs in PHMA would be reduced by 50% in the Big Gumbo area resulting in a total of 3,739 permitted AUMs in the planning area. The reduction of permitted	Impacts from grazing management would be similar to Alternative B; however, standards would be developed at the field office level, in partnership with NDGFD and USFWS.	Impacts would be similar to those described under Alternative D. Assessment and changes to grazing management would be

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	permitted AUMs. Structural range improvements in PHMA would be permitted, but costs and time to construct these structures may be increased due to requirements to make structures conserve or enhance GRSG habitat.	grazing level has the potential to result in economic impacts on permittees. The reduction may also impact ability of permittees current seasonal rotations or other management strategies that utilize both public and private lands.		priorities in PHMA. It would be focused on areas not meeting Land Health Standards, with a further focus on those containing riparian areas. Adjustments to grazing management may be required to meet Land Health Standards and GRSG habitat objectives. The level of impacts would be determined on site specific review.
Vegetation could be managed to improve forage and impacts on range management from vegetation management would be minimal.	Implementation of projects to remove non-native species and improve habitat in PHMA could improve livestock forage but may also result in the need to adjust grazing management with potential for increased costs or time for permittees.	Impacts from vegetation management would be similar to Alternative B, but would apply to PHMA and GHMA. However, overall impacts would be reduced due to the reduction in grazing.	Similar to Alternative B, changes to livestock grazing systems could be required for post restoration management with potential impacts on costs or time for management by permittees. Projects to reduce conifer encroachment would also benefit range management by improving forage conditions in the long term.	Impacts would be similar to Alternative D. Conifer removal would be extended to all sagebrush habitat, improving forage conditions in the long term.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
AREAS OF CRITICAL ENVIRONMENTAL CONCERN				
No impacts; no ACEC would be designated.	Same as Alternative A.	Management within the new 32,900 ACEC would be equivalent to the management actions proposed under Alternative B, but with a grazing reduction and road closures within 4 miles of a lek. Reducing livestock grazing by 50% on all allotments in the Big Gumbo area would reduce the risk of trampling and loss of herbaceous understory cover in GRSG nesting habitat; however, it could contribute to increased fuel loading and risk of wildfire in these areas.	Same as Alternative A.	Same as Alternative A.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
AIR RESOURCES				
No changes to criteria air pollutant or hazardous air pollutant emissions would occur.	57% decrease in projected new producing wells on federal oil and gas estate would have the potential to result in fewer impacts due to decreased emissions associated with exploration and development of fluid minerals.	Impacts would be similar as under Alternative B, with slightly fewer new wells projected.	14% decrease in projected new producing wells on federal oil and gas estate would have the potential to result in fewer impacts due to decreased emissions associated with exploration and development of fluid minerals.	Impacts would be the same as those described under Alternative D.
CLIMATE				
No changes to greenhouse gas (GHG) emissions would occur.	57% decrease in projected new producing wells on federal oil and gas estate would have the potential to result in fewer impacts due to decreased GHG emissions associated with exploration and development of fluid minerals.	Impacts would similar as under Alternative B, with slightly fewer new wells projected	14% decrease in projected new producing wells on federal oil and gas estate would have the potential to result in fewer impacts due to decreased GHG emissions associated with exploration and development of fluid minerals.	Impacts would be the same as those described under Alternative D.
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	Impacts on soil resources would be similar to Alternative B, although impacts would be further reduced since protections would apply to both PHMA and GHMA (32,980 acres),	Impacts would be similar to Alternative B, though increased management flexibility under this alternative may improve soil resources by targeting those areas that need most	Impacts would be similar to those under Alternative D. However, there would be potential beneficial impacts on soils from applying the lek buffers

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	PHMA (32,900 acres).	and the BLM would apply additional mitigation requirements.	protection.	and density and disturbance caps. These measures could reduce the likelihood of loss or erosion of soil.
Soil conditions could continue to be degraded where land use authorizations were approved.	Managing 32,900 acres as ROW exclusion and 80 acres as ROW avoidance areas would reduce impacts on soil resources from surface disturbing activities related to ROW development.	Managing 32,980 acres as ROW exclusion would reduce impacts on soil resources from surface disturbing activities related to ROW development.	Managing 32,900 acres in PHMA as wind energy exclusion areas and 32,980 acres as ROW avoidance areas would reduce impacts on soil resources from surface disturbing activities related to ROW development.	Impacts would be similar to Alternative D. There would be a similar extent of acres managed as ROW avoidance or exclusion. Additionally, PHMA would be managed as ROW exclusion to wind and solar energy, thereby reducing these same types of impacts. Density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for soil resources by reducing disturbance in certain areas.
Restrictions on fluid mineral leasing would protect soil resources from	PHMA (61,197 acres) would be closed to fluid mineral leasing, protecting	Impacts from closing fluid minerals would be similar to Alternative B, but would	Applying NSO stipulations on PHMA (61,197 acres) would protect soil	Impacts would be similar to those described for

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
surface disturbance in the 9,780 acres where NSO stipulations would be applied and the 21,235 acres where CSU stipulations would be applied. Approximately 816 acres of short-term disturbance and 548 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on soils.	soil resources in these areas from surface disturbance and compaction. Approximately 624 acres of short-term disturbance and 476 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on soils.	apply to both PHMA and GHMA (66,293 acres). Approximately 621 acres of short-term disturbance and 475 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on soils.	resources from surface disturbance and compaction. Approximately 767 acres of short-term disturbance and 530 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on soils.	Alternative D. However, granting no waivers or modifications would provide more certainty of protections to soils from NSOs. Density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for soil resources by reducing disturbance in certain areas.
WATER RESOURCES				
Water quality could continue to be degraded where land use authorizations were approved.	Managing 32,900 acres as ROW exclusion and 80 acres as ROW avoidance areas would reduce impacts on water resources from surface disturbing activities related to ROW development.	Managing 32,980 acres as ROW exclusion would reduce impacts on water resources from surface-disturbing activities related to ROW development.	Managing 32,900 acres in PHMA as wind energy exclusion areas and 32,980 acres as ROW avoidance areas would reduce impacts on water resources from surface-disturbing activities related to ROW development.	Impacts would be similar to Alternative D. A similar amount of acres managed as ROW avoidance or exclusion. Additionally, PHMA would be managed as ROW exclusion to wind and solar energy ROWs, reducing these same

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
				type of impacts. Density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for water resources by reducing runoff and contamination in certain areas.
Erosion into waterways could occur as a result of grazing; however, implementing and meeting the Standards for Rangeland Health and Guidelines would minimize these impacts.	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 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 B.	Impacts would be similar as Alternative A with respect to the number of AUMs available and the acreage open for grazing; this would result in the same impacts on water resources. In addition, the BLM would prioritize reviewing and processing grazing permits and leases in PHMA, particularly in areas not meeting Land Health Standards. This would help to protect water resources.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Restrictions on fluid mineral leasing would protect water resources from potential erosion and contamination in the 9,780 acres where NSO stipulations would be applied and the 21,235 acres where CSU stipulations would be applied. Approximately 816 acres of short-term disturbance and 548 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on water resources.	PHMA (32,900 acres) would be closed to fluid mineral leasing, protecting water resources in these areas from potential erosion and contamination. Approximately 624 acres of short-term disturbance and 476 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on water resources.	Impacts from closing fluid minerals would be similar to Alternative B, but would apply to both PHMA and GHMA (32,980 acres). Approximately 621 acres of short-term disturbance and 475 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on water resources.	Applying NSO stipulations on PHMA (61,197 acres) would protect water resources from potential erosion and contamination. Approximately 767 acres of short-term disturbance and 530 acres of long-term disturbance on BLM-administered lands. However, limited reasonably foreseeable development of oil and gas would result in minimal impacts on water resources.	Impacts would be similar to those described for Alternative D. However, granting no waivers or modifications would provide more certainty of protections to water resources from NSOs. Density and disturbance caps, regional mitigation, and lek buffers offer incidental protection for water resources by reducing disturbance and contamination in certain areas.
SPECIAL STATUS SPECIES—OTHER SPECIES OF ISSUE				
No ROW exclusion or avoidance areas and few measures to preclude new land use authorizations from impacting species and habitat related to human disturbance and	ROW exclusion areas in PHMA (32,900 acres) would preclude future impacts from human disturbance and infrastructure in these areas from development. ROW	ROW exclusion areas in PHMA and GHMA (32,980 acres) would preclude future impacts from human disturbance and infrastructure in these areas.	ROW avoidance areas in PHMA and GHMA (32,980 acres) (except for managing wind energy as ROW exclusion in PHMA) would reduce future impacts from human disturbance and	ROW avoidance areas in PHMA and GHMA (32,980 acres) for high voltage transmission lines and large pipelines, ROW avoidance areas in

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
infrastructure.	avoidance areas in GHMA (80 acres) would likely reduce these types of impacts in these areas.		infrastructure from development in these areas.	PHMA for minor ROWs, and ROW exclusion areas in PHMA for wind and solar energy ROWs would reduce or preclude impacts, including habitat disturbance in these areas.
Managing vegetation and sagebrush communities by Rangeland Health Standards, and managing riparian areas for PFC would reduce special status species habitat alteration by livestock.	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 potential habitats, including sagebrush steppe, riparian areas, and wet meadows.	Grazing AUMs would be reduced to increase herbaceous cover for GRSG benefit. Livestock use of riparian zones would be limited to maintain PFC and benefit special status species habitat. The reduction in grazing AUMs could reduce rangeland health by facilitating fuel buildup.	Impacts from grazing would be similar to Alternative B, though increased management flexibility under this alternative may improve habitat conditions by targeting those areas that need most protection.	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 implementing RDFs and BMPs.
Impacts could continue to occur on 73,435 acres where BLM-administered surface lands and split - estate would be open to fluid mineral leasing. Of these, 19,569 acres of	61,197 acres of BLM-administered and split-estate lands would be closed to fluid mineral leasing and conservation measures would be applied on leased fluid mineral	66,293 acres, all of which would be Sprague's pipit distribution, would be closed to fluid mineral leasing and conservation measures would be applied on leased fluid mineral	No lands would be closed to fluid mineral leasing, but 61,197 acres, all of which is Sprague's pipit distribution, would be open to leasing, subject to an NSO stipulation. The BLM would	Impacts would be similar to Alternative D; however, leasing and development outside of PHMA and GHMA would be prioritized; this would

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Sprague's pipit distribution would be open to fluid mineral leasing. Impacts would be reduced on BLM-administered and split estate lands where NSO (9,780 acres), CSU (21,235 acres), or TL (38,504 acres) constraints would be applied. NSO and/or CSU would be applied on 31,014 acres of Sprague's pipit distribution.	estate and split-estate lands. These actions would reduce the likelihood and extent of impacts on the distribution of Sprague's pipit caused by fluid mineral development.	estate and split estate lands. These actions would reduce the likelihood and extent of impacts caused by fluid mineral development.	apply CSU and TL stipulations on the same GHMA as Alternative A. In addition, a number of operational constraints would be applied to existing leases as COAs in PHMA, which would reduce impacts on other special status species in these areas.	reduce but not avoid impacts on Sprague's pipit and other special status species distribution.
Fire and fuels management would not specifically protect sagebrush vegetation, although prescribed burning may be used where appropriate in support of resource management objectives, including improving special status species habitat condition.	Proposed modifications to fire and fuel management in PHMA (32,900 acres) would result in an increase in the protection of sagebrush vegetation and would thereby protect habitat for species that rely on this habitat.	Impacts from proposed modifications to fire and fuel management would be similar to Alternative B but would occur over a larger area, both PHMA and GHMA (32,980 acres).	Impacts from proposed modifications to fire and fuel management would be similar to Alternative B; however, fuels management projects in PHMA would be designed to incorporate greater flexibility to maximize the acreage protected.	Impacts would be similar to those under Alternative D, but the Proposed Plan Amendment would require Burn Plans and additional NEPA analysis. Additional restrictions would be placed on the use of prescribed fire. This could impact the ability to manage habitat for special status species, including Sprague's pipit.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Application of Integrated Vegetation Management Handbook policies would improve vegetation management in sagebrush habitat, thereby likely improving habitat conditions in these areas.	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 would habitat conditions in these areas.	Impacts from habitat restoration and vegetation management would be similar to Alternative B but would occur over a larger area, both PHMA and GHMA.	Impacts from habitat restoration and vegetation management would be similar to Alternative B; however, consideration of other threatened, endangered, or sensitive species may change the proportions of vegetation communities and habitat that would be protected in certain instances.	Impacts would be similar to those under Alternative D; however, conifer removal in GRSG habitat may beneficially or negatively impact other special status species, depending on their habitat requirements.
RENEWABLE ENERGY				
0 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, and there would continue to be no restrictions from ROW allocations on wind energy development.	32,900 acres would be managed as ROW exclusion, and 80 acres would be managed as ROW avoidance, including 3,606 acres considered to have "Good" or better wind potential. As a result, 97% of lands with "Good" or better wind potential that are open for ROW applications under Alternative A would become exclusion or avoidance areas under Alternative B, likely precluding wind energy	32,980 acres would be managed as ROW exclusion areas and would not be open for ROW applications (no areas would be managed as ROW avoidance). Within this ROW exclusion area, 3,686 of these acres are considered to have "Good" or better wind potential. As a result, 99% of lands with "Good" or better wind potential that are open for ROW applications under Alternative A would become exclusion areas	Impacts would be the same as Alternative B.	Impacts would be the same as Alternative B.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	development on BLM-administered lands.	under Alternative C, likely precluding wind energy development on BLM-administered lands.		
SOCIAL AND ECONOMIC CONDITIONS				
Existing contributions from oil and gas development on federal mineral estate in the decision area would continue. Employment and income associated with exploration, development and production of oil and gas would be 21 jobs and $778,000 in labor income. Payments to local governments associated with oil and gas royalties would be approximately $6.5 million and would support 116 jobs and $4 million in labor income.	Existing development would enable current contributions to continue from oil and gas development on federal mineral estate in the decision area. However, future development within PHMA found on unleased federal mineral estate with high potential would not occur since all federal mineral estate within PHMA would be Employment and income associated with exploration, development and production of oil and gas would be approximately 21 jobs and $764,000 in labor income. Payments to local governments associated with oil and gas royalties would be approximately $6.5 million and would	Existing development would enable current contributions to continue from oil and gas development on federal mineral estate in the decision area. Future development of unleased federal mineral estate would be restricted on PHMA as described in Alterative B. Restrictions would also be applied to GHMA; therefore, limitations on future development would be similar to those described in Alternatives B, but increased in intensity. Employment and income associated with exploration, development and production of oil and gas would be approximately 21 jobs and	Existing development would enable current contributions to continue from oil and gas development on federal mineral estate in the decision area. However, NSO stipulations within PHMA would apply to future leases and would preclude economic benefits from future development. Employment and income associated with exploration, development and production of oil and gas would be approximately 21 jobs and $764,300 in labor income. Payments to local governments associated with oil and gas royalties would be approximately $6.5 million and would	Impacts would be the same as Alternative D.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	support 114 jobs and $4 million in labor income.	$764,000 in labor income. Payments to local governments associated with oil and gas royalties would be approximately $6.4 million and would		
Use of allocated forage on allotments in the planning area would continue to generate an estimated 10 jobs (direct, indirect, and induced) and $20,311 in labor income (direct, ,indirect, and induced) on an average annual basis in the three-county impact area economy (Bowman, Golden Valley, and Slope Counties). This figure includes direct contributions of seven jobs, which would comprise about 5.6% of employment in this agricultural economic sector.	Impacts from grazing would be the same as under Alternative A.	Reducing AUMs by 50% on all allotments in the Big Gumbo area would decrease employment from 10 to 6 total jobs (direct, indirect, and induced). It would decrease labor income from $20,311 to $13,140 (direct, indirect, and induced) on an average annual basis in the impact area economy. This estimate includes a direct employment decrease from 7 jobs to 4, which would correspond to a decrease from 5.6 to 3.4% of employment in this sector.	Impacts from grazing would be the same as under Alternative A.	Impacts from grazing would be the same as under Alternative A.

Table 2-6
Summary Comparison of Environmental Consequences[2]

Alternative A *(No Action)*	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ENVIRONMENTAL JUSTICE				
While minority and low-income populations exist in the area, none of the minority or low-income populations meet the criteria (discussed in **Section 3.23**, Environmental Justice) to be considered environmental justice populations. None of 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.				

Chapter 3
Affected Environment

TABLE OF CONTENTS

Chapter Page

3. AFFECTED ENVIRONMENT 3-1

3.1 Changes Between the Draft EIS and Final EIS 3-1
3.2 Introduction 3-1
3.3 Organization of Chapter 3 3-2
3.3.1 WAFWA Management Zone Data 3-4
3.4 Special Status Species—Greater Sage-Grouse 3-5
3.4.1 Conditions of the Planning Area 3-6
3.4.2 Conditions on BLM-Administered Lands 3-14
3.4.3 Trends 3-15
3.5 Lands and Realty 3-15
3.5.1 Conditions of the Planning Area 3-18
3.5.2 Conditions on BLM-Administered Lands 3-20
3.5.3 Trends 3-22
3.6 Vegetation (Including Noxious Weeds; Riparian and Wetlands) 3-22
3.6.1 Conditions of the Planning Area 3-23
3.6.2 Conditions on BLM-Administered Lands 3-26
3.6.3 Trends 3-28
3.7 Wildland Fire Management and Ecology 3-29
3.7.1 Conditions of the Planning Area 3-30
3.7.2 Conditions on BLM-Administered Lands 3-31
3.7.3 Trends 3-32
3.8 Fluid Minerals 3-33
3.8.1 Conditions of the Planning Area 3-33
3.8.2 Conditions on BLM-Administered Lands 3-37
3.8.3 Trends 3-42
3.9 Coal 3-43
3.9.1 Conditions of the Planning Area 3-43
3.9.2 Conditions on BLM-Administered Lands 3-44
3.9.3 Trends 3-44
3.10 Locatable Minerals 3-44
3.10.1 Conditions of the Planning Area 3-45
3.10.2 Conditions on BLM-Administered Lands 3-45
3.10.3 Trends 3-45
3.11 Mineral Materials 3-45
3.11.1 Conditions of the Planning Area 3-46
3.11.2 Conditions on BLM-Administered Lands 3-46
3.11.3 Trends 3-46
3.12 Comprehensive Travel and Transportation Management 3-46
3.12.1 Conditions of the Planning Area 3-46
3.12.2 Conditions on BLM-Administered Lands 3-48
3.12.3 Trends 3-49
3.13 Recreation 3-49
3.13.1 Conditions of the Planning Area 3-49
3.13.2 Conditions on BLM-Administered Lands 3-50
3.13.3 Trends 3-51

3.14 Range Management....3-51
3.14.1 Conditions of the Planning Area....3-52
3.14.2 Conditions on BLM-Administered Lands....3-53
3.14.3 Trends....3-57
3.15 Areas of Critical Environmental Concern....3-57
3.15.1 Conditions of the Planning Area....3-58
3.15.2 Conditions on BLM-Administered Lands....3-58
3.16 Air Resources....3-58
3.16.1 Conditions of the Planning Area....3-58
3.16.2 Conditions on BLM-Administered Lands....3-62
3.16.3 Trends....3-62
3.17 Climate....3-63
3.17.1 Conditions of the Planning Area....3-63
3.17.2 Conditions on BLM-Administered Lands....3-64
3.17.3 Trends....3-64
3.18 Soil Resources....3-65
3.18.1 Conditions of the Planning Area....3-66
3.18.2 Conditions on BLM-Administered Lands....3-66
3.18.3 Trends....3-67
3.19 Water Resources....3-68
3.19.1 Conditions of the Planning Area....3-68
3.19.2 Conditions on BLM-Administered Lands....3-68
3.19.3 Trends....3-72
3.20 Special Status Species – Other Species of Issue....3-72
3.20.1 Conditions of the Planning Area....3-73
3.20.2 Conditions on BLM-Administered Lands....3-74
3.20.3 Trends....3-74
3.21 Renewable Energy....3-82
3.21.1 Conditions of the Planning Area....3-83
3.21.2 Conditions on BLM-Administered Lands....3-84
3.21.3 Trends....3-84
3.22 Social and Economic Conditions....3-84
3.22.1 Existing Conditions....3-85
3.23 Environmental Justice....3-93

TABLES

Page

3-1 Priority Habitat and General Habitat Occurring on BLM-Administered Lands and non-BLM-Administered Lands in the Planning Area....3-8
3-2 Average Range of Vital Rates for GRSG, range-wide and in Montana....3-13
3-3 Surface Ownership within the Planning Area....3-18
3-4 GRSG Habitat within City Limits....3-18
3-5 Transmission Lines within GRSG Habitat....3-19
3-6 Communication Towers within GRSG Habitat....3-19
3-7 Vertical Obstructions within GRSG Habitat....3-20
3-8 Wind Turbines within GRSG Habitat....3-20
3-9 Active ROW Authorizations within the Planning Area....3-21
3-10 Vegetation Communities within GRSG Habitat on BLM-Administered Lands....3-26
3-11 PFC Assessment for Riparian Habitat on BLM-Administered Lands....3-27

3-12 PFC Assessment for Wetland Habitat on BLM-Administered Lands 3-27
3-13 Wildland Fire within GRSG Habitat 3-30
3-14 Planning Area Fire Regime Condition Class 3-32
3-15 Oil and Gas Activity by Field in the Planning Area 3-34
3-16 Open to Oil and Gas Leasing within GRSG Habitat 3-35
3-17 Closed to Oil and Gas Leasing within GRSG Habitat 3-35
3-18 Oil and Gas Leases within GRSG Habitat 3-36
3-19 Oil and Gas Leases Held by Production within GRSG Habitat 3-36
3-20 Oil and Gas Wells within GRSG Habitat 3-37
3-21 Federal Mineral Status in the North Dakota Planning Area 3-37
3-22 Oil and Gas Federal Mineral Status in the North Dakota Decision Area 3-38
3-23 Oil and Gas Potential in Relation to GRSG PH and GH 3-38
3-24 Existing Oil and Gas Leases on Federal Mineral Estate 3-39
3-25 Drilling Activity within GRSG Habitat 3-40
3-26 Oil and Gas Leasing Categories in PH and GH 3-41
3-27 Coal Potential within GRSG Habitat 3-43
3-28 Surface Coal Leases within GRSG Habitat 3-44
3-29 Miles of Roads within GRSG Habitat 3-47
3-30 Acres of Roads within GRSG Habitat 3-47
3-31 Miles of Railroads within GRSG Habitat 3-48
3-32 Acres of Railroads within GRSG Habitat 3-48
3-33 Recreation Activities and Participants 3-50
3-34 Grazing Allotments within GRSG Habitat 3-53
3-35 Fences within GRSG Habitat 3-53
3-36 North Dakota Field Office Planning Area – Grazing Allocation on BLM-Administered Lands 3-54
3-37 North Dakota Field Office Planning Area – AUMs by Allotment 3-54
3-38 North Dakota Field Office Planning Area – Allotments and AUMs by Habitat Category 3-56
3-39 North Dakota Field Office Planning Area – Land Health Assessment 3-56
3-40 Air Quality Monitor Values in Billings and Dunn Counties (2009-2011) 3-59
3-41 Air Quality Index Report (2009-2011) 3-60
3-42 Annual Average Deposition (2004-2011) 3-61
3-43 Major Soil Orders on BLM-Administered Lands 3-66
3-44 Summary of NRCS Farmlands on BLM-administered Lands 3-67
3-45 Streams on BLM-Administered Lands in the Planning Area 3-69
3-46 Federally Listed Species with the Potential to Inhabit the Planning Area 3-75
3-47 North Dakota Field Office BLM Sensitive Species with the Potential to Inhabit the Planning Area 3-76
3-48 Wind Potential on Slopes <15% on BLM-administered Lands 3-84
3-49 Cattle and Sheep Inventory and Estimated Annual Forage Requirement in Impact Area Counties 3-89
3-50 Population by Race and Ethnicity (2010) 3-94

DIAGRAMS

Page

3-1 Population Change for the Three-County Impact Area 3-86
3-2 Employment Distribution in the Three-County Impact Area and North Dakota 3-87
3-3 Oil Production in the Three-County Impact Area and North Dakota 3-91

FIGURES *(see Appendix A)*

3-1 North Dakota Preliminary Sage-Grouse Habitat
3-2 Greater Sage-Grouse Distribution and Preliminary Priority Habitat
3-3 Greater Sage-Grouse Habitat (Planning Area)
3-4 Greater Sage-Grouse Habitat (BLM-Administered Lands)
3-5 Surface and Mineral Management Status
3-6 Planning Area Fire Regime Condition Class
3-7 Oil and Gas Potential
3-8 Transportation Routes
3-9 Planning Area Grazing Allotments

CHAPTER 3
AFFECTED ENVIRONMENT

3.1 CHANGES BETWEEN THE DRAFT EIS AND FINAL EIS

Chapter 3 of the Draft RMPA/EIS was revised as follows:

- A discussion of predators and predation existing conditions was added in **Section 3.4.1**, Conditions of the Planning Area. Range-wide and Montana-specific average vitality rates for GRSG are provided in **Table 3-2**.
- A discussion of the current land cover in the planning area and on BLM-administered lands was added in **Section 3.4.2**, Conditions on BLM-Administered Lands. This new section also references two new maps (**Figure 3-3**, Greater Sage-Grouse Habitat [Planning Area] and **Figure 3-4**, Greater Sage-Grouse Habitat [BLM-Administered Lands]). These were prepared to illustrate the current land cover in the planning area and on BLM-administered lands.
- A discussion of cheatgrass in the planning area was added to **Section 3.6.3**, Trends.

3.2 INTRODUCTION

This chapter succinctly 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 chapter provides the context for assessing potential impacts as described in **Chapter 4**.

The planning area for the North Dakota Greater Sage-Grouse RMPA/EIS is composed of BLM, Forest Service, North Dakota school trust, USFWS, and private lands (refer to **Table 1-1**) in Bowman, Slope, and Golden Valley Counties in southwestern North Dakota. 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 amendment. 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. Implementation of any of the action alternatives would result in general and unquantifiable indirect beneficial effects for the following 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:

- Fish and Wildlife (other than Special Status Species)
- Visual Resources
- Cultural Resources
- Paleontological Resources

For further information on the affected environment of these resources and programs, please refer to the Affected Environment sections of the North Dakota RMP being amended by this North Dakota 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 North Dakota Greater Sage-Grouse RMPA/EIS.

- Special Status Species – Greater Sage-Grouse
- Lands and Realty
- Vegetation (Including Noxious Weeds; Riparian and Wetlands)
- Wildland Fire Management and Ecology
- Fluid Minerals
- Coal
- Locatable Minerals
- Mineral Materials
- 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
- 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 North Dakota RMP. 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 and the reasons for the change are identified. Trends can 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 North Dakota RMP 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 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 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.

3.3.1 WAFWA Management Zone Data

To augment this planning document at a biologically meaningful scale for GRSG, the USGS produced for the BLM a BER (*Summary of Science, Activities, Programs, and Policies that Influence the Range-Wide Conservation of Greater Sage-Grouse* [Centrocercus urophasianus]) (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 North Dakota Greater Sage-Grouse RMPA/EIS is located in WAFWA MZ I (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 MZ I 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 MZ I cumulative effects analysis for GRSG in **Chapter 5**.

The data and information included from the BER is the most accurate data available from 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 basis 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; therefore, 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's large-scale, WAFWA management zone focus. These fine-scale, local data are incorporated into the affected environment discussion to complement the

BER's data, characterize the relative contributions of threats in the planning area versus the WAFWA management zones, and to set the stage for the cumulative effects analysis for GRSG.

3.4 SPECIAL STATUS SPECIES—GREATER SAGE-GROUSE

The BLM special status species are: (1) species listed or proposed for listing under the ESA, and (2) species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA, which are designated as BLM sensitive by the state director(s). All federal candidate species, proposed species, and delisted species in the five years following delisting will be managed as BLM sensitive species.

The BLM's policy for special status species is to: 1) conserve and/or recover T&E 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 Bureau 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 2008d), sets policy for the management of candidate species and their habitat. Candidate species are considered Bureau sensitive species. The 6840 manual directs 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."

The BLM 6840 Policy 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/or recover listed species, as well as provisions for the conservation of Bureau sensitive species are identified. The BLM 6840 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 United States 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 297 million acres (Schroeder et al. 2004). Current distributions of fringe populations, including North Dakota, are fragmented and increasingly disjunct from core regions of the distribution in the Great Basin and Colorado Plateau.

In response to petitions, USFWS first evaluated GRSG for listing in 2005 and determined listing was not warranted. In response to a 2007 court order, the agency again considered the GRSG and in 2010, USFWS concluded that that

GRSG listing under the ESA was warranted range-wide but precluded by higher priority species (USFWS 2010).

In 2009, the BLM published management guidance for GRSG, Guidance for Greater Sage-Grouse Management and Conservation in Resource Management Plan Revisions in Management Zones 1 and 2 Within the Montana/Dakotas BLM (IM MT-2010-017[BLM 2010a]). This IM provided interim guidance for conserving GRSG on BLM-administered lands in these management zones during preparation of GRSG RMPAs.

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 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. This report was used to focus the analysis in **Chapter 4** on the threats most likely to impact GRSG in North Dakota. According to the COT report, the known threats to GRSG in North Dakota that are present and widespread include isolation/small size, energy, and infrastructure (fire and mining are also listed as widespread; however, this is because the population also includes South Dakota where these threats are more likely to occur). Threats that are present but localized include elimination of sagebrush, agricultural conversion, weeds/annual grasses, and grazing (USFWS 2013).

The BER was produced by the USGS in cooperation with 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 PH and GH. North Dakota is evaluated as part of WAFWA MZ I. This management zone consists of four GRSG populations as identified by Garton et al. (2011), including the Dakotas, Northern Montana, Powder River Basin, and Yellowstone Watershed populations. PH areas for North Dakota can be seen in **Figure 3-1** in **Appendix A**.

The NTT was established by BLM to coordinate effective management actions based on best available science for GRSG conservation and restoration. *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011) includes a discussion of threats and recommended BLM management actions for each.

3.4.1 Conditions of the Planning Area

GRSG numbers are small and the population is considered to be at high risk in North Dakota. The population is characterized by low recruitment during brood rearing, due to predation and disease (Kazcor 2008; Swanson 2009). Declines in the planning area are most likely due to cumulative effects of influences including, but not limited to, oil and gas development, conversion of

native rangeland to cropland, and over-grazing in localized areas (USFWS 2013, pg. 63).

Privately-owned lands make up 66 percent of sagebrush, with BLM-administered land making up 17 percent (Knick 2011). Sagebrush cover is naturally limited in this region due to the preponderance of grassland ecosystems, and, with agricultural pressure and energy production, results in substantial habitat limitations for GRSG populations.

Availability of Sagebrush Habitat (Broad- and Mid-Scale Indicator)

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).

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

- 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, and winter concentration areas; and
- GH: Areas of occupied seasonal or year-round habitat outside of priority habitat.

For North Dakota, the BLM and NDGFD worked together to map GRSG habitat and mapping was completed in May 2012. PH and GH were delineated as follows:

Priority Habitat

GRSG leks were buffered by 5.3 miles to map PH. A 4-mile buffer would include approximately 80 percent of nesting GRSG hens; therefore, the 5.3 mile buffer captured 100 percent of the collared nesting hens, and consequently, almost all the habitat (a small amount of habitat was left on the southeast corner, but no leks nearby) (Herman-Brunson 2007). Buffering leks produced "bubbles" of PH, and these boundaries were "softened" to form the northern and eastern edge of PH. The western and southern boundaries are the states of Montana and South Dakota, respectively.

General Habitat

The GH for North Dakota is what remained for habitat on the eastern portion of the bird's range; this is the historic range for GRSG. There are no GRSG leks in the GH area, but birds occasionally use it. There is very little BLM surface ownership in GH (80 acres); however, there are federal subsurface minerals.

Acres of PH and GH within the planning area are presented in **Table 3-1**. Specific information on roads, mineral leasing, and other infrastructure in GRSG habitat are included in the topic sections of **Chapter 3**.

Table 3-1
Priority Habitat and General Habitat Occurring on BLM-Administered Lands and non-BLM-Administered Lands in the Planning Area

Lands	PH (acres)	GH (acres)	Outside GRSG Habitat (acres)
BLM-administered lands	32,900	80	50
Non-BLM-administered lands	428,170	242,221	259,596
Total Planning Area	**461,070**	**242,301**	**259,646**

Source: BLM 2012a

GRSG occur primarily in the southwestern area of the planning region where shrubland, steppe, and savanna systems are present. This area has been designated as PH because it has been identified as having the highest conservation value to maintaining sustainable GRSG populations in North Dakota. GRSG also occur in a halo around the PH, in the regions that are characterized by grassland systems and human use, and designated as GH. Within the planning area, there were 12 active leks in 2012 (NDGFD 2012a); leks are key spring activity areas for mating and nesting and are most often located in open areas surrounded by sagebrush cover.

The Dakotas' population of GRSG occurs on the far eastern edge of the species' range, consisting of approximately 800 square miles in North Dakota (Herman-Brunson 2007). See **Figure 3-2** in **Appendix A**. Though contiguous with populations in Montana, this population is small and considered to be at high risk. The minimum male count for this population was reported at 587 and the study estimated a 66 percent chance that this population would dip below 200 males in the next 100 years (Garton et al. 2011). Population counts in 2012 for North and South Dakota were approximately 300 males. The Dakotas' territory is heavily influenced by oil and gas development and conversion of native rangeland to cropland. Over-grazing in localized areas has reduced herbaceous understory cover, which can reduce nesting success (USFWS 2013, pg. 46).

Connectivity of Habitat Patches (Mid-Scale Indicator)

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. 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 conditions that influence the distribution of sagebrush and associated understories. Where home ranges have been reported, they are extremely variable (1.5 to 238 square miles) (Connelly et al. 2011a).

GRSG populations may be nonmigratory or migratory, moving between or among seasonal use areas (Connelly et al. 2011a). GRSG in North Dakota are generally nonmigratory, though current research has found some localized movements west into Montana (Swanson 2009). The Dakotas' population occurs on the far eastern edge of GRSG range and is considered small and at high risk (USFWS 2013, pg. 46). GRSG are thought to move east and west between the Dakotas and Montana, with Montana providing seasonal habitat for birds from North Dakota, a likely conduit for genetic connectivity with the Montana and Dakotas' populations (USFWS 2013, pg. 46).

Landscape Matrix and Edge Effect (Mid-Scale Indicator)

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 (human) edges 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). Edge effects are significant elements of the threat posed by infrastructure and energy development to GRSG populations.

Anthropogenic Disturbances (Broad- and Mid-Scale Indicator)

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 that have reduced habitat availability and fragmented remaining sagebrush habitat nearby. In North Dakota, conversion of sagebrush to croplands has been an important threat to GRSG populations (USFWS 2013, pg. 63). 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).

As discussed below in **Section 3.5**, Lands and Realty, approximately 500 miles of transmission lines are present in PH on BLM-administered and National

Forest System land in the planning area, and approximately 9,800 miles on private and North Dakota school trust lands in the planning area. Transmission lines, in addition to reducing habitat suitability and increasing fragmentation (Ellis 1985), can cause GRSG mortality through bird collisions with lines (Beck et al. 2006) and facilitate raptor predation of GRSG. Transmission structures and communication towers may also provide nesting sites for corvids and raptors in habitats with low vegetation and relatively flat terrain (Ellis 1984; Steenhof et al. 1993; Johnson et al. 2011). Lek count trends tend to be lower on leks within three miles of interstate highways (trend lines are lower compared to trend lines for leks located greater than three miles) (Johnson et al. 2011) but no apparent relationship has been found between lek count trends and the presence of secondary roads (Aldridge et al. 2008).

As discussed below in **Section 3.8**, Fluid Minerals, approximately 26,000 acres of oil and gas leases are present in PH on BLM-administered land, and approximately 16,500 acres on North Dakota school trust or private land. Generally, oil and gas developments within two to four miles of leks and/or nesting areas had deleterious effect on populations, with the effect increasing with increasing well density (Lyon and Anderson 2003; Walker et al. 2007; Johnson et al. 2011).

Paved roads exist in most sagebrush regions in densities up to approximately 1.25 miles per 100 acres; less than 5 percent of the GRSG range is more than 1.5 miles from a paved road. Indirectly, interstates and major highways potentially influence more than 95 percent of priority habitats throughout the range of the species. A large proportion of these roads exist as ROWs on public lands, including 55 percent of BLM-administered PH (Manier et al. 2013, pg. 31). In the planning area, as discussed below in **Section 3.12**, Comprehensive Travel and Transportation Management, approximately 180 miles of roads (paved or unimproved) are present in PH on BLM-administered and National Forest System land, and approximately 760 miles are on private and North Dakota school trust lands.

Population and Leks (Mid- and Fine-scale Indicator)

NDGFD monitors 52 lek sites in North Dakota annually (NDGFD 2012a). The lek data for 2012 show that there were 12 active leks with 72 males present in the planning area. Eight of these leks showed a decline in number of males from the previous year, while four showed an increase or no change.

Predators

Predation is one of five specific ESA listing criteria; however the USFWS did not identify predation as a significant threat to GRSG in its 2010 decision to list the species as warranted for protection (USFWS 2010). The USFWS acknowledged that increasing patterns of landscape fragmentation are likely contributing to increased predation on the species and it identified two areas, neither in North Dakota, 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 North Dakota, the public remains concerned about the influence of predators on GRSG conservation.

Predators, both avian and mammalian are part of the natural ecosystem, and they have always preyed upon GRSG. They 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 coyotes, red fox, American badgers, bobcats, 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 are coyotes, American badgers, common ravens and black-billed magpies (Schroeder and Baydack 2001; Hagen 2011). Smaller predators of GRSG, such as red fox or skunks, can also be 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 grouse populations was rarely recommended historically, even for T&E populations in altered or fragmented habitats (Patterson 1952; Schroeder and Baydack 2001). It is likely 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 (DOI 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 (crows, ravens and the like) 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 developed infrastructure. 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). Longer-term trends in GRSG population abundance and distribution can be a function of habitat loss or deterioration (Garton et al. 2011).

GRSG are part of the sagebrush grassland ecosystem that comprises 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 becomes a problem only 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, and predator abundance) and is to be expected with a species that shows cyclic tendencies.

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 the USDA's Animal and Plant Health Inspection Service. Annually, NDFO BLM completes an MOU with this service for predator control on BLM-administered lands in the preferred GRSG core area. 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 (DOI 2010; Hagen 2011). In Strawberry Valley, Utah, fox removal appeared to increase adult survival and productivity; however, 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, removing 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 southwestern Colorado designed to increase recruitment in a small population of Gunnison's sage-grouse may be showing some success, but only five chicks are monitored per year[1].

There are 13 displaying males currently in this population. The cost of monitoring and control has totaled $267,000 over five years[2], bringing into question the sustainability of this program. Raven removal in northeastern Nevada resulted in short-term reductions in raven populations; however, others repopulated the vacated habitat within one 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 nonbreeding birds (Bui et al. 2010). Thus, removing raven groups from foraging sites would be unlikely to influence GRSG nest success; removing territorial pairs would likely have only short-term effects until a new pair reoccupies the habitat.

Range-wide and Montana-specific average vitality rates for GRSG are provided in **Table 3-2**.

Table 3-2
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 County	Wallestad and Pyrah 1974
		28–43%	2004 - 2005	Musselshell and Golden Valley Counties	Sika 2006
		35–61%	2001 - 2003	S. Phillips County	Moynahan et al. 2007
		53–61%	2007 - 2008	Milk River Basin	Tack 2009
		59%	2011 - 2012	Musselshell and Golden Valley Counties	Berkeley, unpublished data[2]

[1]Colorado Parks and Wildlife, pers. comm.
[2]Ibid.

Table 3-2
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
Chick survival	12 –50%	33–38%	2007 - 2008	Milk River Basin	Tack 2009
		12%	2011 - 2012	Musselshell and Golden Valley Counties	Berkeley, unpublished data[2]
Hen survival	37–78%	25–96%[3]	2001 - 2003	S. Phillips County, Montana	Moynahan et al. 2006
		94% (nesting season) 84–93% (late summer)	2004 - 2005	Musselshell and Golden Valley Counties	Sika 2006
		55 –91% (spring/summer) 84–92% (over winter)	2007 - 2008	Milk River Basin	Tack 2009
		59%	2011 - 2012	Musselshell and Golden Valley Counties	Berkeley, unpublished 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%.

3.4.2 Conditions on BLM-Administered Lands

Acres of PH and GH on BLM-administered lands within the planning area are presented in **Table 3-1**, along with acres on non-BLM-administered lands. BLM-administered and private lands exist in close proximity and conditions on BLM-administered lands are similar to those on non-BLM-administered lands, as discussed in **Section 3.4.1**.

Figure 3-3 in **Appendix A** shows the current land cover for most of the PH in the planning area. There are two small pieces shown in gray where the data were unavailable (these are on the fringe of the habitat). Currently, approximately 18 percent of PH (all ownerships) has anthropogenic disturbances (e.g., agriculture fields, roads, oil wells, power lines). On BLM-administered lands, the anthropogenic disturbance is approximately 3.5 percent. GH is not included in this calculation since the BLM manages only two 40-acre parcels of surface in GH.

On BLM-administered surface lands, there are less than 8,000 acres that have at least 10 percent sagebrush cover. Much of the BLM-administered surface (over 22,000 acres) is grasslands/sparse vegetation or is categorized as having less than 10 percent sagebrush. See **Figure 3-3** and **Figure 3-4** in **Appendix A**.)

For BLM North Dakota, there has been extremely limited historic seeding of nonnative species; this has been in association with only reseeding ROW corridors and construction areas. There are no converted fields on BLM-administered lands. However, many native grassland areas have been invaded with crested wheatgrass or other nonnative grass species.

Population and Leks

NDGFD monitors five lek sites in North Dakota on BLM-administered land (NDGFD 2012a). Lek data from 2012 shows that three of these leks were active, with a total of 35 males present. One of the five leks showed a decline from 2011, two showed no change, and two showed an increase in use.

3.4.3 Trends

GRSG habitat is potentially being impacted by loss of habitat due to increased drilling for oil and gas, and other mineral development in North Dakota, particularly western Bowman County. Annual rates of change show a long-term population decline in North Dakota, averaging 2.79 percent annually in the past several decades (Herman-Brunson 2007). Studies have shown nest survival rates of approximately 30 percent (Herman-Brunson 2007, Swanson 2009). Lek data collected by the NDGFD show overall declines in GRSG numbers from 299 in 1982 to 72 in 2012, a decline of 76 percent; the number of males per lek (16.5 in 1982, compared to 6 in 2012, a decline of 64 percent); and the number of active leks (23 to 12) in the planning area (NDGFD 2012a).

As discussed above, GRSG in North Dakota are few in number and the population is considered to be at high risk (USFWS 2013). Small populations are at higher risk of decline from habitat loss and fragmentation, primarily due to conversion to agriculture. Small populations also are more vulnerable to isolation, predation and disease, primarily West Nile virus, and degradation of habitat from oil and gas development, over-grazing, and other factors. The GRSG population in North Dakota is characterized by low recruitment during brood rearing (30 to 40 percent chick survival) primarily from predation and West Nile virus (Kazcor 2008; Swanson 2009). Threats to GRSG are discussed in more detail in **Chapter 4**.

3.5 LANDS AND REALTY

Lands and realty actions can be divided between land use authorizations and land tenure adjustments. Land use authorizations consist of ROWs, utility corridors, 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

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

It is the BLM's objective 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 land use long-term land uses, and 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 T&E habitats)
- avoid cultural sites that are listed on, or are eligible for listing on, the National Register of Historic Places

The BLM does not require a ROW authorization in circumstances where actions are tied to leases that are part of a unit. For example, a fluid mineral leaseholder wanting to install a pipeline within a unitized area would be exempt from acquiring a ROW authorization as long as the pipeline is contained in the unit. There are 24,842 acres of unitized areas in the decision area.

BLM land use plans designate areas as ROW avoidance (areas to be avoided but may be available for ROWs with special stipulations) and ROW exclusion areas (areas that are not available for ROWs under any conditions). Areas not designated as avoidance or exclusion are open to ROW development.

Land Tenure Adjustments

Land ownership (or land tenure) adjustment refers to those actions that result in the disposal of public land, or the acquisition by the BLM of nonfederal lands or interests in land. The FLPMA requires that public land be retained in public ownership unless, as a result of land use planning, disposal of certain parcels is warranted. Tracts of land that are designated in BLM land use plans as potentially available for disposal can be conveyed out of federal ownership through an exchange or a sale. Acquisition of and interests in lands are important components of the BLM's land tenure adjustment strategy.

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 public 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, maximize the use of withdrawn lands consistent with their primary purpose, and eliminate 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, USFWS), various state agencies, and private landowners. **Table 3-3** shows the acreage and overall percent ownership for each landowner in the planning area. Also see **Figure 3-5** in **Appendix A**.

Table 3-3
Surface Ownership within the Planning Area

Surface Ownership	Planning Area (acres)	PH (acres)		GH (acres)	
BLM-administered lands	33,030	32,900	99.6%	80	>1%
Forest Service	140,432	66,549	47%	29,863	21%
USFWS	638	0	0%	0	0%
North Dakota School Trust	40,894	21,550	53%	10,871	27%
Private	741,607	335,322	45%	201,016	27%
Water	6,416	4,749	74%	471	7%
Total Planning Area	**963,017**	**461,070**	**48%**	**242,301**	**25%**

Source: BLM 2012a
[1]Planning area acres includes additional acres that are not PH or GH on BLM-administered lands.

WAFWA Management Zone 1

Table 3-4 through **Table 3-8** display data compiled in a BER produced by the USGS and BLM (Manier et al. 2013). In each table, data are presented by surface management agency and their occurrence within GH and PH in the planning area and in MZ I. There are no utility corridors within the planning area (Manier et al. 2013).

Table 3-4
GRSG Habitat within City Limits

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	0	9,353	0	9,300	0	53
Forest Service	60	68	0	8	60	60
Tribal and Other Federal	0	200	0	200	0	0

Table 3-4
GRSG Habitat within City Limits

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
Private	2,500	117,300	1,000	113,200	1,500	4,100
State	0	8,100	0	7,300	0	800
Other	0	6	0	0	0	6

Source: Manier et al. 2013

Table 3-5
Transmission Lines within GRSG Habitat

Surface Management Agency	Total Acres[1]		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	200	42,800	0	35,500	200	7,300
Forest Service	300	8,600	0	7,300	300	1,300
Tribal and Other Federal	0	57,000	0	56,300	0	700
Private	16,000	511,100	6,700	452,600	9,300	58,500
State	500	45,900	0	37,800	500	8,100
Other	0	620	0	600	0	20

Source: Manier et al. 2013
[1]Includes transmission lines greater than 115 kilovolts (kV) and assumes a 656-foot-wide footprint

Table 3-6
Communication Towers within GRSG Habitat

Surface Management Agency	Total Number[1]		Number within GH		Number within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	0	128	0	108	0	20
Forest Service	1	37	0	36	1	1
Tribal and Other Federal	0	167	0	167	0	0
Private	31	2,310	14	2,161	17	149
State	0	122	0	108	0	14
Other	0	10	0	10	0	0

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

Table 3-7
Vertical Obstructions within GRSG Habitat

Surface Management Agency	Total Acres[1]		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	0	0	0	0	0	0
Forest Service	0	0	0	0	0	0
Tribal and Other Federal	0	7	0	7	0	0
Private	0	230	0	230	0	0
State	0	17	0	17	0	0
Other	0	15	0	15	0	0

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

Table 3-8
Wind Turbines within GRSG Habitat

Surface Management Agency	Total Number[1]		Number within GH		Number within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	0	62	0	35	0	27
Forest Service	0	41	0	21	0	20
Tribal and Other Federal	0	32	0	21	0	11
Private	13[2]	80	0	45	17	35
State	0	62	0	34	0	28
Other	0	42	0	28	0	14

Source: Manier et al. 2013
[1]Derived from Federal Aviation Administration data on wind towers.
[2]Non-BER data; derived from MDU 2013

3.5.2 Conditions on BLM-Administered Lands

Land Use Authorizations

Within GRSG habitat, there are 368 acres of ROW authorizations in PH and three acres in GH. **Table 3-9** provides a breakdown of ROW types and acres in each habitat type.

Table 3-9
Active ROW Authorizations within the Planning Area

Type	PH		GH	
	Number of Authorizations	Size (Acres)	Number of Authorizations	Size (Acres)
Road	21	136		
Power	45	122	1	3
Telephone	11	22		
Water facilities	1	2		
Oil and gas	33	86		
Total	**111**	**368**	**1**	**3**

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.

There is no ROW avoidance or exclusion areas within the planning area.

ROW Corridors and Communication Sites

Utility corridors are developed to concentrate the effects of utility lines in manageable locations on BLM-administered lands. The corridors may contain power lines, transcontinental fiber optic communication cables, and trans-state gas pipelines. 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 rather than ROW. There are no communication sites on BLM-administered lands.

Renewable Energy

Wind and solar resource facilities are permitted with ROWs, through the Lands and Realty Program. Geothermal resources are considered fluid leasable minerals. 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 3.21, Renewable Energy, provides a description of renewable energy resources.

Land Tenure Adjustments

Disposal
There are approximately 3,436 acres of BLM-administered land identified for disposal in the planning area, including 3,306 acres in PH and 80 acres in GH. There are no pending land exchanges or sales within the planning area.

Withdrawal
There are no withdrawals in the planning area.

Acquisitions
There are no proposed acquisitions in the planning area.

3.5.3 Trends

Land use authorizations (primarily ROWs) are currently very active in the NDFO, but substantially less so within the planning area. Major projects include three major crude oil pipelines. These pipelines involve two or more federal agencies and cross Lake Sakakawea, which is outside the planning area. The NDFO also has proposals for two major gathering systems; however, these are also located outside the planning area. Demand for land use authorizations in the planning area may increase due to increased oil and gas development in other parts of the field office and the need for increased pipelines to move product to rail/market. The NDFO has no new requests for communication sites.

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 NDFO 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 occurs within two Level III Ecoregions: Northwestern Great Plains and Middle Rockies (EPA 2011a). Most of the planning area occurs 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 spring wheat and alfalfa farming also occur; native grasslands persist in areas of steep or broken topography. Agriculture is restricted by the erratic precipitation and limited opportunities for irrigation (EPA 2010a).

The majority of the BLM-administered land in the planning area contains gentle rolling plains. Other areas, such as those around the Missouri River, contain rugged, eroded river breaks. Badlands, buttes, alluvial fans, river terraces, stream bottoms, and flat-topped benches are also present.

Annual precipitation ranges from 12 to 23 inches on the prairie. About 70 percent of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Winter precipitation in the planning area is typically snow.

Major vegetation types in this area are grasslands, sagebrush grasslands, and juniper woodlands. Grasses tend to be a mixture of cool and warm season grasses common in the Northern Great Plains. Bunch grasses grow in distinct clumps and include species such as needlegrasses, little bluestem (*Schizachyrium scoparium*), junegrass (*Koeleria* spp.), and Sandberg bluegrass (*Poa secunda*). Rhizomatous grasses produce shoots from lateral root systems and grow as a continuous carpet of vegetation. Common rhizomatous grasses include western wheatgrass (*Pascopyrum smithii*), thickspike wheatgrass (*Elymus lanceolatus* ssp. *lanceolatus*), and blue grama (*Bouteloua gracilis*).

The planning area contains numerous forbs and several species of cacti. The most common forb families are asters, legumes, and mustards. Several species of prickly pear cacti (*Opuntia* spp.) and two species of pin cushion cacti are present. Yucca (*Yucca* spp.) is common on loamy to sandy soils, especially on ridges and river breaks.

Common upland shrubs include big sagebrush (*Artemisia tridentata*), silver sagebrush (*A. cana*), and skunkbush sumac (*Rhus trilobata*). Less common upland shrubs include rubber rabbitbrush (*Ericameria nauseosa*) and sand sagebrush (*Artemisia filifolia*). Rocky Mountain juniper (*Juniperus scopulorum*) occurs as woodlands in the river breaks and can also be found scattered across steep slopes and ridges with loamy soils. A small part of the area can support forest vegetation characterized by oak (*Quercus* spp.) and aspen (*Populus* spp.). The flora of southwestern North Dakota is unique because it contains the only extensive population of big sagebrush in the state.

Riparian and Wetland

The term "riparian" is used here to include both lotic and lentic systems. Wetlands, both lotic and lentic systems, typically provide wildlife with green forage, insects, and drinking water. Green forage is especially important for many wildlife species during the summer and fall when upland vegetation has dried out. Although riparian zones account for a very small proportion of the total acreage of the planning area, the structure, food, and water provided by these communities make them the most diverse and productive wildlife habitat within the planning area.

Riparian communities occur along the major watercourses in the planning area and in association with isolated springs, seeps, and smaller streams. Along the major waterways of the Missouri, Yellowstone, and Little Missouri rivers, these communities are dominated by various mixtures of cottonwood (*Populus* spp.) and willow (*Salix* spp.) species. Other vegetation within riparian areas includes chokecherry (*Prunus virginiana*), hawthorn (*Crataegus* spp.), buffaloberry (*Shepherdia* spp.), and sandbar willow (*Salix interior*).

Lentic systems include other permanently wet or seasonably wet areas such as lakes, reservoirs, meadows, springs, and seeps. These areas are commonly found independently of defined stream channels and can occur in diverse landscape settings. Lentic systems are typically small but are extremely important ecologically. Within the planning area in Bowman County, the majority of wetlands are manmade.

The functioning condition of riparian and wetland areas is a result of the interaction of geology, soil, water, and vegetation (BLM 1998). PFC can be defined separately for lotic and lentic waters, as follows:

Lotic Waters

Lotic water is 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 water flows, 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; and
- Support greater biodiversity.

Lentic waters

Lentic waters are standing water systems, such as lakes, ponds, seeps, bogs, and meadows. 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; and
- 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 in **Section 3.6.2**, Conditions on BLM-Administered Lands.

Noxious Weeds and Invasive Species

Noxious and invasive weeds compete with native vegetation for water, space, and nutrients. The State of North Dakota's noxious weed list includes twelve species of weeds that are designated noxious by state law:

- Absinth wormwood (*Artemisia absinthium*)
- Canada thistle (*Cirsium arvense*)
- Dalmatian toadflax (*Linaria genistifolia* ssp. *dalmatica*)
- Diffuse knapweed (*Centaurea diffusa*)

- Field bindweed (*Convolvulus arvensis*)
- Leafy purge (*Euphorbia esula*)
- Musk thistle (*Carduus nutans*)
- Purple loosestrife (*Lythrum salicaria*, *Lythrum virgatum*, and all cultivars)
- Russian knapweed (*Acroptilon repens*)
- Salt cedar (*Tamarix ramosissima*, *T. chinensis*, and *T. parviflora*)
- Spotted knapweed (*Centaurea maculosa*)
- Yellow star thistle (*Centaurea solstitialis*)

Invasive plants also occur within the planning area. These include not only noxious weeds, but also other plants that are not native to the United States. 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). Common invasive vegetation includes smooth brome, crested wheatgrass, Kentucky bluegrass, dandelion, salsify, Japanese and downy brome, and cheatgrass.

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 3-10**.

Table 3-10
Vegetation Communities within GRSG Habitat on BLM-Administered Lands

Vegetation Community	PH (acres)	GH (acres)	Outside of PH/GH (acres)
Aquatic	83	0	7
Forest and woodland systems	552	0	0
Grassland systems	17,557	79	16
Human land use	315	0	2
No data	51	0	0
Recently disturbed or modified	0	0	8
Riparian and wetland systems	1,452	0	11
Shrubland, steppe, and savanna systems	9,738	1	4
Sparse and barren systems	3,153	0	1

Source: USGS 2010

Of the BLM-administered land that is assessed annually, 90 percent meets the BLM's Standards for Rangeland Health (see **Table 3-39**). Those areas not meeting the standards have problems as a result of introduced species such as smooth brome (*Bromus inermis*), noxious weeds, or cheatgrass (*B. tectorum*). In some cases, areas have problems because of over-grazing by livestock.

Riparian and Wetland

A survey was completed in 2007 to determine riparian condition for most areas within the North Dakota RMP planning area. Approximately 25 miles of stream and 49 acres of wetlands were inventoried, representing the majority of riparian areas on BLM surface within the planning area. The survey provided baseline data of current riparian conditions (**Table 3-11** and **Table 3-12**).

Table 3-11
PFC Assessment for Riparian Habitat on BLM-Administered Lands

PFC Rating	Miles
Proper functioning condition	11.71
Functional at risk with upward trend	8.96
Functional at risk with downward trend	0.23
Functional at risk with no trend	2.03
Non-functional	2.93

Source: BLM 2010b

Table 3-12
PFC Assessment for Wetland Habitat on BLM-Administered Lands

PFC Rating	Acres
Proper functioning condition	5.33
Functional at risk with upward trend	11.44
Functional at risk with downward trend	21.44
Functional at risk with no trend	4.5
Non-functional	6.69

Source: BLM 2010b

Noxious Weeds and Invasive Species

While noxious weed inventories have not consistently been completed for all BLM-administered lands in the planning area, some surveys have been conducted. Currently, the most widespread noxious weeds are leafy spurge and Canada thistle, with some amount of absinth wormwood. Some parcels within the area are almost monocultures because of the years of infestation before any treatment began. Noxious weeds have been found in a variety of locations and habitat types, with waterways and transportation systems being the major

vectors of spread. Other dissemination vehicles include OHV use, wind, wildlife, livestock, and humans.

The majority of weeds on BLM-administered lands are found in Dunn County, located east of the planning area. About 120 acres here have been treated for five years with herbicide to control leafy spurge along the Little Missouri River, and 500 acres have been treated for about two years. Biological control has been tried in Dunn County to control leafy spurge, with no success.

3.6.3 Trends

All Vegetation

Between 2000 and 2008, the planning area experienced a drought. Although normal precipitation patterns resumed periodically following this period, a long-term drought pattern has emerged. The most noticeable changes are dry winters and hot, dry summers. Springtime moisture levels have varied, with some areas receiving above-average precipitation in some years, and other areas receiving so little moisture that a spring green-up is not apparent.

The drought reduced the production of perennial grasses. The resumption of normal spring and summer moisture has improved the vigor of grasses in some places, while leaving other areas well below normal.

Riparian and Wetland

In the planning area, riparian vegetation was adversely affected by drought but appears to be recovering rapidly. During the drought, vegetation along the Little Missouri River was less robust with less streambank cover. Fortunately, most woody vegetation along riparian areas survived the drought. The occasional die-off of sandbar willow was observed, but no massive mortality was observed on woody species.

The BLM will continue to inventory isolated parcels that will help understand the current conditions of wetlands and riparian areas. The overall trend observed in surveyed areas is upward for riparian areas and downward for wetland areas. Stock water ponds were the primary wetland areas assessed. Continuing degradation is a concern due to invasive species, especially leafy spurge. Some areas are declining because of invasive species but other indicators are improving.

Noxious Weeds and Invasive Species

Established weed populations in many areas continue to expand, and new weed species appear within the planning area. Leafy spurge and Canada thistle continue to colonize new areas and spread at a rapid rate.

Invasion of cheatgrass and subsequent effects on wildfire frequency and severity and related sagebrush habitats is not an issue in the planning area. Although cheatgrass does occur, past fire history and research has shown that annual

bromes, including cheatgrass, do not expand into and dominate healthy, northern mixed-grass prairie plant communities (Haferkamp 2001). Instead, the amount and abundance of annual bromes occurring on Northern Great Plains rangeland is cyclic, depending on seed bank, temperature, and the amount and distribution of precipitation (Haferkamp2001). According to this study, annual bromes expanding into mixed-grass prairie communities is buffered by two long-lived perennial grasses, western wheatgrass and blue grama, especially where grazing management maintains healthy native mixed-grass prairie vegetation. In addition, increased production of western wheatgrass and decreased annual grass production (including cheatgrass) has been observed following summer fire in the northern mixed-grass prairie (Vermiere et al. 2011).

Research on the impacts of climate change also suggests there would not be a cheatgrass invasion into the Northern Great Plains. In particular, climate change modeling illustrates the median precipitation change scenario[1] depicts no increase in suitable habitat for cheatgrass within the planning area (Bradley 2009).

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, pg. 7).

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.

[1]Used to identify the most likely future climate change.

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.

Wildfire has been identified as a primary factor associated with GRSG population declines. It can result in the loss of habitat and loss of a food source. Direction for fire management in GRSG habitat is provided in BLM IM 2011-138, *Sage-grouse Conservation Related to Wildland Fire and Fuels Management* (BLM 2011b).

Spread of invasive weed species is another related concern in fire management. Spread of invasive species can displace native species and decrease habitat quality for the GRSG (see **Section 3.6**, Vegetation (Including Noxious Weeds; Riparian and Wetlands), for further details).

3.7.1 Conditions of the Planning Area

There is the potential for wildfire to occur in the planning area, particularly during times of drought. No wildfire has been reported on BLM-administered land in the planning area in the past 20 years. However, there have been wildfires on National Forest System, North Dakota school trust, and private lands in the planning area between 2003 and 2012 (Forest Service 2013a). The shrublands in the southwestern part of the planning region are identified as GRSG range, and as such, fire in these areas would be of particular concern (BLM 1987). Additionally, if a fire were to occur in PH, in the southwestern corner of the planning region, GRSG breeding, late brood-rearing, and wintering could be greatly impacted.

WAFWA Management Zone 1

Table 3-13 displays data compiled in a BER produced by the USGS and BLM (Manier et al. 2013), including the total acres of land burned in wildland fire in the planning area and MZ 1 between 2000 and 2012.

Table 3-13
Wildland Fire within GRSG Habitat

Surface Management Agency	Total Acres[1]		Acres within GH		Acres within PH	
	Planning Area	MZ 1	Planning Area	MZ 1	Planning Area	MZ 1
BLM	0	96,300	0	74,300	0	22,000
Forest Service	0	8,200	0	6,400	0	1,800
Tribal and Other Federal	0	18,300	0	18,300	0	0

Table 3-13
Wildland Fire within GRSG Habitat

Surface Management Agency	Total Acres[1]		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
Private	300	527,600	0	446,600	300	81,000
State	0	46,200	0	35,600	0	10,600
Other	0	0	0	0	0	0

Source: Manier et al. 2013
[1]Acres calculated from wildland fires occurring between 2000 and 2012.

Subsequent to finalizing the data in **Table 3-13**, new data provided by the Forest Service indicates that there have been fires on National Forest System, state, and private lands between 2003 and 2012 (Forest Service 2013a). There are no acres of high probability for wildland fire within the planning area (Manier et al. 2013).

3.7.2 Conditions on BLM-Administered Lands

In 2004, the BLM prepared North Dakota's Fire Management Plan, which was developed as a result of the Federal Wildland Fire Management Policy and Program Review (1995, 2000), National Fire Plan (2000), and the Federal Fire Policy (2001) (BLM 2004b). The Fire Management Plan established one Fire Management Unit for all BLM-administered lands in the state of North Dakota (59,563 acres). As such, the Fire Management Unit encompasses a larger region that that of the planning area BLM-administered lands 33,030 acres) which are concentrated in the area around PH and GH habitat in Bowman, Slope, and a portion of Golden Valley Counties (see **Chapter 1**). The number of acres, historic fire regime, and condition class for the Fire Management Unit is classified in terms of potential natural vegetation groups which describe the type of vegetation that will occupy a site without disturbance or climate change (USDA 2000). The planning areas lands are classified as Prairie Grasslands and the Juniper Steppe natural vegetation groups (BLM 2004b). Both of these vegetation areas are classified as FRCC II, which means the fire regimes have been moderately altered from their historical range by either increased or decreased frequency. A moderate risk of losing key ecosystem components is identified for lands in this class.

BLM-administered lands exist primarily in the southwestern region of the planning area. The majority of BLM-administered land is delineated as PH. In this habitat, vegetation is primarily within FRCC II. Total acres of PH and GH on BLM-administered lands are listed by FRCC in **Table 3-14** and **Figure 3-6** in **Appendix A**.

Table 3-14
Planning Area Fire Regime Condition Class

Fire Regime Group	Fire Frequency and Severity	Non-habitat (acres)	PH (acres)	GH (acres)	Total BLM-administered lands
I	0-35 years; low (surface fire most common) severity	0	1,300	5	1,300
II	0-35 years; high (stand replacement) severity	41	27,068	75	27,184
III	35-100+ years; mixed severity	0	197	0	197
IV	35-100+ years; high (stand replacement) severity	0	3,253	0	3,253
V	> 200 years; high (stand replacement) severity	0	2	0	2

Source: Hann et al. 2008; BLM 2012a

Although the North Dakota RMP allows for the use of prescribed fires for vegetation manipulation as appropriate, none have been set in the past 20 years, and there are no immediate plans to implement prescribed fire on BLM-administered lands in the planning area. Due to the scattered land patterns, developing and completing a prescribe fire project would involve coordination with different agencies, private landowners, local governments and permittees (BLM 2004b). In addition, the NDFO has been classified as Category B, or an area where wildland fire may not be desired because of current conditions (BLM 2004b).

Wildfire plays a major role in sustaining the healthy ecology of the prairie grasslands of North Dakota. However, wildland fires on BLM-administered lands in the planning area is very infrequent and, therefore, plays a very minor role in that overall ecology.

3.7.3 Trends

Wildland fire has historically occurred within the planning area, and tends to occur between late April and September, typically caused by lightning. It is likely that fires will 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 (National Conference of State Legislatures 2008). Over the past 20 years, no wildland fires have been reported on BLM-administered lands in the planning area (BLM 2004b). Between 2000 and 2012, approximately 300 acres of wildland fire have occurred on private lands (BLM 2012a). Some small fires may have occurred unreported and been suppressed by local fire departments, permittees, contractors, and residents (BLM 2004b).

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 on oil and gas because they are the only fluid minerals that exist within the planning area.

Coal bed natural gas potential exists within lignite formations in the planning area in what is known as the Fort Union coal region. The Potential Gas Committee estimated that the Fort Union coal region has approximately 0.5 trillion cubic feet of potentially recoverable coal bed gas resources that may be found in the lignites in this region. Based on surface acreage calculations, nearly 57 percent of the gas in these strata may lie within North Dakota. Because most of the GRSG habitat within the planning area is within the Fort Union coal region, it is reasonable to assume there is potential for recoverable coal bed gas resources in GRSG habitat (BLM 2009a, pg. 67). However, this resource has not yet proven to be economically important in the range-wide planning area.

While coal bed natural gas activity is minimal in the planning area, a substantial amount of conventional oil and gas exploration and development is ongoing. Approximately 33 percent of Bowman County and four percent of Slope County is covered by oil and gas fields (BLM 2009a, pg. 10). There is no oil and gas activity in the portion of Golden Valley County within the planning area; therefore, the following discussion will include only Slope and Bowman Counties.

Most active oil and gas development within GRSG habitat is occurring in Bowman County in the vicinity of the Cedar Creek anticline. Oil production in Bowman County peaked in 2008 at over 1.5 million barrels (bbls) per month and has declined since then to a 2013 rate of approximately 730,000 barrels per month (North Dakota Industrial Commission 2013a, pg. 15–16). Gas production in Bowman County also peaked in 2008 at over two million MCF (thousand cubic feet) per month. It has since declined to a 2012 rate of approximately 900 thousand to one million MCF per month (North Dakota Industrial Commission 2013b, pg. 5–6). Bowman County currently has 577 wells capable of producing oil and gas (North Dakota Industrial Commission 2013c, pg. 2).

Within Bowman County, the shallow Pierre formation produces gas, and the deeper Red River and Red River B formations produce both oil and gas. At less than one percent, three percent, and two percent, respectively, of total gas produced in North Dakota in 2012, none of these formations plays a major role in North Dakota gas production (North Dakota Industrial Commission 2012).

In 2007, the Red River formation produced 42 percent of the oil in North Dakota. This figure dropped to only one percent in 2012, due to both declining production from the formation (the natural depletion of the reservoir) and the large amount of oil now being produced by the Bakken formation, which does not reach Slope or Bowman County and does not have potential in the portion of Golden Valley County within the planning area (BLM 2009a, pg. 22; North Dakota Industrial Commission 2011).

Slope County has some oil and gas activity as well. Oil production in Slope County remained relatively stable between 2007 and 2013 at between 30,000 and 55,000 barrels per month (North Dakota Industrial Commission 2013a, pg. 15–16). Gas production in the county peaked between 2008 and 2009 at over 200 thousand MCF per month. It has since declined to a 2013 rate of approximately 13 to 19 thousand MCF per month (North Dakota Industrial Commission 2013b, pg. 5–6). Slope County currently has 19 wells capable of producing oil and gas (North Dakota Industrial Commission 2013c, pg. 2).

There are 11 oil and gas fields within GRSG habitat. **Table 3-15** shows the number of wells in each field and production (by barrels of oil and MCF of gas) by field in 2011.

All of the fields shown in **Table 3-15** are in Bowman County. A small portion of the Cedar Hills field reaches into the southern tip of Slope County. No other fields exist in the planning area. All of the oil fields lie within the Red River and Red River B formations, and the gas fields lie within the Pierre formation.

Table 3-15
Oil and Gas Activity by Field in the Planning Area

Field	Resource	Producing Wells	Injection Wells	2011 Production
Cedar Hills	Oil	239	240	9,025,993 barrels
Cedar Creek	Oil and Gas	41 Oil, 30 Gas	23	290,916 barrels; 1,100,876 MCF
Little Missouri	Oil and Gas	4 Oil, 30 Gas	1	12,746 barrels; 1,100,872 MCF
Horse Creek	Oil	13	2	78,388 barrels
South Horse Creek	Oil	3	0	26,163 barrels
Medicine Pole Hills	Oil	46	31	613,587 barrels

Table 3-15
Oil and Gas Activity by Field in the Planning Area

Field	Resource	Producing Wells	Injection Wells	2011 Production
Amor	Oil	8	2	130,251 barrels
State Line	Oil	5	1	49,206 barrels
Coyote Creek	Oil	4	0	15,290 barrels
Hart[1]	Oil	0	0	0
Rhame[1]	Oil	0	0	0

Source: BLM 2012a
[1]Field is no longer producing and has no remaining active wells.

WAFWA Management Zone 1

Table 3-16 through **Table 3-20** display data compiled in a BER produced by the USGS and BLM (Manier et. al. 2013). In each table, data are presented by surface management agency and their occurrence within GH and PH in the planning area and MZ 1. There are no acres of oil shale leases in the planning area (Manier et al. 2013).

Table 3-16
Open to Oil and Gas Leasing within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ 1	Planning Area	MZ 1	Planning Area	MZ 1
BLM	73,435	6,763,200	100	3,970,400	30,400	2,792,800
Forest Service	92,700	768,400	29,300	484,100	63,400	284,300
Tribal and Other Federal	0	413,800	0	329,800	0	84,000
Private	35,400	8,582,500	5,000	6,510,600	30,400	2,071,900
State	400	181,000	0	98,800	400	82,200
Other	0	900	0	900	0	0

Source: Manier et al. 2013

Table 3-17
Closed to Oil and Gas Leasing within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ 1	Planning Area	MZ 1	Planning Area	MZ 1
BLM	0	520,200	0	370,100	0	150,100
Forest Service	0	16,600	0	16,600	0	0

Table 3-17
Closed to Oil and Gas Leasing within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
Tribal and Other Federal	0	1,595,800	0	1,594,400	0	1,400
Private	0	2,353,600	0	1,848,000	0	505,600
State	0	379,100	0	315,400	0	63,700
Other	0	0	0	0	0	0

Source: Manier et al. 2013

Table 3-18
Oil and Gas Leases within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	26,000	951,800	0	624,200	26,000	327,600
Forest Service	25,200	54,600	12,200	29,700	13,000	24,900
Tribal and Other Federal	0	5,000	0	5,000	0	0
Private	5,200	2,268,100	1,200	1,721,900	4,000	546,200
State	200	45,300	200	27,900	0	17,400
Other	0	0	0	0	0	0

Source: Manier et al. 2013

Table 3-19
Oil and Gas Leases Held by Production within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PP\H	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	24,500	784,500	0	673,900	24,500	110,600
Forest Service	1,827	117,800	27	80,900	1,800	36,900
Tribal and Other Federal	0	19,500	0	19,500	0	0
Private	14,400	2,055,700	400	1,819,300	14,000	236,400
State	500	16,900	0	13,500	500	3,400
Other	0	0	0	0	0	0

Source: Manier et al. 2013

Table 3-20
Oil and Gas Wells within GRSG Habitat

Surface Management Agency	Total Acres[1]		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	702	30,800	2	26,200	700	4,600
Forest Service	27	3,600	9	2,100	18	1,500
Tribal and Other Federal	0	3,406	0	3,400	0	6
Private	2,200	161,800	300	140,400	1,900	21,400
State	133	17,900	13	15,400	120	2,500
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 manages 30,574 acres of surface over federal minerals within the planning area, the BLM also manages the subsurface minerals underlying 396,053 acres (41 percent) of the planning area (including federal subsurface beneath BLM-administered lands). Lands on which the surface is owned or managed by an entity other than the BLM and the subsurface is managed by the BLM are called split-estate lands. **Table 3-21** breaks down the surface ownership above federal minerals in the planning area.

Table 3-21
Federal Mineral Status in the North Dakota Planning Area

Land Status	Acres
BLM Surface/Federal Minerals	30,574
Private Surface/Federal Minerals	227,020
North Dakota School Trust/Federal Minerals	1,842
National Wildlife Refuge/Federal Minerals	318
Forest Service/Federal Minerals	136,299
Total	**396,053**

Source: BLM 2012a

Because the BLM is not making decisions on federal minerals beneath surface managed by other federal agencies in this plan amendment, only federal minerals beneath BLM, private, and state surface are discussed in **Chapter 3** and **Chapter 4** as being part of the decision area.

The federal government does not always own every type of mineral in a given acre of federal mineral estate. For example, in some areas, the federal government will only own the coal rights, while a private or state entity might own the oil and gas rights. For this reason, the federal mineral estate for any specific mineral type in the decision area is different than that for all other mineral types in the decision area. The federal mineral estate for oil and gas in the decision area is 73,441 acres, as shown in **Table 3-22**. Oil and gas potential in the tri-county area is shown in **Figure 3-7** in **Appendix A**.

Table 3-22
Oil and Gas Federal Mineral Status in the North Dakota Decision Area

Land Status	Acres
BLM Surface/Federal Minerals	30,574
Private Surface/Federal Minerals	42,452
North Dakota School Trust/Federal Minerals	415
Total	**73,441**

Source: BLM 2012a

Table 3-23 shows the oil and gas potential within each type of habitat as well as throughout the planning area.

Table 3-23
Oil and Gas Potential in Relation to GRSG PH and GH

	Development Potential (acres)			
Habitat Type	**High**	**Medium**	**Low/No Known**	**Total**
Total Decision Area *(BLM surface/federal minerals)*	26,731	2,002	1,841	**30,574**
Total Decision Area *(Private or school trust surface/federal minerals)*	19,379	5,218	18,264	**42,861**
PH *(BLM surface/federal minerals)*	26,731	2,002	1,721	**30,454**
PH *(Private or school trust surface/federal minerals)*	18,930	4,731	7,082	**30,743**
GH *(BLM surface/federal minerals)*	0	0	80	**80**
GH *(Private or school trust surface/federal minerals)*	442	327	4,247	**5,016**

Table 3-23
Oil and Gas Potential in Relation to GRSG PH and GH

Habitat Type	Development Potential (acres)			
	High	Medium	Low/No Known	Total
Other Areas *(BLM surface/federal minerals)*	0	0	40	**40**
Other Areas *(Private or school trust surface/federal minerals)*	7	160	6,935	**7,102**

Source: BLM 2012a

A total of 46,110 acres (63 percent) of the federal mineral estate administered by the BLM in the planning area has high oil and gas potential. However, much of this federal mineral estate has already been leased. There are 170 existing leases in the planning area: 130 in PH, 16 in GH, and five in both PH and GH. A total of 25,930 acres (85 percent) of federal oil and gas beneath BLM-administered surface in the planning area has been leased. Additionally, 21,487 acres (50 percent) of federal oil and gas estate beneath private or state-owned surface has been leased. **Table 3-24** breaks down existing leases within PH and GH. A total of 42,367 acres (89 percent) of existing leases in the planning area are within PH.

Table 3-24
Existing Oil and Gas Leases on Federal Mineral Estate

Habitat Type	Acres Leased
Total Decision Area *(BLM surface/federal minerals)*	25,930
Total Decision Area *(Private or school trust surface/federal minerals)*	21,487
Priority Habitat (PH) *(BLM surface/federal minerals)*	25,888
Priority Habitat (PH) *(Private or school trust surface/federal minerals)*	16,479
General Habitat (GH) *(BLM surface/federal minerals)*	42
General Habitat (GH) *(Private or school trust surface/federal minerals)*	1,383
Other Areas *(BLM surface/federal minerals)*	0
Other Areas *(Private or school trust surface/federal minerals)*	3,625

Source: BLM 2012a

Because much of the federal mineral estate in this area has been leased, drilling activity on federal mineral estate within GRSG habitat has been decreasing since 2005 and has dropped off significantly since 2008 (**Table 3-25**). Well density in GRSG habitat ranges from 0 to 25 wells per section.

Bowman County is the only county with large blocks of BLM-administered surface. Although the BLM can limit oil and gas development on split-estate lands, the BLM has more discretion to restrict these activities where it manages the surface as well as the subsurface mineral estate. Production on federal mineral estate in Bowman County has been primarily in the Red River B formation, although there has also been significant activity in the Eagle formation (BLM 2010b, pg. 108). More information on these formations can be found above under *Conditions of the Planning Area*.

Table 3-25
Drilling Activity within GRSG Habitat[1]

Year	Wells Drilled
2005	88
2006	82
2007	38
2008	49
2009	7
2010	14
2011	2
2012	3

Source: BLM 2012a
[1]All wells are either federal wells or private wells located on a federal unit (see discussion on unitization below).

Many of the oil and gas leases in Bowman County are unitized. Unitization provides for the exploration and development of an entire geologic structure or area by a single operator so that drilling and production may proceed in the most efficient and economic manner. The two most extensive units administered by the NDFO in the Red River B formation include approximately 400 producing and service wells (e.g., water and air injection and water source wells). Roughly one-half of these wells are on BLM-administered surface lands. As of 2009, there were 101 producing or permitted gas wells in the Little Missouri Pierre Unit (within the Pierre formation). Roughly one-half of these were producing on BLM-administered surface lands. These units appear to be reaching full development, although activity is still present (BLM 2010b).

Oil and gas leases offered since March 2004 are subject to NSO and TL stipulations to protect GRSG. The NSO stipulation prohibits surface occupancy

within 0.25 mile of leks. Additionally, a TL prohibits seismic, construction, or other development from occurring within two miles of leks between March 1 and June 15. Leases offered between 1987 and 2004 are subject to NSO stipulations within 500 feet of leks and a requirement to use special care to avoid nesting areas associated with leks from March 1 to June 30. Some leases within GRSG habitat date back before 1987 and may not be subject to any special stipulations to protect GRSG. **Table 3-26** breaks down the acres within BLM-administered lands by whether they are open or closed to leasing and what stipulations are applied. Because some acres may be subject to both TLs and CSU stipulations, the acres in this table will not add up to the total oil and gas federal mineral estate in the decision area.

Table 3-26
Oil and Gas Leasing Categories in PH and GH

Category	Total Decision Area (acres)	PH (acres)	GH (acres)
Open to Leasing (*BLM surface/federal minerals*)	30,574	30,494	80
Open to Leasing *(Private or school trust surface/federal minerals)*	42,859	30,741	5,016
Total Federal Oil and Gas Estate Open to Leasing	**73,433**	**61,235**	**5,096**
Closed to Leasing *(BLM surface/federal minerals)*	0	0	0
Closed to Leasing *(Private or school trust surface/federal minerals)*	0	0	0
Total Federal Oil and Gas Estate Closed to Leasing	**0**	**0**	**0**
Open to Leasing (subject to standard terms and conditions) *(BLM surface/federal minerals)*	3,238	3,117	80
Open to Leasing (subject to standard terms and conditions) *(Private or school trust surface/federal minerals)*	21,892	9,782	5,011
Total Federal Oil and Gas Estate subject to standard terms and conditions	**25,130**	**12,899**	**5,091**
NSO *(BLM surface/federal minerals)*	6,444	6,443	2
NSO *(Private or school trust surface/federal minerals)*	3,336	3,335	2
Total Federal Oil and Gas Estate subject to NSO	**9,780**	**9,778**	**4**

Table 3-26
Oil and Gas Leasing Categories in PH and GH

Category	Total Decision Area (acres)	PH (acres)	GH (acres)
CSU *(BLM surface/federal minerals)*	11,742	11,742	5
CSU *(Private or school trust surface/federal minerals)*	9,493	9,493	3
Total Federal Oil and Gas Estate subject to CSU	**21,235**	**21,235**	**8**
Seasonal TL *(BLM surface/federal minerals)*	20,882	20,883	4
Seasonal TL *(Private or school trust surface/federal minerals)*	17,622	17,623	3
Total Federal Oil and Gas Estate subject to Seasonal TL	**38,504**	**38,506**	**7**

Source: BLM 2012a

As **Table 3-26** shows, all federal oil and gas estate within the decision area is open to oil and gas leasing. However, NSO stipulations apply on 9,780 acres (one percent) of the decision area, CSU stipulations apply on 21,235 acres (29 percent), and TLs apply on 38,504 acres (52 percent). A total of 25,130 acres (34 percent) of the decision area are open to leasing subject to standard terms and conditions.

Fifteen parcels on 9,036 acres of federal oil and gas estate in the planning area have been nominated for leasing since July 2011; however, all nominated parcels since that time have been deferred until this plan amendment is completed.

3.8.3 Trends

The Energy Information Administration estimates that over the next two decades both demand and prices for oil and gas will increase. These circumstances would likely result in continued industry emphasis on increasing oil supplies and searching for additional natural gas supplies in the planning area. Much of the oil and gas supply growth within the planning area is expected to come from production in existing reservoirs, with new reservoir discoveries potentially coming from the exploration of the Three Forks Formation (which is north of GRSG habitat, outside the planning area), shallow gas and biogenic gas reservoirs, and coal bed natural gas (BLM 2009a).

It is estimated that, in an unconstrained scenario, between 2010 and 2029 as many as 7,641 wells will be drilled in North Dakota (BLM 2009a, pg. 64). Up to 150 (two percent) of those wells could be coal bed gas wells within the Fort Union coal region. The potential for future coal bed natural gas development is discussed further below. Of the other 7,491 wells (98 percent), the majority are

projected to be drilled in and around existing fields in the deeper portion of the Williston basin (around the Bakken formation, which is outside the planning area) and along the Cedar Creek anticline in Bowman County (BLM 2009a, pg. 64).

No coal bed gas exploration drilling plans or plans of development have been proposed by industry, and operators polled in 2009 did not submit projections of future activity or interest in future activity. Much of the potential coal bed gas drilling is likely to occur in one or two townships instead of being spread evenly over the area of potential (BLM 2009a, pg. 67–68).

3.9 COAL

The BLM manages coal through the solid leasable mineral program. 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.

3.9.1 Conditions of the Planning Area

North Dakota coal is considered lignite since it generally is of lower rank and has low British Thermal Units, or heating value, per ton of coal. Lignite is developed through surface mining. Most mining and production of lignite in North Dakota has been mine-mouth production associated with coal-fired power plants (BLM 2010b, pg. 109).

Lignite mining is concentrated in the north-central portion of North Dakota and mainly occurs on privately owned mineral deposits. There is no activity within the planning area. While there is a large coal deposit within GRSG habitat in Bowman County, this deposit has not been mined and is not leased.

WAFWA Management Zone 1

Table 3-27 and **Table 3-28** 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 MZ I.

Table 3-27
Coal Potential within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	8,284	2,955,400	84	2,573,200	8,200	382,200
Forest Service	96,500	688,500	29,900	426,500	66,600	262,000
Tribal and Other Federal	0	1,499,600	0	1,378,800	0	120,800
Private	471,100	18,123,200	201,000	15,403,800	270,100	2,719,400

Table 3-27
Coal Potential within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
State	26,600	1,884,500	10,900	1,567,300	15,700	317,200
Other	0	9,400	0	9,400	0	0

Source: Manier et al. 2013

Table 3-28
Surface Coal Leases within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	0	77,700	0	19,300	0	58,400
Forest Service	5,600	38,500	5,200	38,100	400	400
Tribal and Other Federal	0	0	0	0	0	0
Private	500	204,500	500	195,800	0	8,700
State	0	3,500	0	3,500	0	0
Other	0	0	0	0	0	0

Source: Manier et al. 2013

3.9.2 Conditions on BLM-Administered Lands

The BLM manages 396,053 acres of federal mineral estate (30,574 acres of BLM-administered land with federal minerals and 365,479 acres of non-BLM administered surface with federal minerals, known as "split-estate") in the planning area. Within GRSG habitat, the BLM manages 32,980 acres (5 percent) of the surface and 279,248 acres (40 percent) of the subsurface minerals.

While coal potential exists on federal mineral estate within the planning area, no development has occurred.

3.9.3 Trends

No coal development is anticipated within the planning area for the next 20 years.

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 lode or placer 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 fluorspar, asbestos, talc, mica, and limestone).

3.10.1 Conditions of the Planning Area

There are no locatable mineral operations within planning area (BLM 2010b, pg. 107). However, several uranium deposits exist within GH in Bowman County. These deposits are primarily within lignites, sandstones, and carbonaceous mudstone. In the 1950s and 1960s, approximately 85,000 tons of low grade ore lignites were produced in North Dakota, resulting in 270 tons of "yellow cake" (U308). Uranium mining in North Dakota halted in 1967. No uranium production has ever occurred within the planning area (North Dakota Geological Survey 2013).

3.10.2 Conditions on BLM-Administered Lands

The BLM manages 396,053 acres of federal mineral estate (30,574 acres of BLM-administered land with federal minerals and 365,479 acres of non-BLM administered surface with federal minerals, also known as "split-estate") in the planning area. Within GRSG habitat, the BLM manages 32,980 acres (5 percent) of the surface and 279,248 acres (40 percent) of the subsurface minerals.

There is no locatable mineral development on BLM-administered lands within the planning area. There is no known locatable mineral potential within GRSG habitat.

3.10.3 Trends

The development potential of locatable minerals other than uranium within the planning area may be limited because the surficial geology is of a primarily sedimentary nature. This limits significant occurrences of mineralized zones (BLM 2010b, pg. 107).

Despite the increase in uranium prices after 2002, the low grade uranium deposits within the planning area are not expected to be developed during the next 20 years.

3.11 MINERAL MATERIALS

Mineral materials include common varieties of construction materials and aggregates, such as, sand, gravel, cinders, roadbed, and ballast material. Mineral materials 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

Sand and gravel, and scoria, or clinker, are of particular interest in North Dakota. Scoria is the result of the baking of overlying rock by burning coal beds and is associated with most lignite occurrences in the planning area (BLM 1986, pg. 34). Most scoria potential within GRSG habitat is located along the Little Missouri River in Bowman and Slope Counties (BLM 2010b, pg. 6).

In 2011, one mineral materials mining operation was active in the planning area. This seven-acre operation was a gravel mine in Bowman County (North Dakota State Soil Conservation Committee 2011, pg. 1).

3.11.2 Conditions on BLM-Administered Lands

The BLM manages 396,053 acres of federal mineral estate (30,574 acres of BLM-administered land with federal minerals and 365,479 acres of non-BLM administered surface with federal minerals, also known as "split-estate") in the planning area. Within GRSG habitat, the BLM manages 32,945 acres (5 percent) of the surface and 279,248 acres (40 percent) of the subsurface minerals.

While mineral materials potential exists within PH, there is currently no development in this area. However, all of the federal mineral estate in the planning area is open to mineral materials disposal.

3.11.3 Trends

Future demand for mineral materials will vary depending upon market conditions, which differ according to economic conditions and construction activity. Construction projects within approximately 50 miles of mineral materials deposits may lead to development of these deposits. The primary driver of construction activity in the planning area is road construction for oil and gas exploration and development. As new oil and gas development in the planning area is occurring at a slow rate, it is expected that mineral materials activity will continue at roughly the same level for the next 20 years.

3.12 Comprehensive Travel and Transportation Management

Travel and transportation management is interrelated with many resources and resource uses that occur on BLM-administered lands. The transportation system throughout the planning area consists of a state highway, numerous paved and unpaved local roads, as well as unpaved primitive OHV roads and trails. See **Figure 3-8** in **Appendix A**. BLM expects to complete a comprehensive inventory of the existing BLM transportation network as part of the North Dakota RMP revision process.

3.12.1 Conditions of the Planning Area

State Highway 12, which runs through northern Bowman County, crosses PH and GH. Numerous local roads and trails also traverse identified GRSG habitat. There are 1,323 total miles of motorized and non-motorized routes in PH and 748 total miles in GH. Highway 12 is the only major roadway in the planning area. Camp Cook Road provides paved and unpaved local access from the town

of Marmarth southward along the western portion of Bowman County, while Rhame Road supports local travel south of the town of Rhame in north central Bowman County. Smaller local paved and unpaved roads, primitive roads, and trails account for the remainder of the transportation network in the planning area.

WAFWA Management Zone 1

Table 3-29 through **Table 3-32** 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 MZ I.

Table 3-29
Miles of Roads within GRSG Habitat

Surface Management Agency	Total Miles		Miles within GH		Miles within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	46	12,100	0	7,400	46	4,700
Forest Service	197	1,900	62	1,200	135	700
Tribal and Other Federal	0	6,100	0	5,800	0	300
Private	1,235	76,300	508	59,700	727	16,600
State	64	7,100	27	5,200	37	1,900
Other	0	0	0	0	0	0

Source: Manier et al. 2013

Table 3-30
Acres of Roads within GRSG Habitat

Surface Management Agency	Total Acres[1]		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	600	127,800	0	79,600	600	48,200
Forest Service	2,100	19,500	700	12,300	1,400	7,200
Tribal and Other Federal	0	64,800	0	61,500	0	3,300
Private	14,000	851,200	5,900	675,000	8,100	176,200
State	700	78,900	300	58,600	400	20,300
Other	0	300	0	300	0	0

Source: Manier et al. 2013
[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 3-31
Miles of Railroads within GRSG Habitat

Surface Management Agency	Total Miles		Miles within GH		Miles within PH	
	Planning Area	MZ 1	Planning Area	MZ 1	Planning Area	MZ 1
BLM	0	59	0	50	0	9
Forest Service	0	28	0	28	0	0
Tribal and Other Federal	0	83	0	83	0	0
Private	32	1,346	9	1,200	23	146
State	0	100	0	90	0	10
Other	0	1	0	1	0	0

Source: Manier et al. 2013

Table 3-32
Acres of Railroads within GRSG Habitat

Surface Management Agency	Total Acres[1]		Acres within GH		Acres within PH	
	Planning Area	MZ 1	Planning Area	MZ 1	Planning Area	MZ 1
BLM	0	257	0	200	0	57
Forest Service	4	204	0	200	4	4
Tribal and Other Federal	0	600	0	600	0	0
Private	232	8,253	68	7,600	164	653
State	0	519	0	500	0	19
Other	0	1	0	1	0	0

Source: Manier et al. 2013
[1]Assumes footprint of 9.4 meters.

Off-Highway Vehicles

There are currently no locations in the planning area designated as open for cross-country OHV use. OHV use is limited to existing routes on 56,490 acres of BLM-administered land throughout the NDFO. BLM travel and transportation management does not currently designate existing routes as open or closed to motorized travel.

3.12.2 Conditions on BLM-Administered Lands

The noncontiguous nature of BLM-administered lands in the North Dakota planning area influences the type and use of existing transportation routes. West of Camp Cook Road, a network of privately maintained unpaved roads support oil and gas drilling operations in the 138,613-acre Big Gumbo Management Area,

of which 22,164 acres are BLM-administered land. This area represents the largest contiguous acreage of BLM-administered land in the planning area as well as the densest network of travel routes on BLM-administered land. Within the Big Gumbo Management Area, there are 413 miles of motorized and non-motorized travel routes, including 110 miles on BLM-administered land. Within the entire GRSG planning area there are 2,944 miles of transportation routes, including 114 miles on BLM-administered lands within PH. The BLM does not perform regular maintenance on any routes within the planning area. Additionally, there are 108 miles (387 acres) of routes within four miles of an active lek. Studies (e.g., Holloran 2005) demonstrate that activity such as traffic on roadways negatively affects the number of male GRSG displaying at lek sites.

3.12.3 Trends

Use of the existing transportation network in the planning area is expected to steadily increase over time. With the increased global demand for petroleum-based fuels, the creation of new roads in the planning area is expected in order to support expanded oil and gas exploration. Use of motorized vehicles on existing travel routes in the planning area is also expected to increase over time to support oil and gas exploration, provide access to prime hunting locations, and for access to private land.

3.13 RECREATION

Recreation opportunities in North Dakota are diverse. However, noncontiguous lands present management challenges. Most recreation users in the state participate in dispersed recreation activities, which include hunting, fishing, camping, biking, hiking, horseback riding, and wildlife viewing. Motorized recreational activities, such as OHV use generally takes place in conjunction with other activities. Users often participate in these activities individually or in small groups.

3.13.1 Conditions of the Planning Area

Low amounts of recreation occur in the planning area. Land in North Dakota is primarily held under private ownership. In the planning area, 741,607 acres (77 percent) are privately held. Although North Dakota state law permits foot travel across private land in order to gain access to public lands, the scattered distribution of BLM-administered land limits the extent of public recreation opportunities throughout the planning area.

Big Game Hunting

Historically, the NDGFD issued hunting licenses for North Dakota white-tailed deer, mule deer, pronghorn antelope, moose, elk, and bighorn sheep. Due to low species populations in 2012, NDGFD suspended the hunting season for pronghorn. For other big game species, additional restrictions are placed on the time of year, location, method of take (gun, bow, muzzleloader), and daily bag and possession limits. Hunting antlerless mule deer in portions of the planning area is periodically prohibited depending on population numbers.

Through agreements between the NDGFD and private landowners, hunting is permitted on designated private parcels. Participants in the Private Land Open to Sportsmen program may enter select private parcels during the applicable hunting season and with the permitted hunting equipment. For hunters, this program can provide more contiguous lands for recreating. However, private lands in the program change frequently and comprise only a small portion of private land in the planning area.

NDGFD permits the hunting of a number of smaller upland game species, water fowl, and furbearers. However, the NDGFD has not allowed the hunting of GRSG since 2008 due to a declining species population (NDGFD 2012b; NDGFD 2014).

3.13.2 Conditions on BLM-Administered Lands

Table 3-33 summarizes the distribution of recreation activities on all BLM-administered lands in the NDFO. The most popular recreation activity on BLM-administered lands in North Dakota is hunting, which accounts for 65 percent of all recreation activities.

Table 3-33
Recreation Activities and Participants[1]

Activity	Participants	Visitor Days
Camping	721	961
Picnicking	155	26
Big Game Hunting	12,986	6,287
Environmental Education	1,232	103
Wildlife Viewing	1,575	246
Hiking, Walking or Running	2,606	376
Horseback Riding	515	258
Total	**19,790**	**8,257**

Source: BLM 2010b
[1]For activities during fiscal year 2008 in the NDFO planning area.

Low amounts of recreation occur on BLM-administered lands. The scattered distribution of BLM-administered land in the planning area limits dispersed recreation opportunities such as camping, hiking, and birding. There are no developed recreational facilities, Special Recreation Management Areas (SRMA), or Extensive Recreation Management Area (ERMA) on BLM-administered lands. Moreover, the BLM does not currently have any approved or pending SRPs in the decision area.

Recreation uses on BLM-administered land where GRSG habitat exists primarily include the low-impact, dispersed activities summarized in **Table 3-33**.

3.13.3 Trends

Recreation use in the planning area, including BLM-administered lands is expected to increase over time. In particular, the NDFO anticipates more dispersed recreation activities because of the region's rural landscape, increasing national population, and increasing numbers of local employment opportunities in the energy sector. Additional factors expected to affect demand for recreation in the planning area include:

- Continued popularity of outdoor recreation as a family-oriented activity
- Increasingly active retired population with more disposable time and income
- Continued importance of hunting and other outdoor recreation activities to the local economy
- Increasing importance of outdoor recreation as other areas of the country becomes more urbanized

3.14 RANGE MANAGEMENT

The primary laws that govern livestock grazing on BLM-administered 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 North and South Dakota Standards for Rangeland Health and Guidelines for Livestock Grazing Management (BLM 1997). 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. As required by regulation, grazing management on allotments not meeting standards would be modified to make progress toward meeting standards if livestock are a significant causal factor. Rangeland conditions which do not meet standards could be improved with changes to allotment management, including, but 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; and
- improving livestock distribution.

Improved livestock distribution could be achieved through construction of water developments and fences, selective salt and/or 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 BLM-administered lands outside an established grazing district (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 and the percent BLM-administered lands utilized 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 (1,000 pounds with calf) 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). Various animals can graze on public lands and have varying forage requirements, which can be displayed in AUM equivalents. The most common classes of livestock in the planning area are cattle, bison (one AUM equivalent), and sheep (0.2 AUM equivalents).

3.14.1 Conditions of the Planning Area

Grazing in the planning area is concentrated in the south-western portion of the state, in Bowman County. The majority of livestock grazing occurs on open, rolling plains or river breaks. Vegetation in the river breaks varies from open grassland to juniper woodlands. Grazing allotments cover a patchwork of land ownership including private lands, BLM-administered lands, National Forest System grasslands, and North Dakota school trust lands (see **Figure 3-9** in **Appendix A**). The majority of grazing allotments in the planning area are within PH.

Local landowners are working together with the National Resource Conservation Service's (NRCS) Bowman-Slope Soil Conservation District and other partners on rangeland health. A working group called Grassing Ranchers About Sustainable Stewardship has been formed to help ranchers and other landowners with GRSG habitat issues and facilitate agency work with landowners.

WAFWA Management Zone I

Table 3-34 and **Table 3-35** display data compiled in a BER produced by the USGS and BLM (Manier et al. 2013). In each table, data are presented by surface management agency and their occurrence within GH and PH in the planning area and MZ I. On lands of all surface management, there is a total of 341,400 acres of grazing allotments, with 70,800 in GH and 270,600 in PH as displayed in **Table 3-34**.

Table 3-34
Grazing Allotments within GRSG Habitat

Surface Management Agency	Total Acres		Acres within GH		Acres within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	32,900		100	4,443,000	32,800	2,982,200
Forest Service	95,500		29,400	510,300	66,100	291,000
Tribal and Other Federal	0		0	137,200	0	10,600
Private	201,700		39,800	11,338,100	161,900	4,619,800
State	11,300		1,500	1,194,300	9,800	681,000
Other	0		0	3,100	0	300

Source: Manier et al. 2013

Table 3-35
Fences within GRSG Habitat

Surface Management Agency	Total Miles[1]		Miles within GH		Miles within PH	
	Planning Area	MZ I	Planning Area	MZ I	Planning Area	MZ I
BLM	63	30,000	59	11,300	4	18,700
Forest Service	200	7,000	100	900	98	6,100
Tribal and Other Federal	0	1,000	0	500	0	500
Private	700	32,200	500	32,100	200	100
State	48	14,000	37	3,300	11	10,700
Other	0	1,400	0	0	0	1,400

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.

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 1,000 miles of fence, 700 in GH, and 300 in PH based on BER data.

3.14.2 Conditions on BLM-Administered Lands

Within the planning area the majority of BLM-administered land is open to grazing (32,820, over 99 percent) (see **Table 3-36**). No portion of BLM-administered lands in the planning areas is closed to grazing, and approximately 85 acres (less

Table 3-36
North Dakota Field Office Planning Area – Grazing Allocation on BLM-Administered Lands

	Non Habitat	GH Acres	PH Acres	Totals Acres
Open to grazing	45	80	32,820	32,945
Closed to grazing	0	0	0	0
Not allocated	5	0	80	85

Source: BLM 2012a

than one percent) of the planning area are not allocated for grazing (i.e., not specified as open or closed to grazing in existing land use plans) (BLM 2012a). Currently, the BLM manages grazing on 28 grazing allotments in the planning area; 26 of these authorizations are for cattle, one is for bison, and one is for sheep. There are 5,780 authorized AUMs on these allotments. **Table 3-37** provides information for each allotment managed in the planning area.

Table 3-37
North Dakota Field Office Planning Area – AUMs by Allotment*

Allotment No.	Allotment Name	Public AUMs	Management Category	Type Livestock	Habitat Type
07371	Bison Creek	13	C	Cattle	PH
10590	Cedar Hills	1,629	M	Cattle	PH
10595	Brushy Draw	53	C	Cattle	PH
10597	Bog Creek	22	C	Bison	PH
10627	Badger	34	C	Cattle	PH
10631	Box Elder	318	C	Cattle	PH
10641	Rattlesnake Butte	24	C	Cattle	PH
10642	Long Grass	108	C	Cattle	PH
10671	Twin Forty	12	C	Cattle	PH
20603	Wildcat	13	C	Sheep	PH
20608	Antler	20	C	Cattle	PH
20610	Badlands	39	C	Cattle	PH
20611	Spotted Mouse	11	C	Cattle	PH
20614	Antelope Butte*	1,092	M	Cattle	PH
20615	Little Mo	38	C	Cattle	PH
20618	Grassy Knoll	30	C	Cattle	PH
20633	Sevenmile	173	C	Cattle	PH
20636	Austby	15	C	Cattle	PH
20638	Mud Butte	100	C	Cattle	PH

Table 3-37
North Dakota Field Office Planning Area – AUMs by Allotment*

Allotment No.	Allotment Name	Public AUMs	Management Category	Type Livestock	Habitat Type
20649	Stove Top	10	C	Cattle	PH
20650	Worser Creek	190	C	Cattle	PH
20651	Big Gumbo	130	M	Cattle	PH
20659	Tatanka	56	C	Cattle	PH
20661	Latigo	100	C	Cattle	PH
20663	Kid Creek	340	I	Cattle	PH
20677	Cold Turkey Creek	20	C	Cattle	GH
20678	Kalina	8	C	Cattle	PH
20696	Border	4	C	Cattle	Non-habitat
Total	**28 Allotments**	**5,780**	**N/A**	**N/A**	**N/A**

Source: BLM 2010a
*Note: Antelope Butte allotment AUMs displayed for the entire allotment, which includes a portion of the allotment in Montana, outside of the planning area.

Many allotments have range improvements such as fences, stock ponds, pipelines, springs, windmills, seedings, wells, and access roads for livestock management purposes.

Livestock grazing allotments are administered under three selective management categories designed to concentrate public funds and management efforts on allotments with the most significant resource conflicts and the greatest potential for improvement (BLM Manual Handbook 1740-1, BLM 2008e).

The categories include:

- Improve (I) category allotments: are managed to resolve high level resource conflicts and concerns and receive highest priority for funding and management actions.
- Maintain (M) category allotments: are managed to maintain currently satisfactory resource conditions and will be actively managed to ensure that resource values do not decline.
- Custodial (C) category allotments: are managed custodial to protect resource conditions and values.

In addition to criteria identified in the handbook, recent guidance (Washington Office IM-2009-018, BLM 2008b) provides additional criteria to be used to designate allotments as Category I, M, or C. In the planning area, one allotment

is managed in the "I" category, three are in the "M" category, and the remaining 24 are in the "C" category (BLM 2010b).

On GRSG habitat (PH and GH), there are all or portions of 26 and one allotments respectively (**Table 3-38**). These allotments cover approximately 32,800 acres in PH and 80 acres in GH.

Table 3-38
North Dakota Field Office Planning Area – Allotments and AUMs by Habitat Category

	Non Habitat	GH	PH	Totals
Number of Active AUMs	8	20	5,752	5,780
Number of Allotments	1	1	26	28

Source: BLM 2012a

An assessment of rangeland health standards and guidelines has been made on all 28 allotments in the planning area, comprising 32,945 acres (see **Table 3-39**). Based on the most recently completed land health assessment, 29,728 acres are meeting all applicable standards and guidelines and 3,217 acres are not meeting standards. Livestock grazing on a 1,309-acre allotment was a causal factor for failing to achieve applicable standards and guidelines. Management actions have now occurred to ensure that this allotment is making progress towards achieving rangeland health standards and guidelines. No standards and guidelines assessments have been made on the 85 acres of non-allocated land in within the NDFO.

Table 3-39
North Dakota Field Office Planning Area – Land Health Assessment

	Non Habitat	GH	PH	Totals
Acres of allotments assessed for land health standards	40	80	32,820	32,945
Acres meeting land health standards	40	0	29,688	29,728
Acres not meeting land health standards	0	80	3,137	3,217
Acres not meeting land health standards due to livestock grazing	0	0	1,309	1,309
Acres of allotments not assessed	5	0	80	85

Source: BLM 2012a

3.14.3 Trends

The two primary factors driving trends for grazing resources in the planning area are the impacts of a long-term drought and increased recreational use and recreational value of rangelands.

Permitted use levels have remained static since the last RMP was written in 1988. Current use of allotments has been down since 2000 as a result of drought (BLM 2010b). The primary factor causing lowered levels of livestock use has been inadequate reservoir water, and a secondary factor has been lowered forage production. Water development from drought cost-share and other programs has increased, resulting in additional wells and stock water pipelines on rangelands. Normally, the majority of these improvements are installed on private land but extend into BLM-administered land. Drought, fire, disturbance, and improper grazing practices can also affect the abundance of cheat grass (*Bromus tectorum* and *B. japonicus*). Cheatgrass is unpalatable to livestock and wildlife except in its early growth phase. The end result is decreased productivity of overall forage levels. If drought conditions continue, alteration of grazing management practices may be required.

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. ACECs are areas within BLM-administered lands where special management attention is required to protect or to prevent irreparable damage to relevant values. These values identified in the ACEC nomination process must meet a set of importance criteria (BLM 1988b). The value, resource, process or natural system, or hazard present must have one of more of the following:

- More than locally significant qualities that 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 1988b). 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

There are no ACECs in the planning area.

3.15.2 Conditions on BLM-Administered Lands

There are no ACECs in the planning area.

3.16 AIR RESOURCES

Air resources include air quality and air quality related values (AQRVs). 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 (NO_x) and volatile organic compounds are regulated because they form ozone in the atmosphere.

In addition to EPA federal regulations, air quality is regulated by the North Dakota Department of Health (NDDoH), Division of Air Quality. This agency develops state-specific regulations and issues air quality permits to emission sources.

Ambient air quality is affected by the type and amount of air pollutants emitted into the atmosphere, the size and topography of the air basin, prevailing meteorological conditions, and the conversion of air pollutants and other species by a complex series of chemical and photochemical reactions in the atmosphere. The levels of air pollutants are generally expressed in terms of concentration, either in units of parts per million (ppm), parts per billion (ppb), or micrograms per cubic meter ($\mu g/m^3$).

AQRVs include effects on soil and water, such as sulfur and nitrogen deposition and lake acidification, and aesthetic effects, such as visibility.

3.16.1 Conditions of the Planning Area

North Dakota is in attainment for all NAAQS (EPA 2012a). The NDDoH, Division of Air Quality operates an ambient air quality monitoring network. This network monitors criteria air pollutant concentrations at six monitoring sites in

western North Dakota and one site in eastern North Dakota (NDDoH 2012). The National Park Service operates an additional criteria pollutant monitoring site in the south unit of the Theodore Roosevelt National Park. In addition, NDDoH requires three major industrial sources to conduct SO_2 monitoring at eight locations in the state (NDDoH 2012). There are no monitoring sites in the planning area; the nearest monitoring sites are the National Park Service site in Billings County and an NDDoH site in Dunn County. The National Park Service site monitors for ozone, $PM_{2.5}$, and SO_2, and the Dunn County site monitors for ozone, NO_2, $PM_{2.5}$ (as of 2011), PM_{10}, and SO_2.

Table 3-40 shows the concentrations of monitored pollutants in the latest three years for which data has been finalized. All monitored criteria pollutant concentrations were below the NAAQS during this time period (EPA 2012b).

Table 3-40
Air Quality Monitor Values in Billings and Dunn Counties (2009-2011)

Monitored Pollutant	Averaging Time	2009	2010	2011	3-year average	NAAQs	% of NAAQS
Billings County							
Ozone	8 hours	0.056	0.061	0.057	0.058	0.075 ppm	77
SO_2	1 hour	9	6	5	6.7	75 ppb	9
$PM_{2.5}$	24 hours	10	12	10	10.7	35 $\mu g/m^3$	30
$PM_{2.5}$[1]	Annual	4.1	4.7	4.1	4.3	12$\mu g/m^3$	36
Dunn County							
Ozone	8 hours	0.054	0.058	0.054	0.055	0.075 ppm	74
NO_2	1 hour	11	13	8	10.7	100 ppb	11
SO_2	1 hour	10	19	10	13	75 ppb	17
PM_{10}	24 hours	52	32	74	52.7	150 $\mu g/m^3$	35

Source: BLM 2012a; EPA 2012a; EPA 2012b

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

[1] $PM_{2.5}$ standard was revised on March 18, 2013, and the percentage shown reflects the revised standard.

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 (USG) –** 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.

Table 3-41 displays the number of days rated "Good" in the AQI, based on data collected from the Billings County monitor between 2009 and 2011. AQI data show there is little risk to the general public from air quality in the planning region. Air quality in the area was consistently good between 2009 and 2011.

Table 3-41
Air Quality Index Report (2009-2011)

Year	Number of Days with AQI	Number of Days rated Good	Percent of Days Rated Good	Number of Moderate Days	Number of USG, Unhealthy, or Very Unhealthy Days
2011	365	365	100	-	0
2010	357	353	99	4	0
2009	365	364	99	1	0
Total	**1,087**	**1,082**		**5**	**0**
Average		**100%**		**0%**	

Source: EPA 2012c
USG = unhealthy for sensitive groups

AQRVs 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. Based on trends identified from 1998 through 2008, visibility had remained stable at the Lostwood Wilderness and Theodore Roosevelt National Park IMPROVE monitor stations on the haziest days (20 percent worst days). On the 20

percent best (clearest) days, visibility at these monitors has been improving, with greater improvement at Theodore Roosevelt National Park (IMPROVE 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 sites to the planning area that are within these networks are in Theodore Roosevelt National Park; dry deposition rates have been measured since 1998, and wet deposition rates have been measured since 2001. The annual average precipitation pH between 2004 and 2011 ranged from 5.38 to 5.81 during this time period, with an average of 5.65. Normal rain has a pH level of 5.6, while acid rain has a pH level around 4.3 (EPA 2012d).

Table 3-42 shows the wet deposition levels of sulfates, nitrates, and ammonium, as well as pH and precipitation, from 2004 to 2011 and the dry deposition levels of sulfur and nitrogen from 2004 to 2010.

Table 3-42
Annual Average Deposition (2004-2011)

Year	pH	Precipitation (centimeters)	Annual Average Wet Deposition (kg/ha/yr)			Annual Average Dry Deposition (kg/ha/yr)	
			SO_4	NO_3	NH_4	Sulfur (SO_2 + SO_4^{2-})	Nitrogen (HNO_3+NO_3+ NH_4)
2004	5.38	27.7	1.67	2.07	0.88	0.5	0.7
2005	5.58	48.2	3.34	4.14	1.82	0.5	0.6
2006	5.71	24.4	2.15	3.12	1.46	0.5	1.0
2007	5.81	35.7	2.53	3.41	2.02	N/A	N/A
2008	5.63	26.9	1.98	2.64	1.29	0.3	0.7
2009	5.72	34.3	2.07	2.63	1.29	0.3	0.6
2010	5.64	58.1	2.61	3.96	2.11	0.3	0.6

Table 3-42
Annual Average Deposition (2004-2011)

Year	pH	Precipitation (centimeters)	Annual Average Wet Deposition (kg/ha/yr)			Annual Average Dry Deposition (kg/ha/yr)	
			SO_4	NO_3	NH_4	Sulfur (SO_2 + SO_4^{2-})	Nitrogen (HNO_3+NO_3+ NH_4)
2011	5.75	59.7	3.04	3.45	2.11	N/A	N/A
Ave	5.65	39.38	2.42	3.18	1.62	0.4	0.7

Source: NADP/NTN 2012; EPA 2004-2010
SO_4=sulfates; NO_3=nitrates; NH_4=Ammonium
kg/ha/yr = kilogram per hectare per year

There are no designated Class I areas within the planning area. The nearest Class I area is Theodore Roosevelt National Park, which is approximately 45 miles northeast of the northern edge of the planning area. There are two USFWS National Wildlife Refuges within Slope County; these refuges are considered potentially sensitive Class II areas. The Stewart Lake National Wildlife Refuge is in the east-central portion of the planning area, while the White Lake National Wildlife Refuge lies approximately 10 miles east of the planning area.

3.16.2 Conditions on BLM-Administered Lands

The area managed by the NDFO is in compliance with all NAAQS (NDDoH 2011, pg. 1-2). The Billings County monitoring location is the closest air quality monitor to the BLM-administered lands. As such, this monitoring location has 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 *Conditions of the Planning Area*.

3.16.3 Trends

Quantitative data provided by the Billings and Dunn County monitors show air quality has been consistently good in the planning area (EPA 2012c). The good air quality is largely attributed to the rural nature of the planning region.

The National Park Service 2008 Annual Performance and Progress Report details air quality and AQRV trends in National Parks, including Theodore Roosevelt National Park (NPS 2009). This report shows that the haze index on haziest days and sulfate, nitrate, and ammonium concentrations in precipitation have remained stable in the 1998 to 2007 time period, while the haze index on the clearest days has improved (NPS 2009, pg. 33-39).

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, pg. 667). 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 2010c). This document is often referred to as the "Climate Change SIR" and is incorporated by reference into the North Dakota 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 2010c, pg. 2-16). 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, pg. 5).

3.17.1 Conditions of the Planning Area

Climate

The climate in North Dakota is characterized by its unpredictability. The state experiences blizzards, floods, droughts, tornados, hail storms, thunderstorms,

[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) (State Department 2010, pg. 24). 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. GHG emissions 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 2012d).

high winds, severe cold spells, and extreme heat (Center for Integrative Environmental Research 2008, pg. 5).

The annual average temperature ranges from about 37°F in northeastern North Dakota to 44°F along most of the southern border. Average January temperatures range from near 0°F in the northeast to 15°F in the southwest. Average July temperatures range from 65°F in the northeast to 72°F in the south. The average number of days per year with maximum temperatures of 90°F or more range from 10 in the northeast to 24 in the west and south. Below 0°F temperatures average about 40 to 70 days each year across the state (Enz 2003).

Average annual precipitation ranges from about 14 to 22 inches from northwestern to southeastern North Dakota. Most precipitation falls as rain from April to September. The coldest months, November through February, average only about 0.50 inches per month, mostly as snow. Despite its northerly location, North Dakota's annual snowfall of 25 to 45 inches is less than other northern states. Winter snowpack averages nine to 15 inches from southwest to northeast (Enz 2003).

Greenhouse Gas Emissions

GHG emissions are generally reported at national and statewide levels. No comprehensive GHG emission inventory has been prepared for North Dakota. However, under the Greenhouse Gas Reporting Rule, facilities emitting more than 25,000 metric tons of GHGs annually are required to report their emissions. The EPA's GHG Reporting Program shows that 40 emitters in North Dakota are required to report their emissions under the program; none of these emitters are located in the planning area counties. These 40 facilities emitted over 37.6 million metric tons of carbon dioxide equivalents in 2010; 82 percent of these emissions came from power plants (EPA 2010b). As reported by the North Dakota Division of Air Quality, carbon dioxide emissions from fossil fuel combustion totaled 48.98 million metric tonnes of carbon dioxide in 2007 (this estimate did not include emissions from other GHGs).

Sources of GHG emissions include fossil fuel development, large wildfires, activities using combustion engines, and agriculture (fertilizer production and methane produced by livestock). No information on the specific GHG emission sources and their percentage contribution to overall levels is currently available for North Dakota.

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 2012d).

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. In the Great Plains, the average annual temperature has increased by about two degrees Fahrenheit over the past 100 years (National Conference of State Legislatures 2008). Depending on the model, in North Dakota temperature increases between three and five degrees Fahrenheit by the mid-21st century and between five and nine degrees Fahrenheit at the end of the century are predicted (US Global Change Research Program 2009, pg. 123). Precipitation is expected to increase during winter and spring, decrease slightly in the summer, and remain relatively unchanged in the fall (US Global Change Research Program 2009, pg. 125). Extreme weather events such as severe drought and intense rainfall are expected to increase in frequency (National Conference of State Legislatures 2008). In the western portion of the state, annual median runoff is expected to decrease between two and five percent by the mid-21st century, while runoff in the northeastern part of the state is expected to increase by five to 10 percent (US Global Change Research Program 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 (National Research Council 2010).

Wildland fire risk is predicted to increase due to climate change effects on temperature, precipitation, and wind. One study predicted an increase in median annual area burned by wildland fires in the western portion of North Dakota, based on a 1.8°F (1°C) global average temperature increase, to be 393 percent (National Research Council 2010). Changes in timing of precipitation and earlier runoff would increase fire risks.

Climate change has caused large-scale shifts in the ranges of species and the timing of the seasons and animal migrations within ecosystems of the US. Documented changes include the arrival of spring an average of 10 days to two weeks earlier through much of the US compared to 20 years ago, and multiple bird species now migrate north earlier in the year. These shifts are expected to continue and would likely impact the GRSG as climate change continues to affect their habitat (US Climate Change Science Program 2008).

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 North Dakota RMP has the following objectives related to soils:

- Soils of the BLM-administered lands will be managed to maintain productivity and promote sustained yields while keeping erosion at minimal/acceptable levels and preventing physical or chemical degradation.
- Proposed surface-disturbing projects will be analyzed to determine suitability of soils to support or sustain such projects. They will be designed to minimize soil loss. Bureau management actions and objectives will be consistent with soil resource capabilities.

In combination with climate, soil type and quality are the primary determining factors that determine whether sagebrush can exist in a given location. Soil type and quality also determine which variety of sagebrush community is able to thrive. Since the presence of GRSG is dependent upon the presence of sagebrush, and sagebrush type and viability are dependent on soil type and quality, soils are an important element in GRSG habitat.

3.18.1 Conditions of the Planning Area

Sagebrush occurs only within the southwest corner of North Dakota and is within the Silver Sagebrush Subdivision floristic province. Miller and Eddleman (2001) describe plains silver sagebrush (*Artemisia cana* var. *cana*) as a sagebrush community type that is widespread over the northern Great Plains at elevations of 1,200 to 2,100 meters that occupy well-drained alluvial flats, terraces valley bottoms, and drainage ways.

In the NDFO GRSG planning area, the overall soil resources condition is good, with some areas demonstrating diminished, unstable, or eroded soils due to grazing and other resource uses such as mineral development.

3.18.2 Conditions on BLM-Administered Lands

Table 3-43 provides acreage numbers for soils within the BLM-administered lands that occur within the planning area.

Table 3-43
Major Soil Orders on BLM-Administered Lands

Soil Type	Total acres (33,030 total)	PH acres (32,900 total)	GH acres (80 total)
Undetermined	4,382	4,338	36
Clayey	148	146	0
Clayey Terrace	44	44	0
Claypan	94	94	0
Closed Depression	2	2	0
Loamy	318	313	0
Loamy Overflow	159	159	0

Table 3-43
Major Soil Orders on BLM-Administered Lands

Soil Type	Total acres (33,030 total)	PH acres (32,900 total)	GH acres (80 total)
Loamy Terrace	256	256	0
Saline Lowland	1,598	1,598	0
Sands	2	0	0
Sandy	600	600	0
Sandy Claypan	1,945	1,918	8
Sandy Terrace	300	296	0
Shallow Clayey	17,567	17,565	0
Shallow Loamy	939	939	0
Shallow Sandy	1,526	1,525	1
Thin Claypan	1,989	1,948	35
Thin Loamy	214	214	0
Thin Sands	674	674	0
Very Shallow	95	95	0
Wet Meadow	176	176	0

Source: BLM 2012a

Farmlands of Statewide Importance occur on BLM-administered lands within the planning area, as shown in **Table 3-44**.

Table 3-44
Summary of NRCS Farmlands on BLM-administered Lands

Farmland Classification	Total Acres	PH Acres	GH Acres
Prime	0	0	0
Unique	0	0	0
Statewide Importance	1,380	1,372	0

Source: BLM 2012a

3.18.3 Trends

Soil quality and quantity has degraded over time due to disturbance related to livestock grazing and mineral development. Compaction related to mineral development and in certain areas of livestock operations has also increased over time. Implementation of the BLM's Standards for Rangeland Health Guidelines has reduced the potential for soil erosion in current grazing management areas and requirements for commercial operations to reclaim and restore damaged soils have slowed or reversed soil degradation. Invasive species potentially alter soil chemistry which influences plant community succession. Vegetative community changes affect soil stability and hydrologic function.

3.19 WATER RESOURCES

This section includes a description of indicators, existing conditions, and trends for water resources. Streams and water quality are the focus of this section. Wetlands (including riparian areas) are discussed in **Section 3.6**, Vegetation (Including Noxious Weeds; Riparian and Wetlands). 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 Missouri River and lakes Sakakawea and Oahe are the largest sources of surface water in North Dakota. Approximately 54,427 miles of rivers and streams exist in North Dakota. The major rivers and their tributaries include the Missouri, Yellowstone, Little Missouri, Knife, Heart, and Cannonball rivers (BLM 2010b).

Water in the planning area is used for stock watering, irrigation, and potable water. The minerals industry also uses a significant amount of water, mostly for oil and gas hydro-fracturing and dust suppression. Recreation and fish and wildlife uses are also important, but they do not consume appreciable quantities of water and are generally incidental to other uses (BLM 2010b).

3.19.2 Conditions on BLM-Administered Lands

Surface Water

The main river that flows through BLM-administered lands is the Little Missouri River. The major constituents affecting the quality of water in the Missouri River main stem (including lakes Sakakawea and Oahe) are sodium, magnesium, calcium, sulfate, and bicarbonate. Water from the Missouri River is suitable for public supply, domestic uses, and irrigation uses (BLM 2010b).

Tributaries of the Missouri River usually have peak flows in response to snowmelt runoff and summer storms. These waters are of poorer quality due to total dissolved solids. Water from the Missouri River tributaries is marginally suitable for public supply, domestic supply, and marginal to unsuitable for irrigation use (BLM 2010b).

The Big Gumbo area is within the unglaciated Northern Great Plains physiographic province of the Missouri River Plateau (the southwest portion of Bowman County, between the Little Missouri River and the Montana state line). Rain on ice or snowpack, rain on saturated soils, or intense summer thunderstorms are the precipitation events that will typically produce runoff. Surface drainage of the area is from west to east through ephemeral channels into the Little Missouri River. Surface water is available in small quantities. Small reservoirs of between five and 12 acre-feet in size provide water for livestock and wildlife uses. Water quality is the major limiting factor for water use because of the high dissolved solids in the reservoirs and streams. Due to the

relatively high sediment loads, reservoirs can be expected to last ten or twenty years before they silt in (BLM 2010b).

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 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 3-45** lists information for perennial and intermittent streams on BLM-administered lands in the planning area.

Table 3-45
Streams on BLM-Administered Lands in the Planning Area

Stream Name	Total Miles	Miles on BLM-Administered Land	Miles on PH on BLM-Administered Land	Miles on GH on BLM-Administered Land
Unnamed	3,031.06	171.42	170.61	0.59
Alkali Creek	29.26			
Bacon Creek	27.25			
Big Gumbo Creek	11.89	10.69	10.69	
Bog Creek	5.96	0.11	0.11	
Boxelder Creek	8.16	0.83	0.83	
Boyce Creek	19.74			
Buffalo Creek	5.76			
Bull Run Creek	27.55			
Butte Creek	5.35			
Cannonball Creek	20.85			
Cash Creek	15.54			
Cold Turkey Creek	20.196			
Corral Creek	7.34			
Cottonwood Creek	18.58			
Coyote Creek	27.90			
Deep Creek	47.27			
Dugout Creek	4.67			
East Fork Deep Creek	29.20			
First Creek	15.98			
Fivemile Creek	21.53	0.38	0.38	
Hay Creek	12.91			
Horse Creek	39.80			
Indian Creek	16.63			
Johny Creek	7.71			

Table 3-45
Streams on BLM-Administered Lands in the Planning Area

Stream Name	Total Miles	Miles on BLM-Administered Land	Miles on PH on BLM-Administered Land	Miles on GH on BLM-Administered Land
Kid Creek	9.84	1.71	1.71	
Little Beaver Creek	23.91			
Little Missouri River	145.78	0.98	0.98	
Lone Tree Creek	21.92			
Mud Creek	14.78			
North Butte Creek	6.31			
North Fork Grand River	23.11			
Sand Creek	32.31			
Second Creek	8.16			
Sevenmile Creek	22.94	2.48	2.48	
Sheep Creek	3.17			
Skull Creek	21.72	0.65	0.65	
Soda Creek	8.92			
South Butte Creek	11.48			
South Mosquito Creek	7.73			
Spring Coulee	76.40			
Spring Creek	6.33			
Third Creek	7.50			
West Fork Deep Creek	27.53			
Williams Creek	24.96			
Worser Creek	6.17	0.18	0.18	

Source: USGS 2012

Riparian areas are ecosystems that occur along rivers, streams, or water bodies. 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 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**, Vegetation (Including Noxious Weeds; Riparian and Wetlands).

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 there are water developments for use by recreation, livestock, or wildlife.

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 North Dakota 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. Designated beneficial uses for water bodies include municipal or domestic supply, aquatic life, propagation of wildlife, irrigation, livestock watering, recreation, and industrial supply (BLM 2010b). Water must meet federal and state standards to be used for the beneficial uses designated for the water, and water that does not meet these standards is considered to be impaired.

The State of North Dakota is required by Section 303(d) of the Clean Water Act to identify waters that 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 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. There are no impaired streams on BLM-administered lands (BLM 2012b).

Upland and riparian land health conditions greatly influence water quality. Conditions that affect water quality can be summarized as the amount of near-stream vegetation, channel shape, and hydrology. Many of these conditions are interrelated and many vary considerably across the landscape. Management activities involving ROW disturbance, grazing, and fire in the planning area create situations that alter these conditions, thereby altering water quality.

Groundwater

Groundwater is more evenly distributed throughout the state than surface water. Most wells finished in aquifers yield small quantities of water that generally are not large enough for commercial uses but are adequate for

domestic and livestock uses. Most rural and municipal water users in North Dakota depend on ground water for their domestic water source (BLM 2010b).

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, 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

The BLM manages a small number of scattered, small tracts of lands. Percentage-wise, the BLM-administered lands are a small portion of the total lands across the planning area. Overall, the BLM-administered surface lands are not a major contributor to water quality.

3.20 Special Status Species – Other Species of Issue

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, or overharvest. Habitat loss and modification from human activities are the primary causes of declining populations, particularly of species that are highly adapted to specific ecological niches. Such species may or may not be legally protected by federal or state agencies. The BLM's policy for special status species is to: 1) conserve and recover T&E 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 2008d), 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 to reduce the likelihood and need for future listing under the ESA. The 6840 manual also 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."

The BLM 6840 Policy 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/or recover listed species, as well as provisions for the conservation of Bureau sensitive species are identified. The BLM 6840 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.

3.20.1 Conditions of the Planning Area

The planning area occurs within the WAFWA MZ 1 of the Northwestern Great Plains Level III Ecoregion (Stiver et al. 2006, pg. 1-11; EPA 2011a). This ecoregion is characterized by semiarid rolling plains of shale, siltstone, and sandstone punctuated by occasional buttes and badlands. Rangeland is common, small grain farming, some row crops, and hay land also occur; native grasslands persist in areas of steep or broken topography. Agriculture is restricted by the erratic precipitation and limited opportunities for irrigation (EPA 2010a, pg. 7). For more detailed information regarding the conditions of the planning area refer to **Section 3.6,** Vegetation (Including Noxious Weeds; Riparian and Wetlands).

Federally Proposed, Threatened and Endangered Species

Within the counties of planning area (Bowman and Slope) the USFWS identified whooping crane (Endangered), black-footed ferret (Endangered), gray wolf (Endangered), northern long-eared bat (Threatened), and Sprague's pipit (Candidate) (USFWS 2015).

Whooping Crane (Grus Americana) Endangered

The primary nesting area for the whooping crane is in Canada's Wood Buffalo National Park. Aransas National Wildlife Refuge in Texas is the primary wintering area for whooping cranes. In the spring and fall, the cranes migrate primarily through the central flyway which traverses the central part of North Dakota. The planning area is outside of the 95 percent confirmed sighting model that has been developed for North Dakota. It is highly unlikely that a whooping crane would migrate over the planning area.

Black-footed ferret (Mustela nigripes) Endangered

Black-footed ferrets were historically found in the southwestern portion of North Dakota but none are known to occur in the planning area (USFWS 2015). Additionally, no areas in North Dakota are considered suitable for the

potential reintroduction of ferrets and existing prairie dog complexes would need to be expanded before reintroductions could occur (Hagen et al 2005).

Gray Wolf (Canis lupis) Endangered
Currently the closest gray wolf population to North Dakota is the northern forests of Minnesota. They now only occur as occasional transient visitors in North Dakota. The most suitable habitat for the gray wolf is found around the Turtle Mountains in North Central North Dakota, where documented and unconfirmed reports of gray wolves have occurred. The gray wolf suitable habitat is far from the planning area.

Northern Long-Eared Bat (Myotis septentrionalis) Threatened
In the US, the species' range reaches from Maine west to Montana, south to eastern Kansas, eastern Oklahoma, Arkansas, and east to South Carolina. Summer surveys in North Dakota (2009-2011) documented the species

in the Turtle Mountains, the Missouri River Valley, and the Badlands (80 Federal Register 17973, April 2, 2015). No northern long-eared bat hibernacula are known within North Dakota.

Sprague's Pipit (Anthus spragueii) Candidate
The Sprague's pipit is closely tied with native prairie habitat and breeds in the north-central US, including South Dakota, Montana and Minnesota. During the breeding season, Sprague's pipits prefer large patches of native grasslands that are free of trees or shrubs. The planning area is heavily inundated with sagebrush and is not quality pipit habitat.

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 **Table 3-46** and **Table 3-47**.

3.20.2 Conditions on BLM-Administered Lands

GRSG habitat on BLM-administered lands includes 32,900 acres of PH and 80 acres of GH, and extends into three North Dakota counties (Bowman, Golden Valley, and Slope). GRSG habitat has the potential to provide habitat to a variety of special status species (**Table 3-1**). Potentially occurring BLM sensitive species and likelihood of occurrence are presented in **Table 3-47**. No federally-listed or BLM sensitive plant species are known to inhabit the planning area, including BLM-administered lands.

3.20.3 Trends

Some of the special status species are in decline due to habitat fragmentation, spread of noxious weeds, lack of fire on the landscape or fire suppression, use conflicts (such as recreation, OHV use, energy development, and livestock grazing) and infrastructure development (BLM 2010b, pg. 227).

Table 3-46
Federally Listed Species with the Potential to Inhabit the Planning Area

Common Name	Scientific Name	Status[1]	General Habitat Description	Likelihood of Occurrence on BLM-administered lands
Mammals				
Black-footed ferret	*Mustela nigripes*	FE	Black-footed ferret populations are intimately tied to and only found in association with prairie dogs. Limited to habitat used by black-tailed prairie dogs, black-footed ferret typically inhabits grasslands, steppe, and shrub steppe, relying on abandoned prairie dog burrows for shelter. Only large complexes (several thousand acres of closely spaced colonies) can support and sustain a breeding population. Currently, no black-tailed prairie dog complexes fitting the acreage requirements for a viable black-footed ferret population exist in North Dakota.	Unlikely to occur – not known to occupy BLM surface lands
Gray wolf	*Canis lupus*	FE	Historically, the gray wolf occupied almost all habitats in North America, including the Great Plains. In modern times, the gray wolf has been restricted to habitats with low densities of roads and people. The forested areas in north central and northeast North Dakota are likely habitat for the gray wolf; however, they may appear anywhere.	Unlikely to occur – not known to occupy BLM surface lands
Northern long-eared bat	*Myotis septentrionalis*	FT	The northern long-eared bat is a forest dwelling species. In the summer months, northern long-eared bats roost under bark or crevices of trees, preferring to roost in tall trees and under the exfoliating bark of dead or dying trees. In the winter northern long-eared bats hibernate in cave and mines.	Unlikely to occur – not known to occupy BLM surface lands
Birds				
Whooping crane	*Grus americana*	FE	Whooping cranes inhabit shallow wetlands characterized by cattails, bulrushes, and sedges. They can also be found in upland areas, especially during migration.	Potential to occur (migratory) – not known to occupy BLM surface lands

Source: USFWS 2015
[1]FE Federally listed as endangered
FT Federally listed as threatened

Table 3-47
North Dakota Field Office BLM Sensitive Species with the Potential to Inhabit the Planning Area

Common Name	Scientific Name	Global Rank[1]/ State Rank	NDGFD Rank[2]	General Habitat Description	Likelihood of Occurrence on BLM-administered lands
Mammals					
Townsend's big-eared bat	*Corynorhinus townsendii*	G4 SNR	Not Ranked	Commonly found in mesic habitats characterized by coniferous and deciduous forests.	Potential to occur
Long-legged myotis	*Myotis volans*	G5 SU	Level 3	Normally found in rugged terrain, roost alone or in small groups in rock crevices and under tree bark. This species has a strong association with coniferous trees.	Potential to occur
Long-eared myotis	*Myotis evotis*	G5 SU	Level 3	Normally found in rugged terrain, roost alone or in small groups in rock crevices and under tree bark, typically in coniferous trees, and hibernate in caves and abandoned mines.	Potential to occur
Black-tailed prairie dog	*Cynomys ludovicianus*	G3, G4 SU	Level 1	Short- and mixed grasslands, usually well grazed lands. They are generally confined to prairie communities with relatively flat topography.	Known to occur
Swift fox	*Vulpes velox*	G3 S1	Level 2	Large tracts of short- and mixed-grass prairie.	Unlikely to occur
Birds					
Baird's sparrow	*Ammodramus bairdii*	G4 SU	Level 1	Extensive tracts of native mixed-grass prairie or lightly grazed pastures.	Potential to occur
Black tern	*Chlidonias niger*	G4 SU	Level 1	Shallow wetlands surrounded by grassland.	Unlikely to occur
Brewer's sparrow	*Spizella breweri*	G5 S3	Level 3	Big sagebrush patches within short-grass prairie.	Potential to occur
Burrowing owl	*Athene cunicularia*	G4 SU	Level 2	Short-grass or grazed mixed-grass prairie with burrows dug by mammals present.	Potential to occur

Table 3-47
North Dakota Field Office BLM Sensitive Species with the Potential to Inhabit the Planning Area

Common Name	Scientific Name	Global Rank[1]/ State Rank	NDGFD Rank[2]	General Habitat Description	Likelihood of Occurrence on BLM-administered lands
Chestnut-collared longspur	*Calcarius ornatus*	G5 SU	Level 1	Grazed or hayed mixed-grass prairie, short-grass prairie.	Known to occur
Common loon	*Gavia immer*	G5 S4	Not Ranked	Riparian areas and herbaceous wetlands surrounded by grasslands but are also found in clear lakes containing both shallow and deep water.	Unlikely to occur
Dickcissel	*Spiza americana*	G5 SU	Level 2	Alfalfa, sweet clover, and other brushy grasslands.	Potential to occur
Ferruginous hawk	*Buteo regalis*	G4 SU	Level 1	Large tracts of native prairie.	Known to occur
Franklin's gull	*Larus pipixcan*	G4, G5 SU	Level 1	Large wetlands with semi-open emergent cover, often feeds in cultivated agricultural fields.	Unlikely to occur
Golden eagle	*Aquila chrysaetos*	G5 S3	Level 2	Rugged portions of the badlands, buttes over-looking native prairie, large trees, and are often found associated with prairie dog towns.	Potential to occur
Grasshopper sparrow	*Ammodramus savannarum*	G5 SNR	Level 1	Idle or lightly grazed tall or mixed-grass prairie, shrub prairie meadows, and hayfields.	Potential to occur
Greater Sage-Grouse	*Centrocercus urophasianus*	G4 SU	Level 2	The big sagebrush ecosystem.	Known to occur
Lark bunting	*Calamospiza melancorys*	G5 SNR	Level 1	Sagebrush communities or mixed-grass prairie interspersed with shrubs, roadsides, and retired cropland.	Potential to occur
Le Conte's sparrow	*Ammodramus leconteii*	G4 SU	Level 2	Fens, wet meadows, and marshes of sedge grasses.	Potential to occur
Loggerhead shrike	*Lanius ludovicianus*	G4 SU	Level 2	Open country with thickets of small trees, shrubs, and shelterbelts.	Potential to occur

Table 3-47
North Dakota Field Office BLM Sensitive Species with the Potential to Inhabit the Planning Area

Common Name	Scientific Name	Global Rank[1]/ State Rank	NDGFD Rank[2]	General Habitat Description	Likelihood of Occurrence on BLM-administered lands
Long-billed curlew	*Numenius americanus*	G5 S2	Level 1	Short-grass prairie or shrub steppe prairie on gently rolling terrain.	Potential to occur
Marbled godwit	*Limosa fedoa*	G5 SU	Level 1	Forage in a variety of wetlands, nest commonly on grazed native prairie.	Potential to occur
McCown's longspur	*Calcarius mccownii*	G4 S2	Level 3	Arid, short-grass prairie or heavily grazed mixed-grass prairie.	Potential to occur
Nelson's sharp-tailed sparrow	*Ammodramus nelsonii*	G5 SU	Level 1	Fens, shallow-marsh and wet meadow zones of wetlands.	Unlikely to occur
Northern goshawk	*Accipiter gentilis*	G5 SU	Not Ranked	Riparian areas surrounded by mixed-grass prairie.	Unlikely to occur
Peregrine falcon	*Falco peregrinus*	G4, T4 S1	Level 3	Expanses of native prairie, badland complexes, and open waterways.	Potential to occur
Sedge wren	*Cistothorus platensis*	G5 SU	Level 2	Wet meadows of tall grasses and sedges.	Unlikely to occur
Sprague's pipit	*Anthus spragueii*	G4 S3	Level 1	Extensive tracts of native mixed-grass prairie, ungrazed or lightly grazed prairie.	Known to occur
Swainson's hawk	*Buteo swainsoni*	G5 SU	Level 1	Native prairie and cropland with thickets of trees.	Potential to occur
Upland sandpiper	*Bartramia longicauda*	G5 SNR	Level 1	Dry, open mixed-grass prairie.	Potential to occur
White-faced ibis	*Plegadis chihi*	G5 SU	Not Ranked	Forested and herbaceous wetlands, riparian areas, marshes, swamps, ponds and rivers.	Unlikely to occur
Willet	*Catoptrophorus semipalmatus*	G5 SU	Level 1	A variety of wetlands associated with upland native grassland.	Potential to occur
Wilson's phalarope	*Phalaropus tricolor*	G5 SU	Level 1	Shallow wetlands and mudflats, nest in the margins of wetlands.	Potential to occur

Table 3-47
North Dakota Field Office BLM Sensitive Species with the Potential to Inhabit the Planning Area

Common Name	Scientific Name	Global Rank[1]/ State Rank	NDGFD Rank[2]	General Habitat Description	Likelihood of Occurrence on BLM-administered lands
Yellow rail	*Coturnicops noveboracensis*	G4 S2	Level I	Fens or wet meadows with emergent vegetation, shallow water, and moist soil.	Unlikely to occur
Fish					
Blue sucker	*Cycleptus elongatus*	G3, G4 S3	Level I	Deep areas with swift current on medium to large turbid rivers where the bottom is normally sand or gravel. They use confluence areas of larger tributaries for spawning.	Potential to occur
Northern redbelly x Finescale dace	*Phoxinus eos x phoxinus neogaeus*	G5 S4	Level 2	Found in pools and slow moving water in small streams where the bottom substrate is normally silted, with vegetation.	Potential to occur
Paddlefish	*Polyodon spathula*	G4 SNR	Level 2	Found in slow-flowing portions of large rivers.	Unlikely to occur
Pearl dace	*Semotilus/Margariscus margarita*	G5 S3	Level I	Found in pools of streams and small rivers, usually with sand or gravel bottom. They may also be found in ponds and lakes.	Potential to occur
Sicklefin chub	*Macrhybopis meeki*	G3 S2	Level I	Large turbid rivers, usually with a sand or gravel bottom.	Potential to occur
Sturgeon chub	*Macrhybopis gelida*	G3 S2	Level I	Medium to large turbid rivers, usually with a sand or gravel bottom.	Potential to occur
Reptiles					
Greater short-horned lizard	*Phrynosoma hernandesi*	G5 SNR	Level II	Semi-arid, short-grass prairie in rough terrain.	Potential to occur

Table 3-47
North Dakota Field Office BLM Sensitive Species with the Potential to Inhabit the Planning Area

Common Name	Scientific Name	Global Rank[1]/ State Rank	NDGFD Rank[2]	General Habitat Description	Likelihood of Occurrence on BLM-administered lands
Snapping turtle	*Chelydra serpentine*	G5 SNR	Level II	Backwaters along medium to large rivers, smaller reservoirs, stock ponds, smaller streams with permanent flowing water, intermittent streams with perennial pools, and are often associated with sandy or muddy bottoms.	Known to occur
Spiny softshell	*Apalone spinifers*	G5 SNR	Not ranked	Riverine habitat such as large rivers and river impoundments, but are also found in lakes, ponds along rivers, pools along intermittent streams, bayous, irrigation canals, and oxbows.	Potential to occur
Western hog-nosed snake	*Heterodon nasicus*	G5 SNR	Level I	Areas with sandy or gravelly soils, including prairies, sandhills, wide valleys, river floodplains, open montane woodland, semi-agricultural areas (but not intensively cultivated land), and margins of irrigation ditches.	Potential to occur
Amphibians					
Great Plains toad	*Bufo cognatus*	G5 SNR	Not ranked	Grasslands, semi-desert shrub-lands, open floodplains, and agricultural areas, typically in stream valleys.	Potential to occur
Northern leopard frog	*Rana pipiens*	G5 SNR	Not ranked	Mixed-grass prairies and associated wetlands.	Potential to occur
Plains spadefoot	*Spea bombifrons*	G5 SNR	Level I	Dry grasslands with sandy or loose soil near permanent or temporary bodies of water.	Known to occur
Western toad	*Bufo boreas*	G4 NS	Not ranked	Western toads inhabit upland habitats around ponds, lakes, reservoirs, and slow-moving rivers and streams.	Potential to occur

Table 3-47
North Dakota Field Office BLM Sensitive Species with the Potential to Inhabit the Planning Area

Common Name	Scientific Name	Global Rank[1]/ State Rank	NDGFD Rank[2]	General Habitat Description	Likelihood of Occurrence on BLM-administered lands
Invertebrates					
Dakota skipper	*Hesperia dacotae*	G5 SNR	Not ranked	High quality native prairie containing a high diversity of wildflowers and grasses. In the western part of North Dakota, can be found in ungrazed or lightly grazed native pastures with little bluestem, needle-and-thread, and purple coneflower. Bluestem grass is a favorite food plant for the larval stage of the skipper.	Unlikely to occur

Source: USFWS 2012, BLM 2010b
[1]G Global ranking
S State ranking
T Subspecies or variety ranking
1 Critically imperiled
2 Imperiled
3 Vulnerable
4 Apparently secure
5 Secure
NR Not ranked
U Unrankable
[2] Level I - Species have high level of conservation priority
Level II - Species have moderate level of conservation priority
Level III - Species have moderate level of conservation priority but are believed to be peripheral or do not breed in North Dakota

3.21 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, § 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; and
- 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 IM 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 2008f), 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 BLM-administered lands, consistent with the provisions of the Secretarial Order.
- IM 2004-227, Biomass Utilization Strategy (BLM 2004c), 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 2009b).

Solar and wind projects are authorized via the ROW process. ROW applications for development on BLM-administered lands must be accompanied by a processing fee as set forth in 43 CFR, Part 7 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).

3.21.1 Conditions of the Planning Area

WAFWA Management Zone 1

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 North Dakota.

Solar

No interest on a commercial scale in solar energy 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

Some commercial wind developments have been constructed in the eastern and central parts of the state of North Dakota and there has also been some sporadic interest in wind farms in the western part of the state. A 19.5-megawatt wind project with 13 turbines is in operation at Rhame, in southwestern Bowman County (MDU 2013). The project is not located on BLM-administered lands.

Biomass

North Dakota 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 North Dakota by lack of easy access to large consumption markets.

3.21.2 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 (kWh/m^2/day), and allocate designations of "Good," "Excellent," or "Premium." Solar potential on BLM-administered land in the NDFO is below 6.0 kWh/m^2/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 MW [megawatts] electricity that will be delivered into the electricity transmission grid [Manier et al. 2013]).

The National Renewable Energy Laboratory places lands in categories of "Good", "Excellent," or "Outstanding" potential when wind resources occur at intensities of 400 watts per square meter or higher. On BLM-administered land in North Dakota there are 3,730 acres of Class 4, Good Wind Potential, 3,606 acres of which is found in PH and 85 acres of which is found in GH. **Table 3-48** shows the wind potential for all the BLM-administered Lands in NDFO.

Table 3-48
Wind Potential on Slopes <15% on BLM-administered Lands

Wind Potential (at 80 meters)	Total acres	PH acres	GH acres
Class 1, Poor (0-200)	0	0	0
Class 2, Marginal (200-300)	11,074	11,074	0
Class 3, Fair, (300-400)	16,198	16498	0
Class 4, Good (400-500)	3,730	3,606	85
Class 5, Excellent (500-600)	0	0	0
Class 6, Outstanding (600+)	0	0	0
Class 7, Superb (800-1,600)	0	0	0

Source: BLM 2012a

3.21.3 Trends

Within the planning area, greater pressure to develop renewable energy resources on the BLM-administered lands will 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 North Dakota, the source of renewable energy will most likely be wind energy, as North Dakota is ranked as the sixth state in wind energy potential (National Renewable Energy Laboratory 2011).

3.22 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 North Dakota Field

Office Greater Sage-Grouse RMPA/EIS Socioeconomic Baseline Assessment Report prepared in support of the planning effort (Forest Service 2013b).

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. There are numerous characteristics that influence and shape the nature of local social and economic conditions such as 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 North Dakota counties containing GRSG habitat influence the relationship between BLM-administered lands and local social and economic activity.

Changes in BLM management of BLM-administered lands can have social and economic effects that extend beyond the immediate boundaries of the lands they manage, 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 three-county region which includes Bowman, Golden Valley, and Slope counties, and for the individual counties within this three-county area. Data is provided for the state as a whole as a reference region where appropriate.

3.22.1 Existing Conditions

Population Change

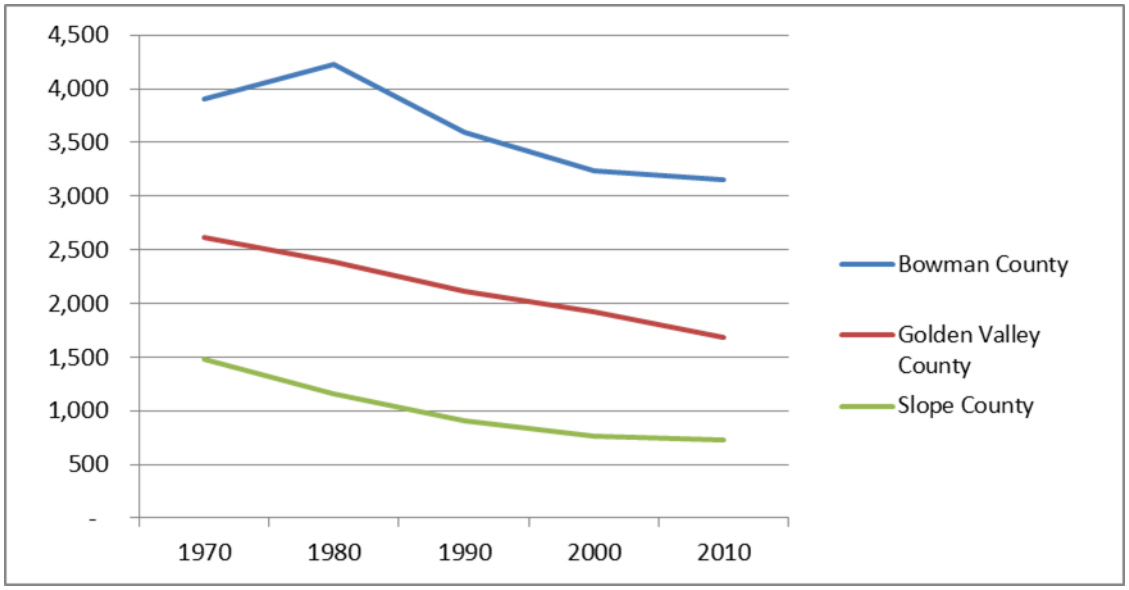
While total US population grew by 24 percent between 1970 and 2010, the three-county impact area experienced a 16 percent decline. Over the past four decades Golden Valley and Slope counties' populations have fallen by 20 percent, while Bowman was reported to have fallen by 12 percent (**Diagram 3-1**). Population declines within the three-county region have gradually tapered off over the last decade as the total population within the region decreased by 375 people, or just over six percent.

Although annual average population loss in Bowman and Slope counties was 0.3 and 0.5 percent respectively between 2000 and 2010, Golden Valley continued to experience a decline of 1.3 percent on an annual average basis.

Employment and Economic Specialization

Average annual unemployment in the three-county impact area has remained relatively constant over the last decade, with unemployment in each of the three counties remaining below state and national averages. While national unemployment in the United States rose from four percent in 2000 to 9.6 percent in 2010, Bowman, Golden Valley, and Slope counties were reported to

Diagram 3-1
Population Change for the Three-County Impact Area



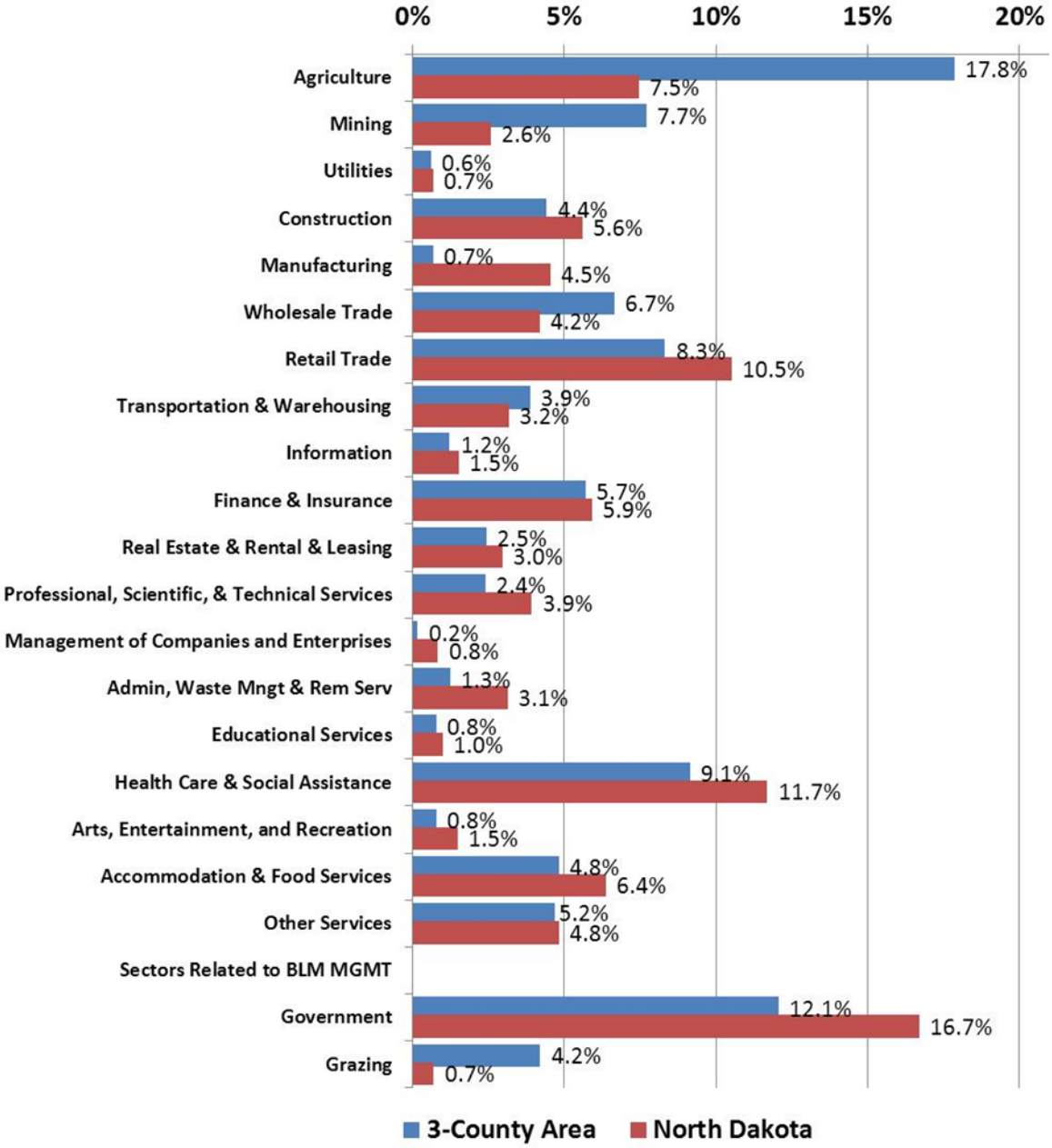
Source: US Department of Commerce 2005, 2000, and 2010

have had an average annual unemployment rate of 2.6 percent, 3.0 percent, and 1.6 percent respectively in 2010, while unemployment was 3.8 percent in North Dakota and 9.6 percent for the United States (Bureau of Labor Statistics 2011).

Employment within the three-county impact area is distributed amongst economic sectors and displayed (**Diagram 3-2**) relative to statewide employment in these sectors. Of particular interest are the Government Grazing, and Oil and Gas sectors which are directly related to BLM land management. The government sector includes all federal, state and local employment, the grazing sector includes both cattle and sheep ranching, and the Oil and Gas sector includes extraction, drilling, and support activities. It should be noted that the contributions from BLM represent only a portion of the industry employment displayed in these three sectors within **Diagram 3-2**. Further discussion of the contributions to these sectors from BLM management is presented in the sections on grazing and oil and gas below.

Using the ratio of the percent employment in each industry in the region of interest (three-county impact area) to the percent of employment in that industry for a larger reference region (the state of North Dakota) 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 the contributions of BLM-administered lands within the three-county impact area. Applying this criterion to 2010 data reveals

Diagram 3-2
Employment Distribution in the Three-County Impact Area and North Dakota



Source: IMPLAN 2010

that the project area can be characterized as most specialized in the agricultural sectors, which include those sectors related to livestock grazing. Since BLM-administered lands within the three-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 income are the most commonly used social indicators of well-being. As discussed above in the employment section, labor participation in Bowman, Golden Valley, and Slope counties is high, with average annual unemployment rates which 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 (12.3 percent and 7.2 percent) and national (13.8 percent and 10.1 percent) level remained high in 2010, poverty in the three-county area was reported to be less prevalent with only nine percent of individuals and 5.7 percent of families living below the poverty level. Poverty at the county level varied across the three counties, with Bowman reporting the lowest rates and Golden Valley reporting the highest. In 2010, 6.7 percent of individuals and 3.9 percent of families in Bowman County, 10.5 percent of individuals and 8.9 percent of families in Slope County, and 13 percent of individuals and 8.9 percent of families in Golden Valley County were estimated to be living in poverty (US Department of Commerce 2012a).

Components of Personal Income

Examining trends within personal income provides insight to the area economy and its connection to BLM-administered lands within the three-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.

Total personal income (TPI) and per capita personal income (PCPI) are two widely used measures of economic well-being within communities. From 1970 to 2010, annual TPI in the three-county impact area increased from $171 million to $268 million, and annual PCPI increased from $21,560 to $48,339 (all measures adjusted for inflation to 2011 dollars). This translates to a TPI increase of 56 percent and a PCPI increase of 124 percent over this time period (US Department of Commerce 2012a). 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 124 percent, average earnings per job rose by 9.6 percent (from $37,552 to $41,155; values adjusted for inflation to 2011 dollars) (US Department of Commerce 2012b). While moderate increases in PCPI can be attributable to increased labor earnings, increased non-labor income within the region also contributed to the large increase in PCPI.

Labor earnings were the largest source of TPI in the three-county area, accounting for 62.1 percent of all income in 2010. Labor earning's share of TPI has decreased from 1970 to 2010 (from 75.2 to 62.1 percent) while the share of non-labor income has risen (from 24.8 to 37.9 percent). As a share of TPI, investment income and transfer payments rose from 15.9 to 22.8 and 8.8 to 15.2 percent, respectively, over this forty-year time period. Although transfer payments' share of TPI rose during 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 0 to 2.1 percent while the share of age related transfer payments in the form of retirement, disability insurance, and Medicare decreased from 23.4 to 17.7 percent (US Department of Commerce 2012a).

Area Economic Conditions Related to Grazing

From 1970 to 2010, employment in the Farm sector (including livestock grazing) decreased by 36 percent (from 1,315 to 838 jobs), with nearly 84 percent of Farm employment in 2010 attributable to farm proprietors. Although employment has been declining, the farm sector continued to support 4,497 jobs (or 18.6 percent of total employment) in the three-county area in 2010 (US Department of Commerce 2012a). In 2011, livestock production in North Dakota accounted for one-sixth of the state's total cash receipts and was valued at more than a billion dollars (USDA 2012). According to agricultural statistics collected by the state, the three-county area was reported to have an inventory of 101,500 head of cattle and 7,600 head of sheep in 2011 (**Table 3-49**).

Table 3-49
Cattle and Sheep Inventory and Estimated Annual Forage Requirement in Impact Area Counties

Region	All Cattle (number of animals)	Sheep (number of animals)
Bowman County	49,500	3,700
Golden Valley County	22,500	2,700
Slope County	29,500	1,200
Three-County Total	*101,500*	*7,600*
North Dakota Total	**1,690,000**	**73,000**

Source: USDA 2012

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 BLM allocates 5,781 AUMs annually on allotments potentially affected by conservation measures under this RMPA. On an average annual basis almost all of the allocated use is actually used contributing about 10 jobs (direct, indirect and induced) and $113,000 in labor income to the impact area economy. Direct employment to the grazing sector amounts to approximately seven jobs, which account for 5.6 percent of employment in the grazing sector depicted in **Diagram 3-2** (IMPLAN 2010).

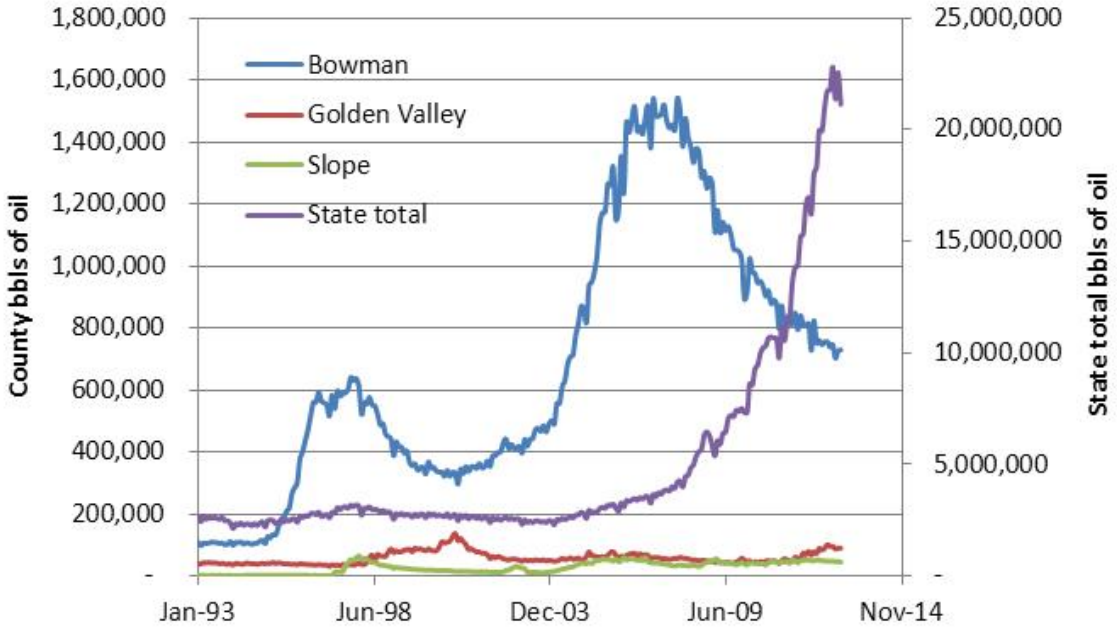
Area Economic Conditions Related to Oil and Gas

Oil and gas development, which includes the extraction of oil and gas, drilling of wells, and support activities, has significantly increased in North Dakota over the last decade as exploration in the Northwestern Bakken formation has intensified (State of North Dakota 2013a). North Dakota is consistently ranked one of the US's top oil and gas producing states; In 2011, North Dakota ranked fourth in the nation in crude oil production (seven percent of US total production) and 18th in natural gas production (0.4 percent of US total production) (US Energy Information Administration 2013a), producing more than 113 bbls of oil and MCF of natural gas in 2010. As of November, 2012 the State's role as a crude oil producer within the nations has increased to the second largest producer behind Texas, producing 10 percent of the nation's domestic supply. This increase in production is driven in most part by development in the Bakken formation which does not overlap with the project area. In 2011 North Dakota contained 0.9 percent of the nation's crude oil producing wells (4,574) and less than 0.5 percent of the nation's natural gas producing wells (239) (US Energy Information Administration 2013b). The decision area contains 3.3 percent of these oil wells and 22.7 percent of these gas wells (DOI 2011).

Annual production can vary considerably within a region and across counties. From 2002 to 2012 annual oil production increased by almost 700 percent across the state while increasing by 84 percent within the three counties containing GRSG habitat (**Diagram 3-3**). Although it also marks a decrease in oil production within Bowman County between 2005 and 2012 shown in **Diagram 3-3**. In 2012 Bowman County produced nine million bbls of oil and 11.2 million MCF of natural gas, Golden Valley produced one million bbls of oil and 650 thousand MCF of natural gas, and Slope County produced 591 thousand bbls of oil and 321 thousand MCF of natural gas (State of North Dakota 2013b).

The exploration, development, and production of oil and gas is important to the three-county analysis area's economy, and has been directly attributed with supporting six percent of the planning area's employment and 11 percent of its labor income (IMPLAN 2010). In 2010 IMPLAN reported that the economic

Diagram 3-3
Oil Production in the Three-County Impact Area and North Dakota



Source: State of North Dakota 2013b

activity associated with oil and gas drilling, extraction, and support activities in the three-county analysis area supported 261 jobs and more than $24 million in employee wages and proprietor's income. Currently there are 231 wells on BLM-administered lands in the decision area that produce oil and gas. Employment and income supported by production from these wells (about three bbls of oil and 525 MCF of gas) is estimated at 20 jobs and $728,000 in labor income (including direct, indirect and induced contributions across all sectors of the three county impact area economy). Contributions to employment in the Oil and Gas Sector are about 16 jobs (direct, indirect and induced) which constitutes six percent of employment in this sector.

Revenue Sharing and Distributions to Counties

The oil and gas industry in North Dakota also contributes to the state and its local economies through the taxes they pay to the federal and state governments. These governmental revenues include personal and corporate income taxes, sales and use taxes, severance and production taxes, as well as rents on leased land not held by production. In 2009, North Dakota's oil and gas industry was directly attributed with generating $821.8 million in government revenue, with the majority of revenue earned from leasing public domain minerals. These funds are spent to fund schools and invest in public works projects such as road improvements, health care facilities and infrastructure needs. Overall, local governments across the state received an estimated $86.5 million in property taxes, $8.4 million in federal mineral re-distributions, and $46 million in re-distributions from state severance taxes in 2009 (Bangsund and Leistritz 2010).

The re-distribution of a portion of these funds back to Bowman, Golden Valley, and Slope counties contributes to employment and income within the region as these funds are spent to fund schools and invest in public works projects. Recent estimates of general government revenue in the three county area indicate that approximately $19,600,000 was allocated in 2012 from taxes, intergovernmental revenue (grants, distributions from other governments, etc.) and charges for services (social services, library, clerks, etc.) (US Department of Commerce 2007). Estimates of current royalty distributions, as discussed in detail below, indicate that approximately 30 percent of this general revenue can be attributed to production on BLM-administered lands within the three county area.

Currently, a portion of federal royalties from production that occurs on public domain and acquired mineral estate (49 and 25 percent respectively) are allocated back to the state of North Dakota who then allocates 50 percent of those revenues back to counties where the oil and gas development occurred. Using estimates of current production for wells on BLM mineral estate, it is estimated that the three-county area received approximately $6.3 million in distributions. As a result of these payments, approximately 114 jobs and $3.9 million in labor income (direct, indirect and induced) were generated in the impact area economy based on IMPLAN analysis.

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 from which society benefits. 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, like 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 North Dakota BLM-administered lands through recreational activities such as hiking, bird watching and OHV use. 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 NDFO, 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 can be difficult to apply, making evaluation during the planning process not feasible. However, this does not preclude their consideration.

3.23 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 National Environmental Policy Act (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 North Dakota.

The ethnic and racial composition of North Dakota, the three-county impact area, and individual counties in 2010 are displayed in **Table 3-50**, below. North Dakota's 2010 population was reported to be significantly less diverse than the general US population (74 percent white), with individuals identifying themselves as white accounting for 89 percent of the state's population. Shares of racial and ethnic minority groups at the state level, with the exception of American Indians, were less than their share of the overall US population. While North Dakota's population has a larger share of individuals identifying themselves as American Indian alone, American Indians living within the three-county area represent 0.5 percent of the area's total population (US Department of Commerce 2012a). While the data indicates that the area has small shares of minority racial and ethnic groups, these populations do not meet the criteria discussed above to be identified as and environmental justice population in regards to minority populations.

Table 3-50
Population by Race and Ethnicity (2010)

	White	Black or African American	American Indian & Alaska Native	Asian	Native Hawaiian & Other Pacific Islander	Some other race	Two or more race	Hispanic (of any race)
United States	74.0%	12.5%	0.8%	4.7%	0.2%	5.5%	2.4%	15.7%
Montana	89.4%	1.0%	5.2%	0.9%	0.1%	0.1%	1.4%	2.0%
Three County Area	98.5%	0.0%	0.5%	0.0%	0.0%	0.3%	0.7	1.9%
Bowman County	98.5%	0.0%	0.2%	0.0%	0.0%	0.6%	0.7%	2.5%
Golden Valley County	97.7%	0.0%	1.4%	0.0%	0.0%	0.0%	1.0%	1.0%
Slope County	100%	0.0%	0.0%	0.0%	0.0%	0.%	0.0%	1.2%

Source: US Department of Commerce 2012a

In addition to race, concentrations of people living under the poverty level are of interest when considering the environmental justice implications of the proposed action. CEQ guidance on identifying low-income populations states "agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect." As discussed above in *Community Well-being* in **Section 3.22**, the three counties included in this analysis had lower poverty rates for individuals and families than general poverty rates for the state and country. Thus, census data indicates that according to the criteria provided above that environmental justice populations in regards to poverty or low income do not exist within the planning area.

Chapter 4
Environmental Consequences

TABLE OF CONTENTS

Chapter Page

4. ENVIRONMENTAL CONSEQUENCES 4-1

4.1 Changes Between the Draft EIS and Final EIS 4-1
4.2 Introduction 4-1
4.2.1 Analytical Assumptions 4-3
4.2.2 General Methodology for Analyzing Impacts 4-7
4.2.3 Incomplete or Unavailable Information 4-8
4.3 Special Status Species—Greater Sage-Grouse 4-9
4.3.1 Methods and Assumptions 4-9
4.3.2 Nature and Type of Effects 4-10
4.3.3 Alternative A 4-16
4.3.4 Impacts Common to Alternatives B——D and the Proposed Plan Amendment 4-21
4.3.5 Alternative B 4-21
4.3.6 Alternative C 4-27
4.3.7 Alternative D 4-31
4.3.8 Proposed Plan Amendment 4-36
4.3.9 Impacts Summary 4-40
4.4 Lands and Realty 4-48
4.4.1 Methods and Assumptions 4-48
4.4.2 Nature and Type of Effects 4-49
4.4.3 Impacts Common to All Alternatives 4-50
4.4.4 Alternative A 4-52
4.4.5 Alternative B 4-52
4.4.6 Alternative C 4-53
4.4.7 Alternative D 4-54
4.4.8 Proposed Plan Amendment 4-54
4.5 Vegetation (Including Noxious Weeds; Riparian and Wetlands) 4-55
4.5.1 Methods and Assumptions 4-55
4.5.2 Nature and Type of Effects 4-57
4.5.3 Impacts Common to All Alternatives 4-62
4.5.4 Alternative A 4-62
4.5.5 Impacts Common to Alternatives B, C, and D and the Proposed Plan Amendment 4-65
4.5.6 Alternative B 4-66
4.5.7 Alternative C 4-68
4.5.8 Alternative D 4-71
4.5.9 Proposed Plan Amendment 4-73
4.6 Wildland Fire Management and Ecology 4-75
4.6.1 Methods and Assumptions 4-75
4.6.2 Nature and Type of Effects 4-76
4.6.3 Impacts Common to All Alternatives 4-78
4.6.4 Alternative A 4-79
4.6.5 Impacts Common to Alternatives B, C, and D and the Proposed Plan Amendment 4-81
4.6.6 Alternative B 4-81
4.6.7 Alternative C 4-84

4.6.8 Alternative D 4-85
4.6.9 Proposed Plan Amendment 4-87
4.7 Fluid Minerals 4-89
4.7.1 Methods and Assumptions 4-89
4.7.2 Nature and Type of Effects 4-91
4.7.3 Impacts Common to All Alternatives 4-93
4.7.4 Alternative A 4-93
4.7.5 Alternative B 4-97
4.7.6 Alternative C 4-100
4.7.7 Alternative D 4-103
4.7.8 Proposed Plan Amendment 4-107
4.8 Coal 4-107
4.9 Locatable Minerals 4-108
4.10 Mineral Materials 4-108
4.10.1 Methods and Assumptions 4-108
4.10.2 Nature and Type of Effects 4-109
4.10.3 Impacts Common to All Alternatives 4-110
4.10.4 Alternative A 4-110
4.10.5 Alternative B 4-110
4.10.6 Alternative C 4-111
4.10.7 Alternative D 4-112
4.10.8 Proposed Plan Amendment 4-112
4.11 Comprehensive Travel and Transportation Management 4-112
4.11.1 Methods and Assumptions 4-113
4.11.2 Nature and Type of Effects 4-114
4.11.3 Impacts Common to All Alternatives 4-114
4.11.4 Alternative A 4-115
4.11.5 Alternative B 4-115
4.11.6 Alternative C 4-115
4.11.7 Alternative D 4-116
4.11.8 Proposed Plan Amendment 4-116
4.12 Recreation 4-116
4.12.1 Methods and Assumptions 4-116
4.12.2 Nature and Type of Effects 4-117
4.12.3 Impacts Common to All Alternatives 4-119
4.12.4 Alternative A 4-119
4.12.5 Alternative B 4-120
4.12.6 Alternative C 4-122
4.12.7 Alternative D 4-123
4.12.8 Proposed Plan Amendment 4-123
4.13 Range Management 4-125
4.13.1 Methods and Assumptions 4-125
4.13.2 Nature and Type of Effects 4-126
4.13.3 Impacts Common to All Alternatives 4-130
4.13.4 Alternative A 4-130
4.13.5 Alternative B 4-133
4.13.6 Alternative C 4-136
4.13.7 Alternative D 4-139
4.13.8 Proposed Plan Amendment 4-141
4.14 Areas of Critical Environmental Concern 4-143

4.14.1 Methods and Assumptions 4-143
4.14.2 Nature and Type of Effects 4-144
4.14.3 Impacts Common to All Alternatives 4-144
4.14.4 Alternative A 4-145
4.14.5 Alternative B 4-145
4.14.6 Alternative C 4-145
4.14.7 Alternative D 4-146
4.14.8 Proposed Plan Amendment 4-146
4.15 Air Resources 4-146
4.15.1 Methods and Assumptions 4-146
4.15.2 Nature and Type of Effects 4-147
4.15.3 Impacts Common to All Alternatives 4-147
4.15.4 Alternative A 4-147
4.15.5 Alternative B 4-148
4.15.6 Alternative C 4-149
4.15.7 Alternative D 4-149
4.15.8 Proposed Plan Amendment 4-150
4.16 Climate 4-150
4.16.1 Methods and Assumptions 4-150
4.16.2 Nature and Type of Effects 4-151
4.16.3 Impacts Common to All Alternatives 4-151
4.16.4 Alternative A 4-151
4.16.5 Alternative B 4-152
4.16.6 Alternative C 4-153
4.16.7 Alternative D 4-153
4.16.8 Proposed Plan Amendment 4-154
4.17 Soil Resources 4-154
4.17.1 Methods and Assumptions 4-154
4.17.2 Nature and Type of Effects 4-155
4.17.3 Impacts Common to All Alternatives 4-156
4.17.4 Alternative A 4-157
4.17.5 Alternative B 4-158
4.17.6 Alternative C 4-159
4.17.7 Alternative D 4-161
4.17.8 Proposed Plan Amendment 4-162
4.18 Water Resources 4-164
4.18.1 Methods and Assumptions 4-164
4.18.2 Nature and Type of Effects 4-165
4.18.3 Impacts Common to All Alternatives 4-167
4.18.4 Alternative A 4-168
4.18.5 Alternative B 4-169
4.18.6 Alternative C 4-171
4.18.7 Alternative D 4-172
4.18.8 Proposed Plan Amendment 4-174
4.19 Special Status Species—Other Species of Issue 4-175
4.19.1 Methods and Assumptions 4-175
4.19.2 Nature and Type of Effects 4-177
4.19.3 Impacts Common to All Alternatives 4-179
4.19.4 Alternative A 4-179
4.19.5 Alternative B 4-181

4.19.6 Alternative C 4-184
4.19.7 Alternative D 4-185
4.19.8 Proposed Plan Amendment 4-187
4.20 Renewable Energy 4-190
4.20.1 Methods and Assumptions 4-190
4.20.2 Nature and Type of Effects 4-191
4.20.3 Impacts Common to All Alternatives 4-191
4.20.4 Alternative A 4-192
4.20.5 Alternative B 4-192
4.20.6 Alternative C 4-193
4.20.7 Alternative D 4-194
4.20.8 Proposed Plan Amendment 4-195
4.21 Social and Economic Conditions 4-195
4.21.1 Methods and Assumptions 4-195
4.21.2 Alternative A 4-195
4.21.3 Alternative B 4-198
4.21.4 Alternative C 4-200
4.21.5 Alternative D and the Proposed Plan Amendment 4-201
4.22 Environmental Justice 4-202
4.23 Unavoidable Adverse Impacts 4-203
4.24 Irreversible and Irretrievable Commitment of Resources 4-204
4.25 Relationship Between Local Short-term Uses and Long-term Productivity 4-205

TABLES

Page

4-1 Estimated Number of Wells and Associated Disturbance 4-6
4-2 Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative A 4-18
4-3 Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative B 4-23
4-4 Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative C 4-28
4-5 Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative D and Proposed Plan Amendment 4-33
4-6 Comparison of Alleviated Threats to GRSG in North Dakota by Alternative 4-41
4-7 Comparison of Lands and Realty Indicators by Alternative 4-48
4-8 ROW Exclusion and Avoidance Areas in GRSG Habitat (PHMA and GHMA) 4-51
4-9 Comparison of Vegetation Indicators by Alternative 4-56
4-10 Acres Open to and Unallocated for Grazing under All Alternatives 4-62
4-11 ROW Exclusion and Avoidance Areas in GRSG Habitat under each Alternative 4-63
4-12 Acres Leased for Minerals or Available for Leasing in Sagebrush Habitat under each Alternative 4-64
4-13 Comparison of Wildland Fire Management and Ecology Indicators by Alternative 4-76
4-14 Comparison of Lands and Realty Actions Across Alternatives 4-79
4-15 Relative Comparison of Fuels Treatment and Fire Suppression Costs Across Alternatives 4-81
4-16 Comparison of Fluid Minerals Indicators by Alternative 4-90
4-17 Oil and Gas Leasing Categories, Alternative A[1] 4-95
4-18 Oil and Gas Leasing Categories, Alternative B[1] 4-98
4-19 Oil and Gas Leasing Categories, Alternative C[1] 4-101
4-20 Oil and Gas Leasing Categories, Alternative D and Proposed Plan Amendment[1] 4-105
4-21 Comparison of Mineral Materials Indicators by Alternative 4-109
4-22 Comparison of Comprehensive Travel and Transportation Management Indicators by Alternative 4-113
4-23 Areas Open/Closed to New Road Construction by Alternative 4-114
4-24 Comparison of Recreation Indicators by Alternative 4-117
4-25 Comparison of Range Management Indicators by Alternative 4-125
4-26 Fluid Mineral Impacts on Range Management by Alternative 4-132
4-27 Comparison of ACEC Indicators by Alternative 4-144
4-28 ACECs by Alternative 4-145
4-29 Comparison of Air Resource Indicators by Alternative 4-146
4-30 Comparison of Climate Change Indicators by Alternative 4-151
4-31 Comparison of Soils Resources Indicators by Alternative 4-155
4-32 Quantitative Impact Summary by Alternative for Soils 4-157
4-33 Comparison of Water Resources Indicators by Alternative 4-164
4-34 Quantitative Impact Summary by Alternative for Water Resources 4-168
4-35 Comparison of Special Status Species-Other Indicators by Alternative 4-176
4-36 BLM-Administered Lands Managed as ROW Exclusion and Avoidance Areas 4-192
4-37 "Good" or Better Wind Potential That Would Be Managed as ROW Exclusion and Avoidance Areas 4-192
4-38 Wind Potential Affected by Alternatives B and D and Proposed Plan Amendment 4-193
4-39 Wind Potential Affected By Alternative C 4-194
4-40 Employment Generated from Grazing on Allotments Covered under the RMPA 4-196

TABLES (CONTINUED) Page

4-41 Labor Income Generated from Grazing on Allotments Covered under the RMPA..... 4-196
4-42 Employment Generated from Oil and Gas Exploration and Development on BLM in the Decision Area 4-197
4-43 Labor Income Generated from Oil and Gas Exploration and Development on BLM in the Decision Area 4-198

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**. The analysis shown under the draft alternatives may be referenced 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 4.2.1**, Analytical Assumptions**,** was updated to include an additional assumption describing how climate change could affect BLM decisions made as part of this planning process. It describes why the RFD scenario analysis was based on only one well per pad.
- **Section 4.3**, Special Status Species—Greater Sage-Grouse**,** was updated to include the following:
  - The potential impacts on GRSG from converting non-federal 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 GRSG 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 Plan Amendment and draft alternatives are presented **Chapter 5** (Cumulative Effects). This chapter is organized by topic, similar to **Chapter 3** (Affected Environment). 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 the 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 **Sections 4.2.1**, Analytical Assumptions, and **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 planning-level decisions and do not result in direct, on-the-ground actions. However, by planning for uses on BLM-administered surface estate and federal mineral estate during the planning horizon for the North Dakota 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 development 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. 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 the 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 the 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 resources issues and concerns identified throughout the process. Occasionally, impacts are described using ranges of potential impacts or in qualitative terms.

This chapter is the description of the environmental consequences associated with the impacts on GRSG and its habitat from activities carried out under 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 compensating 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 E**) 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, compensation, additionally, 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 North Dakota 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 could 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 and indirect impacts of implementing the RMPA may occur on all lands in the planning area; however, impacts would primarily occur on the decision area lands.
- 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.
- Stipulations for fluid mineral leasing (i.e., NSO, CSU, and TL) and activities associated with fluid mineral leasing (e.g., truck-mounted drilling, stationary drill rigs in unison, geophysical exploration equipment off designated routes, and construction of wells and pads) would be applied as specified to BLM-administered lands overlying the federal mineral estate. In addition, stipulations may be applied to private lands overlying federal mineral estate (known as split estate). Within the decision area, the BLM administers 30,574 of surface over federal mineral acres and 42,867 acres of federal fluid minerals underlying split estate, for a total of 73,441 acres of federal fluid federal mineral estate.
- RDFs apply to certain activities (i.e., water developments, mineral development, and fire fuels management) conducted by the BLM. RDFs would not apply to locatable minerals. RDFs would be applied to locatable minerals to the extent consistent with applicable law. Because the BLM does not have jurisdiction over split estate lands for activities not related to fluid mineral leasing and development, RDFs apply only to the 33,030 acres of BLM surface in the decision area. RDFs do apply to fluid minerals on split estate lands.
- Restrictions on land use authorizations are identified as ROW avoidance or ROW exclusion, although TL restrictions may also be applied and would restrict construction activities during the specified timeframes. 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 33,030 acres of BLM surface in the decision area.
- 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. Readers should not infer that they reflect exact measurements or precise calculations. Likewise, the figures in **Appendix A** are provided for illustrative purposes and are subject to the limitations discussed above.

- In the future, as tools for predicting climate change in a management area improve and changes in climate affect resources and necessitate changes in how resources are managed, the BLM may be required to reevaluate decisions made as part of this planning process and to adjust management accordingly.

Oil and Gas Reasonable Foreseeable Development Scenario

The RFD scenario, presented below in **Table 4-1**, Estimated Number of Wells and Associated Disturbance, lists projected future oil and gas exploratory and development activity and associated disturbance through 2029 based on the management actions (constraints) for the Proposed Plan Amendment in **Section 2.6.2** and each of the draft alternatives in **Table 2-4**. In southwestern North Dakota, the RFD scenario was based on only one well per pad This is because this has been the predominant drilling method for the area (the Red River play area). Although there are some recent well pads with more than one well, for analysis purposes, the predominant single-well pad drilling method was used. Factors used to project future activities include (but are not limited to) a review of published oil and gas resource information (including a number of on-line databases) for the area, a call for data from oil and gas operators, a review of petroleum technology research and development, geophysical activity, and limitations on access and infrastructure. It must be emphasized that the reasonable foreseeable development projections presented in **Table 4-1** are possible and/or likely to happen and should not be considered to be worst-case scenarios, but reasonable and science-based projections of the anticipated oil and gas activity (BLM 2013b). Additionally, the BLM-administered well pads and acres for short and long-term surface disturbance in **Table 4-1** is primarily located in PHMA. On lands outside PHMA, there was less than one well projected; therefore, most of the development is associated with PHMA (this is where most of the high potential oil and gas is found and where most of the existing leases are located).

Table 4-1
Estimated Number of Wells and Associated Disturbance

Alternatives and Totals	Total Pads	Total Wells	BLM-Administered Pads	BLM-Administered Wells	Total Acres	BLM-Administered Acres
Disturbance Associated with Existing Wells, Pads and Projected Active Well Pads (Short-Term Disturbance[1])						
Alternative A - new exploratory and development well pads/wells	384	384	60	60	2,071	337
Alternative A - existing and projected well pads/wells	894	894	231	231	2,455	479
Alternative A - Total Well Pads/Wells	*1,278*	*1,278*	*291*	*291*	*4,526*	*816*
Alternative B - new exploratory and development well pads/wells	352	352	26	26	1,899	145
Alternative B - existing and projected well pads/wells	894	894	231	231	2,455	479
Alternative B - Total Well Pads/Wells	*1,246*	*1,246*	*257*	*257*	*4,354*	*624*
Alternative C - new exploratory and development well pads/wells	352	352	25	25	1,899	142
Alternative C - existing and projected well pads/wells	894	894	231	231	2,455	479
Alternative C - Total Well Pads/Wells	*1,246*	*1,246*	*256*	*256*	*4,354*	*621*
Alternative D and Proposed Plan Amendment - new exploratory and development well pads/wells	376	376	51	51	2,028	288
Alternative D and Proposed Plan Amendment - existing and projected well pads/wells	894	894	231	231	2,455	479
Alternative D and Proposed Plan Amendment - Total Well Pads/Wells	*1,270*	*1,270*	*282*	*282*	*4,483*	*767*
Disturbance Associated with Existing Wells, Pads and Projected Producing Well Pads (Long-Term Disturbance[2])						
Alternative A - new producing well pads/wells	314	314	49	49	772	125
Alternative A - existing and projected well pads/wells	793	793	211	211	2,144	422
Alternative A - Total Well Pads/Wells	*1,107*	*1,107*	*259*	*259*	*2,915*	*548*
Alternative B - new producing well pads/wells	289	289	21	21	708	54

Table 4-1
Estimated Number of Wells and Associated Disturbance

Alternatives and Totals	Total Pads	Total Wells	BLM-Administered Pads	BLM-Administered Wells	Total Acres	BLM-Administered Acres
Alternative B - existing and projected well pads/wells	793	793	211	211	2,144	422
Alternative B - Total Well Pads/Wells	*1,081*	*1,081*	*232*	*232*	*2,851*	*476*
Alternative C - new producing well pads/wells	289	289	21	21	707	53
Alternative C - existing and projected well pads/wells	793	793	211	211	2,144	422
Alternative C - Total Well Pads/Wells	*1,081*	*1,081*	*232*	*232*	*2,851*	*475*
Alternative D and Proposed Plan Amendment - new producing well pads/wells	308	308	42	42	756	107
Alternative D and Proposed Plan Amendment - existing and projected well pads/wells	793	793	211	211	2,144	422
Alternative D and Proposed Plan Amendment - Total Well Pads/Wells	*1,101*	*1,101*	*252*	*252*	*2,899*	*530*

[1]Short-term disturbance is a calculation of the cumulative disturbance that would occur to the end of the plan from the new wells projected in the North Dakota RFD Scenario for oil and gas, plus those presently considered to be active (unplugged and unreclaimed).
[2]Long-term disturbance is a calculation of unreclaimed disturbance that would be present at the end of 2029.
Source: BLM 2013b

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 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 the 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. Duration is defined as follows, unless a specific duration is provided under a resource or resource use. 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 North Dakota 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 in an EIS (40 CFR 1502.22). If the information is essential to a reasoned choice among alternatives, it must be included in an EIS 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 would 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 SPECIAL STATUS SPECIES—GREATER SAGE-GROUSE

4.3.1 Methods and Assumptions

Indicators

Indicators of impacts on GRSG are as follows:

- Acres of sagebrush habitat
- Acres of short- and long-term surface disturbance (oil and gas)
- Connectivity of habitat patches
- Direct disturbance to GRSG

Assumptions

The analysis includes the following assumptions:

- Three general categories of anthropogenic 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.

- BMPs, 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 timeframe of two years or less, and long-term effects would occur over longer than two years.
- Under Alternative A, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which 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 include GRSG.
- Ground-disturbing activities could positively or negatively modify habitat, or cause loss or gain of individuals, depending on the amount of area disturbed, the nature of the disturbance, the species affected, and the location of the disturbance (e.g., juniper reduction treatments are ground-disturbing but could positively modify habitat in the long term).
- BLM-administered oil and gas well pads are primarily located in PHMA. On lands outside PHMA, there is less than one well projected (see **Table 4-1**); therefore, most of the development is associated with PHMA.

4.3.2 Nature and Type of Effects

Factors related to the decline in GRSG distribution and abundance includes habitat loss and degradation, disease and predation, chemicals and changes in land use (USFWS 2010, pg. 14). Habitat loss and fragmentation reduces the land area available to support GRSG, and also increases opportunities for other types of disturbance, such as human traffic, wildfire, and spread of invasive plant species. The GRSG impacts section is arranged to focus on the COT report threats identified for North Dakota.

COT Report Threats —Isolated/Small Populations, Agriculture, and Ex-Urban Development

Impacts from Land Tenure Decisions

GRSG in North Dakota are restricted to approximately 800 square miles in western Bowman County, western Slope County, and extreme southern Golden Valley County. GRSG in North Dakota are largely non-migratory, although there may be some short seasonal movements between summer and winter habitats, primarily between Montana and North Dakota (NDGFD 2005; Swanson 2009). As a small population with limited suitable habitat, North Dakota GRSG are especially vulnerable to the effects of isolation and habitat fragmentation.

Land tenure adjustments or withdrawals made in GRSG habitat could reduce the habitat available to sustain GRSG populations, unless provisions were made to ensure that GRSG conservation remained a priority under the new land management regime. Land exchanges designed to decrease fragmentation of GRSG habitat would help GRSG populations (NTT 2011, pg. 13-14).

The continuing pressure for converting non-federal rangeland to agricultural land or residential development in NDFO increases the risks of habitat fragmentation, particularly given mixed 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).

COT Report Threat—Energy and Mining

Impact from Mineral Resources

Energy development requires construction of roads, well pads, wells and other infrastructure, with associated noise, traffic and lights, that 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 (Hagen 2010). GRSG population declines resulted from avoidance of infrastructure during one or more seasons, reduced productivity, and/or reduced survival (Naugle et al. 2011).

Industrial activity associated with the development of surface mines and infrastructure (e.g., roads and power lines) could result in noise and human activity that disrupt the habitat and life-cycle of GRSG. Impacts from roads may include direct habitat loss, direct mortality, barriers to migration corridors (depending on the size of the road and season of use) or seasonal habitats, facilitation of predators and spread of invasive plant 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 over a 5-year period following an increase in mining activity, though some recovery was subsequently observed (Remington and Braun 1991, cited in Manier et al. 2013 pg. 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).

Studies consistently reported that breeding populations of GRSG were negatively impacted at conventional well pad densities (defined in the study as 4 to 8 pads per square mile), with declines in lek attendance by male GRSG ranging from 13 to 79 percent associated with these well densities. 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 4 miles (Manier et al. 2013, pg. 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. pg. 59).

Despite significant closures of BLM-administered lands to oil and gas leasing within GRSG habitat (720,800 acres in PH and 4,164,700 acres in GH in MZ I, according to Manier et al. 2013, Table 12, pg. 55), current leases are substantial across GRSG ranges in BLM MZ I, which includes the planning area. 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, pg. 51). Mining of various federal mineral resources currently directly affects approximately 3.5 percent of potential GRSG habitat within MZ 1, with indirect effects potentially affecting larger portions in some areas. Restrictions on mineral leasing in GRSG habitat would reduce disturbance to the species by reducing these disturbances.

Potential restrictions on use of GRSG habitat could include NSO, CSU and TL stipulations. NSO stipulations would prevent habitat loss, fragmentation and disturbance in GRSG habitat, while CSU would avoid breeding habitat and other sensitive areas, and TL would avoid nest disturbance by restricting use during certain times of year. However, if mineral resources can be recovered from drilling into the subsurface from an adjacent private landholding, habitat degradation, noise disturbance and other impacts from drilling could still occur in the planning area and the stipulations may be ineffective in protecting GRSG.

COT Report Threat—Infrastructure

Impact from Lands and Realty

Transmission lines and major power lines are widespread throughout the range of GRSG. GRSG generally 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 temporarily disturb individual GRSG and habitat along the ROW. Following construction, GRSG avoidance of vertical structures, potentially due to raptors perching on the structures, 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 in an area in pre- and post-transmission line comparisons (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). Additionally, the tendency of GRSG to fly relatively low, and in low light or when harried, may put them at high risk of collision with power lines (Beck et al. 2006, cited in Manier et al. 2013, pg. 50).

ROW exclusion areas would prohibit all development of ROWs, 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 non-federal land-ownership areas are mixed and exclusion areas may result in development on non-federal 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/or habitat loss, alteration of physical environment, leaching of nutrients, erosion, spread of invasive plants, and alteration by humans due to accessibility. 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). Increased length of road, increased traffic levels on roads, and traffic activity during the early morning on roads within approximately two miles of leks all negatively influence male lek attendance (Holloran 2005; LeBeau 2012; Forman and Alexander 1998; Lyon and Anderson 2003, cited in Manier et al. 2013, pg. 44, 50).

Closing and reclaiming unused, minimally used and/or unnecessary (e.g., redundant) roads in and around GRSG habitat would reduce disturbance to GRSG in those habitats as well as increase the amount of GRSG habitat when the roads are reclaimed (NTT 2011, pg. 11-12).

COT Report Threat—Fire

Impacts from Fire

Fire is particularly damaging to sagebrush ecosystems. 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). 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 re-growth 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, pg. 4-6).

The chance of a large wildfire in sagebrush is less in the NDFO planning area than in GRSG habitats to the west and south, due to the planning area's vegetation (less cheatgrass) and cooler wetter climate. However, climate change may increase the risk of wildfire throughout Montana and the Dakotas (NRC 2010).

Fire suppression may be used to maintain habitat for GRSG (NTT 2011, pg. 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), and fire suppression may 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, pg. 26-27). Re-evaluation of controlled burning, fuels management and fire suppression policies is intended to protect sagebrush ecosystem and the GRSG that depend on it.

COT Report Threat—Grazing and Range Management

Impacts from Range Management

Livestock grazing is the most widespread land use across the sagebrush biome (Connelly et al. 2004, pg. 7-29). Livestock grazing can affect soils, vegetation, water and nutrient availability by consuming or altering vegetation, redistributing nutrients and plant seeds, trampling soils and vegetation, and disrupting microbial composition (Connelly et al. 2004, pg. 7-29 – 7-32). Livestock may also trample nests and disturb GRSG behavior (Beck and Mitchell 2000, Coates 2007, pg. 28, 33).

At unsustainable levels of grazing, impacts can lead to loss of vegetative cover, reduced water infiltration rates, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife, including GRSG (Knick et al. 2011). Properly managed grazing; however, may protect GRSG by reducing fuel load (Connelly et al. 2004, pg. 7-30).

Structural range improvements such as fences represent potential movement barriers (especially woven-wire fences), predator perches or travel corridors, and are a potential cause of direct mortality to GRSG (Braun 1998). Grazing restrictions that protect sagebrush ecosystem health would enhance habitat for GRSG populations.

Livestock and associated human facilities may also increase the presence of predators, such as ravens, coyotes, eagles, and other raptors. Dead livestock and trash can attract predators, which may then prey on or disrupt GRSG using these sites (e.g., leks and nesting areas) or cause displacement into less desirable habitats.

An indirect impact from excluding livestock grazing from BLM-administered lands is the potential conversion of adjacent non-federal 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 lead to a loss of GRSG habitat on adjacent non-federal lands if ranches were converted to residential or agricultural use. Temperature increases from climate change may also increase crop yields, encouraging ranchlands not previously used for agriculture to be converted for that purpose (NRC 2010).

COT Report Threat—Vegetation Management (Sagebrush Elimination, Conifer Invasion, Invasive Species)

Impacts from Vegetation Management and Habitat Restoration

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, using surface (soil) stabilization to manipulate vegetation composition or 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, and may competitively exclude 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, and may also 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 threaten GRSG because they do not provide suitable habitat, and further, 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 and potential for erosion, and offers additional perch sites for raptors; thus, woodland expansion may also represent expansion of raptor predation threat, similarly 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 including a diversity of herbaceous species and healthy native grasses, making management for high condition important (Knick et al. 2011). Given the limited distribution of sagebrush and the cost of habitat restoration, management plans that protect intact sagebrush and restore impacted areas strategically to enhance existing habitats (i.e., 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, pg. 108). Sagebrush-promoting vegetation treatments would increase the amount and quality of GRSG habitat.

COT Report Threat—Recreation

Impacts from Recreation

Recreational use of GRSG habitat may be benign in some situations, but may also result in human disturbance of birds or nesting sites, degradation of sagebrush habitat, or poaching (NTT 2011, p. 12). Activities such as camping, bicycling, off-road vehicle use and hunting utilizing the extensive network of BLM roads and trails impact sagebrush and GRSG by generating noise and dust, spreading invasive plants, and altering wildlife behavior (Knick et al. 2011). In addition, increased human use of areas could attract GRSG predators (e.g., ravens) through residual trash and food waste. As discussed under travel and transportation above, road and trail use may directly cause GRSG mortality via collisions with vehicles. Closing or seasonally restricting roads used by recreationalists in and around seasonal GRSG habitats may reduce the impacts on wildlife. Restricting access to important habitat areas based on seasonal use and coincident with GRSG activities would also protect GRSG (Knick et al. 2011; NTT 2011, pg. 11).

4.3.3 Alternative A

COT Report Threat—Isolated/Small Populations, Agriculture, and Ex-Urban Development

Impacts from Land Tenure Decisions

Though 3,436 acres of BLM-administered land are available for disposal, land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which 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 retention of areas with GRSG, and would thus retain occupied habitats under BLM management. Retaining land under BLM jurisdiction would avoid the possibility of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat, though conversions could still occur on adjacent non-federal lands.

Although this alternative would likely retain lands within planning area, it is not a requirement of the current North Dakota RMP (i.e., the lands are technically available for disposal and if an isolated parcel contained no GRSG habitat it could be disposed of or exchanged); therefore, it would not meet COT report Conservation Option 5 under Ex-Urban Development to "not relinquish public lands… in GRSG habitat." Acquisitions of GRSG habitat would still be allowed, so COT report Conservation Option 2 under Ex-Urban Development could be met but there is no emphasis on it.

Impacts from ACECs

No ACECs would be designated under Alternative A; therefore, there would be no impacts on GRSG or their habitats from management for ACECs.

COT Report Threats—Energy and Mining

Impacts from Fluid Minerals

Under Alternative A, NSO stipulations would be applied within one-quarter-mile of active leks and no seismic exploration or other development would be allowed within two miles of leks between March 1 and June 15. Currently, no acres in the planning area are closed to fluid mineral leasing, while 73,435 BLM-administered acres are open to leasing. Of these, 25,130 acres are under standard terms and conditions, while 9,780 acres are NSO, 21,235 acres are CSU, and 38,504 acres are under TLs. As shown below in **Table 4-2**, Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative A, 291 current and projected pads under existing leases on BLM-administered land are anticipated to disturb 816 acres in the short term, with 259 pads anticipated to disturb 548 acres long term. As discussed above under *Nature and Type of Effects*, mineral exploration and extraction impacts are direct impacts from habitat loss, direct mortality, barriers to migration corridors or seasonal habitats, facilitation of predators, spread of invasive vegetation species, and other indirect influences, such as noise, although leasing restrictions would reduce these impacts by disturbing/degrading fewer acres of sagebrush habitat, and reducing direct disturbance of birds on BLM-managed minerals. 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.

The existing oil and gas stipulations (e.g., 1/4 mile NSO and TLs) would not work towards meeting the COT report Conservation Measures 1 and 2 under Energy Development: avoid energy development in PACs (no PHMA or GHMA in this alternative) or, if not possible to avoid, development should occur only on non-habitat areas. The current NSO, CSU, and TL restrictions in place for GRSG would help meet Conservation Measure 3 "…the development should occur in the least suitable habitat for GRSG…".

Table 4-2
Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative A

	Total Pads	Total Wells	BLM-Administered Pads	BLM-Administered Wells	Total Acres	BLM-Administered Acres
Short-Term Disturbance[1]						
New exploratory and development well pads/wells	384	384	60	60	2,071	337
Existing and projected well pads/wells	894	894	231	231	2,455	479
Total well pads/wells	*1,278*	*1,278*	*291*	*291*	*4,526*	*816*
Long-Term Disturbance[2]						
New producing well pads/wells	314	314	49	49	772	125
Existing and projected well pads/wells	793	793	211	211	2,144	422
Total well pads/wells	*1,107*	*1,107*	*259*	*259*	*2,915*	*548*

[1]Short-term disturbance is a calculation of the cumulative disturbance that would occur to the end of the plan from the new wells projected in the North Dakota RFD scenario for oil and gas, plus those presently considered to be active (unplugged and unreclaimed).
[2]Long-term disturbance is a calculation of unreclaimed disturbance that would be present at the end of 2029.
Source: BLM 2013b

Impacts from Solid Minerals

Under Alternative A, 242,743 acres would be available for consideration for coal leasing (of this, 30,408 acres are BLM surface), although there are no existing coal leases and no current interest in federal coal resources in GRSG habitat. For locatable minerals, mineral materials, salable minerals and nonenergy leasable minerals, a total of 56,681 BLM-administered acres would continue to be open to leasing and development, and impacts on GRSG and habitat described under *Nature and Type of Effects* would continue. Although there are currently no mines on BLM minerals, the planning area is open to mining, so therefore does not meet the COT report Conservation Option 1 under Mining to "avoid **new** mining activities and/or any associated facilities within occupied habitat, including seasonal habitats."

COT Report Threat—Infrastructure

Impacts from Lands and Realty

Alternative A includes no specific lands and realty management related to GRSG or their habitat, although some measures to site ROWs in a way that minimizes surface disturbance and avoids environmentally sensitive areas would be applied. There are currently no ROW exclusion or avoidance areas within the planning area. Infrastructure can result in a variety of direct and indirect impacts, such as

habitat loss, habitat degradation at multiple scales[1], increased likelihood of predation because of 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 has declined due to the species avoidance of infrastructure and reduced productivity or reduced survival in the vicinity of infrastructure (Naugle et al. 2011). If no other lines are built within the decision area, impacts on GRSG may be relatively minor.

However, since the entire area is open to ROWs, there are no specific actions that would make progress toward meeting the COT report Conservation Option 1 under Infrastructure to "avoid construction of these features in GRSG habitat, both within and outside of PACs." The current RMP direction to avoid environmentally sensitive areas would partially meet the COT report Conservation Option 2 to either bury power lines or consolidate new structure with existing features.

Impacts from Travel and Transportation Management

BLM-administered lands would continue to allow limited yearlong use for motorized wheeled vehicles, restricted to existing roads and trails on 33,030 acres (see **Chapter 1** for more detail on the OHV ROD). Through site-specific planning, BLM would inventory, map and designate roads and trails as open, seasonally open, or closed. Through this process, important wildlife habitat areas, including GRSG habitat, could be protected, though there is currently no direct protection for GRSG or GRSG habitat from travel and transportation management under Alternative A. Fragmentation and direct impacts described under *Nature and Type of Effects* would likely continue, though the extent of these impacts is not clear in the absence of projected road-building needs. Since this alternative carries forward the Limited designation (OHVs limited to existing road and trails) from the Montana-Dakotas OHV ROD, it would meet the COT report Conservation Option 1 under Recreation to: "Close important GRSG use areas to off-road vehicle use." Off-road vehicle use has not been allowed in the planning area since 2003.

COT Report Threat—Fire

Impacts from Fire and Fuels Management

Fire and fuels management under Alternative A would not specifically protect GRSG or their habitat, although prescribed burning may be used where appropriate in support of resource management objectives, including improving vegetation conditions in GRSG habitat. Though it would not be an RMP action under this alternative, BLM would still meet the COT report Conservation

[1]For example, invasive species at the microsite habitat scale and increased habitat fragmentation at the seasonal habitat scale and population-level.

Option 4 under Fire to: Renew and implement the BLM IM 2011-138 Sage-grouse Conservation Related to Wildlife Fire and Fuels Management…" The part it would not meet is incorporating this IM direction into an RMP-level action; BLM would still use the applicable practices from the IM.

COT Report Threats—Grazing and Range Management Structures

Impacts from Range Management

Under Alternative A, 32,945 acres in the planning area would continue to be open for livestock grazing, with 5,780 available AUMs, while 85 acres would remain unallocated for grazing. Livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing RMP followed to maintain ecological conditions according to Standards for Rangeland Health, which include maintaining healthy, productive and diverse populations of native plants and animals. The Montana/Dakotas Drought Policy (**Appendix H**) would be followed to prevent impacts on rangelands under drought conditions. Continuation of these policies would not specifically protect GRSG habitat, though could provide indirect benefits through preservation of existing sagebrush habitat.

Riparian habitats would be managed to achieve PFC and livestock would be restricted from riparian areas. Together, these management actions would help to improve riparian vegetation health and reduce impacts caused by livestock, such as trampling and overuse of riparian areas. As a result, seasonal habitats for GRSG would be improved or preserved where they are applied.

Range improvements would be designed to meet both wildlife and range objectives, and would include building or modifying fences to permit passage of wildlife. Fences could also increase opportunities for raptor perching and predation on GRSG. Impacts would increase in areas where perching is near 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). One range improvement is currently planned, a seven-mile pipeline in the Antelope Butte Allotment. In addition, all interior non-wildlife friendly fences have been replaced within the Big Gumbo Allotment within the past five years. Development of range improvements on erodible soils would be avoided in springs. Although not directly created to protect GRSG, these approaches would protect GRSG habitat by reducing the likelihood of surface disturbance in sensitive areas.

With the current Biodiversity Standard in the Standards for Rangeland Health, this alternative would help meeting Conservation Option 1 under Grazing to "ensure that allotments meet ecological potential and wildlife habitat requirements…" However, this alternative would not fully meet Conservation Option 3 to "Incorporate sage-grouse habitat needs or habitat characteristics

into relevant resource and allotment management plans…" since there are no GRSG specific standards developed.

COT Report Threats—Vegetation Management (Sagebrush Elimination, Conifer Invasion, Invasive Species)

Impacts from Habitat Restoration and Vegetation Management
Under Alternative A, Integrated Vegetation Management Handbook policies would be followed and would provide providing guidance on which treatments and chemicals can be used. Application of these policies would improve vegetation management in sagebrush habitat thereby improving habitat conditions for GRSG. Although there is no specific RMP direction under Alternative A, current and planned vegetation management projects in the planning area do include conifer reduction in the southern portion of the area, without the use of prescribed fire. This project would improve habitat for GRSG.

This alternative would meet COT report Conservation Objective under Pinyon-juniper Expansion to: "Remove pinyon-juniper from areas of sagebrush that are most likely to support sage-grouse (post-removal)…"

COT Report Threat—Recreation

Impacts from Recreation
Alternative A includes no specific recreation management related to GRSG or their habitat. Potential impacts on GRSG from recreational use would be as discussed above under *Nature and Type of Effects*. Although there are no developed recreation facilities in the planning area, this alternative would not meet the COT report Conservation Option 2 under Recreation to "Avoid development of recreational facilities… in sage-grouse habitats" because future development would not be precluded.

4.3.4 Impacts Common to Alternatives B——D and the Proposed Plan Amendment

Adopting a Monitoring Framework (see **Section 2.7.2**) to oversee the implementation and effectiveness of GRSG habitat improvement could improve habitat and long-term viability of GRSG.

4.3.5 Alternative B

COT Report Threat—Isolated/Small Populations, Agriculture, and Ex-Urban Development

Impacts from Land Tenure Decisions
No lands in PHMA would be available for disposal under Alternative B and if conservation actions cannot be achieved, the BLM would seek to acquire lands with intact subsurface mineral estate. Retaining land under BLM jurisdiction

would avoid the possibility of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat, though these conversions could still occur on adjacent non-federal lands. Alternative B would meet the COT report Conservation Option 5 under Ex-Urban Development to "…not relinquish public lands…," and it would also meet Conservation Option 2 to: "Acquire and manage sage-grouse habitat to maintain intact ecosystems."

Impacts from ACECs

Impacts would be the same as Alternative A.

COT Report Threats—Energy and Mining

Impacts from Fluid Minerals

Restrictions and RDFs (**Appendix B**) for fluid mineral leasing and development proposed under Alternative B would result in beneficial impacts on GRSG compared to Alternative A. Under Alternative B, 61,197 acres in the planning area would be closed to fluid mineral leasing, while 12,238 acres of BLM-administered lands would remain open to leasing. PHMA would be closed to new fluid mineral leasing, existing leases would not be renewed, and conservation measures would be applied as COAs. These proposed policies would result in a decrease in the number of acres of GRSG habitat that would be impacted by fluid mineral leasing and development compared to Alternative A, and a reduction in the likelihood of impacts from fluid mineral exploration and development described under *Nature and Type of Effects*.

As shown below in **Table 4-3**, Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative B, 257 current and projected pads under existing leases on BLM-administered land are anticipated to disturb 624 acres, a 12 percent drop from Alternative A that disturbs 192 fewer acres of habitat. In the long term, 72 fewer acres would be disturbed, and fewer habitats would be fragmented, compared to Alternative A. The difference in acreage from Alternative A is small because much of the mineral resource in NDFO is already under existing leases.

Alternative B meets COT report Conservation Measures 1-3 to: avoid energy development in PACs (new leases), use adequate buffers for valid existing rights, and use reasonable alternative avoidance measures (see actions in **Table 2-4** under Alternative B for Unleased and Leased Fluid Mineral in **Chapter 2** for all conservation measures). As mentioned above, this would result in 12 percent reduction in disturbed acres from Alternative A.

Impacts from Solid Minerals

The limitations proposed under Alternative B would result in beneficial impacts, compared to Alternative A, on GRSG and their habitat associated with solid mineral exploration and extraction activities described under *Nature and Type of Effects*. All surface mining of coal would be available for further consideration of

Table 4-3
Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative B

	Total Pads	Total Wells	BLM-Administered Pads	BLM-Administered Wells	Total Acres	BLM-Administered Acres
Short-Term Disturbance[1]						
New exploratory and development well pads/wells	352	352	26	26	1,899	145
Existing and projected well pads/wells	894	894	231	231	2,455	479
Total Well Pads/Wells	*1,246*	*1,246*	*257*	*257*	*4,354*	*624*
Long-Term Disturbance[2]						
New producing well pads/wells	289	289	21	21	708	54
Existing and projected well pads/wells	793	793	211	211	2,144	422
Total Well Pads/Wells	*1,081*	*1,081*	*232*	*232*	*2,851*	*476*

[1]Short-term disturbance is a calculation of the cumulative disturbance that would occur to the end of the plan from the new wells projected in the North Dakota RFD scenario for oil and gas, plus those presently considered to be active (unplugged and unreclaimed).
[2]Long-term disturbance is a calculation of unreclaimed disturbance that would be present at the end of 2029.
Source: BLM 2013b

coal leasing with surface restrictions in PHMA (87,443 acres); subsurface mining could only be allowed if all surface disturbance and facilities were place outside PHMA. PHMA would be recommended for withdrawal from locatable mineral entry. For nonenergy leasable minerals, PHMA would be closed to leasing and to mineral material sales. RDFs (**Appendix B**) would be applied to existing leases and locatable mineral claims minerals to the extent consistent with applicable law, and restoration would be required for existing salable mineral pits[2].

These actions would decrease the number of acres potentially impacted by solid mineral development compared to Alternative A, and a reduction in the likelihood of disturbance and fragmentation impacts from solid mineral exploration and extraction described under *Nature and Type of Effects*. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on GRSG or their habitat but it would preclude any potential future development.

[2]Although there are no authorized mineral pits in the planning area, any trespass pits found in the planning area would be subject to restoration.

This alternative would meet the COT report Conservation Option 1 under Mining to: "Avoid new mining activities and/or associated facilities within occupied habitats, including seasonal habitats."

COT Report Threat—Infrastructure

Impacts from Lands and Realty

Establishing ROW exclusion and avoidance areas would protect GRSG habitat in areas where they are applied as described above under *Nature and Type of Effects*. Under Alternative B, PHMAs would be managed by the BLM as ROW exclusion areas (32,900 acres). GHMA would be managed by the BLM as ROW avoidance areas (80 acres). Potential removal, burial, or modification of power lines could also decrease the likelihood of predator presence in these areas. Such management would increase the number of acres of GRSG habitat that would be protected by lands and realty management compared to Alternative A.

The net impact of the ROW exclusion area is less because a portion of the PHMA is a unitized oil and gas field (this means facilities such as roads and pipelines needed for the development of the field are covered under a separate agreement between the operator and the BLM vs. the realty program). All other utilities would be subject to the ROW exclusion (PHMA) and avoidance (GHMA) areas.

By making PHMA a ROW exclusion area this alternative would partially meet the COT report Conservation Option to: "Avoid construction of these features in sage-grouse habitat…" This partially meets because there would still be construction of some of these features for valid existing rights.

Impacts from Travel and Transportation Management

Travel and transportation management under Alternative B would likely result in beneficial impacts on GRSG and their habitat, compared to Alternative A. These impacts would be on roads and motorized vehicles by limiting traffic on existing roads in PHMA and GHMA, evaluating the need to permanently or seasonally close roads or areas to traffic in PHMA, restoring roads not designated in travel management plans in PHMA, and completing activity level travel plans within five years of the ROD. Site-specific travel planning would designate specific roads and trails to be open, closed, or seasonally closed in the planning area. Although the extent of permanent or seasonal road closures and the reclaiming of undesignated roads is unknown, these provisions make Alternative B more likely to result in beneficial impacts on GRSG as described under *Nature and Type of Effects* compared to Alternative A, though the extent of these impacts is not clear in the absence of projected road-building needs and/or closures.

Since this alternative carries forward the Limited designation (OHVs limited to existing road and trails) from the Montana-Dakotas OHV ROD, it would meet the COT report Conservation Option 1 under Recreation to: "Close important

sage-grouse use areas to off-road vehicle use." Off-road vehicle use has not been allowed in the planning area since 2003.

COT Report Threat—Fire

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. BLM would prioritize suppression in PHMA, though it is unknown to what extent firebreaks or post-fire restoration will be employed in the planning area. Although fire is still a threat listed in the COT report, fires have only burned 2 percent of the entire planning area in the past 10 years (or about 21,000 acres). 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*.

BLM would meet the COT report Conservation Option 4 under Fire to: "Renew and implement the BLM IM 2011-138 Sage-grouse Conservation Related to Wildlife Fire and Fuels Management…" Many of the other Conservation Options for Fire in the COT report are included as RDFs in **Appendix B** and are applicable to Alternatives B-D. Alternative B also meets the Conservation Measures 2 and 5 to: eliminate intentional fires in sagebrush habitats and immediately suppressing fire in all sagebrush habitat.

COT Report Threats—Grazing and Range Management Structures

Impacts from Range Management

Under Alternative B, BLM would implement a number of management actions in PHMA to incorporate GRSG habitat objectives livestock grazing management, though there would be no change to the acreage open for grazing or available AUMs. For example, at the implementation level, BLM may consider changes in grazing practices or systems to ensure allotments meet rangeland health standards or can restrict new grazing infrastructure in GRSG habitat. These changes could reduce grazing intensity or change the season of use. In addition, changes in number of livestock or season of use within riparian and wet meadows can reduce impacts in these important seasonal habitats. Together, these efforts would result in beneficial impacts from grazing on GRSG and habitat described under *Nature and Type of Effects* compared to Alternative A.

With the current Biodiversity Standard in the Standards for Rangeland Health, this alternative would help meeting Conservation Option 1 under Grazing to "ensure that allotments meet ecological potential and wildlife habitat

requirements…" This alternative states to incorporate GRSG habitat objectives and management considerations into all allotments through AMPs or permit renewals, and would thus work towards meeting Conservation Option 3 to "Incorporate sage-grouse habitat needs or habitat characteristics into relevant resource and allotment management plans…" Conservation Measures 2, 4, and 5 also have similar management actions under this alternative (e.g., work cooperatively on integrated ranch planning, prioritize completion of Standards for Rangeland Health within PHMA, manage for vegetation composition and structure consistent with ecological site potential).

COT Report Threats—Vegetation Management (Sagebrush Elimination, Conifer Invasion, Invasive Species)

Impacts from Habitat Restoration and Vegetation Management

Habitat restoration and vegetation management actions under Alternative B would aim to improve GRSG habitat and prioritize restoration efforts to benefit GRSG habitats. As a result, the restoration and management of vegetation actions would enhance GRSG habitat 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. It is unknown how many vegetation management projects would be undertaken in the decision area to prioritize restoration of GRSG habitat.

This alternative would meet COT report Conservation Objective under Pinyon-juniper Expansion to: "Remove pinyon-juniper from areas of sagebrush that are most likely to support sage-grouse (post-removal)…" as well as Conservation Measure 1 under Invasive Plant Species to" "Retain all remaining large intact sagebrush patches…"

COT Report Threat—Recreation

Impacts from Recreation

Management proposed under Alternative B would result in beneficial impacts from organized recreation as described under *Nature and Type of Effects* on GRSG and their habitat, compared to Alternative A, by limiting issuance of SRPs in PHMA. However, impacts from dispersed recreation, such as hiking, biking, or equestrian activities, would continue to disturb vegetation and GRSG in the areas where they occur.

Although there are no developed recreation facilities in the planning area, this alternative would not meet the COT report Conservation Option 2 under Recreation to "Avoid development of recreational facilities… in sage-grouse habitats" because there is no specific action addressing future recreation development (not an issue in this part of the NDFO); however, SRPs would only

be issued if they were neutral or beneficial to PHMA. See *Impacts from Travel and Transportation Management* sections for Conservation Option 1.

4.3.6 Alternative C

COT Report Threat—Isolated/Small Populations, Agriculture, and Ex-Urban Development

Impacts from Land Tenure Decisions

No lands in PHMA and GHMA would be available for disposal under Alternative C. Retaining land under BLM jurisdiction would avoid the possibility of habitat conversion to agriculture, urbanization, or other uses that would remove sagebrush habitat, though these conversions could still occur on adjacent non-federal lands. Private land may be acquired in ACECs 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 has the potential to increase the acreage of enhanced sagebrush compared Alternative A, as no such measures have been provided under Alternative A. Alternative C would meet the COT report Conservation Option 5 under Ex-Urban Development to "…not relinquish public lands…," and it would also meet Conservation Option 2 to: "Acquire and manage sage-grouse habitat to maintain intact ecosystems."

Impacts from ACECs

An ACEC to protect GRSG would be designated as sagebrush reserves on PHMA, covering 32,900 acres. GRSG populations and habitat within areas designated as ACECs would be protected by increased management focus and restrictions on surface-disturbing activities in these areas.

COT Report Threats—Energy and Mining

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 conservation measures, thereby enhancing protection of GRSG habitat and populations compared to Alternative A. In addition, actions would be applied to both PHMA and GHMA, which would increase the area of GRSG habitat that would be protected. For example, under Alternative C, 66,293 acres in the planning area would be closed to fluid mineral leasing, while 7,142 BLM-administered acres within PHMA would remain open to leasing. Of these, 7,142 acres would be under standard terms and conditions. As shown below in **Table 4-4**, Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative C, 231 current and projected pads under existing leases on BLM-administered land are anticipated to disturb 621 acres short-term, 195 fewer than Alternative A. In the long term, 73 fewer acres would be disturbed

Table 4-4
Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative C

	Total Pads	Total Wells	BLM-Administered Pads	BLM-Administered Wells	Total Acres	BLM-Administered Acres
Short-Term Disturbance[1]						
New exploratory and development well pads/wells	352	352	25	25	1,899	142
Existing and projected well pads/wells	894	894	231	231	2,455	479
Total Well Pads/Wells	*1,246*	*1,246*	*256*	*256*	*4,354*	*621*
Long-Term Disturbance[2]						
New producing well pads/wells	289	289	21	21	707	53
Existing and projected well pads/wells	793	793	211	211	2,144	422
Total Well Pads/Wells	*1,081*	*1,081*	*232*	*232*	*2,851*	*475*

[1]Short-term disturbance is a calculation of the cumulative disturbance that would occur to the end of the plan from the new wells projected in the North Dakota RFD scenario for oil and gas, plus those presently considered to be active (unplugged and unreclaimed).
[2]Long-term disturbance is a calculation of unreclaimed disturbance that would be present at the end of 2029.
Source: BLM 2013b

compared to Alternative A. These are approximately the same reductions achieved under Alternative B. The change in acreage from Alternative A is small because much of the mineral resource in NDFO is already under existing leases.

Alternative C meets COT report Conservation Measures 1-3 to: avoid energy development in PACs (new leases), use adequate buffers for valid existing rights, and use reasonable alternative avoidance measures (see actions in **Table 2-4** under Alternative C for Unleased and Leased Fluid Mineral in **Chapter 2** for all conservation measures). This alternative would result in approximately 12 percent drop of disturbed acres from Alternative A; even though Alternative C makes PHMA and GHMA no-lease areas, the acreages and well numbers are not very different from Alternative B (where PHMA is a no lease) because of the location of existing leases.

Impacts from Solid Minerals

Impacts from solid minerals management would be similar to Alternative B but would be applied to a larger area (PHMA and GHMA). Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on GRSG or their habitat but it would preclude any potential future development. This alternative would meet the COT report Conservation Option 1 under Mining to: "Avoid new mining activities and/or associated facilities within occupied habitats, including seasonal habitats."

COT Report Threat—Infrastructure

Impacts from Lands and Realty

Similar to Alternative B, the measures proposed under Alternative C would reduce the impacts of ROWs on GRSG habitat. PHMA and GHMA would be ROW exclusion areas (32,980 acres), including for wind energy. Other impacts would be the same as under Alternative B. Management of ROW exclusion areas would result in beneficial impacts (described under the *Nature and Type of Effects*) on sagebrush and vegetation which support GRSG and other wildlife, compared to Alternative A. As under Alternative B, public ownership would be maintained in PHMA, but without the exceptions provided under Alternative B. ROW exclusion areas could have the unintended side-effect of shifting ROW development onto adjacent non-federal lands.

As with Alternative B, the net impact of the ROW exclusion area is less because a portion of the PHMA is a unitized oil and gas field (see Alternative B). By making PHMA and GHMA a ROW exclusion area this alternative would partially meet the COT report Conservation Option to: "Avoid construction of these features in sage-grouse habitat…" This partially meets because there would still be construction of some of these features for valid existing rights.

Impacts from Travel and Transportation Management

Impacts from travel and transportation management would be similar to Alternative B, although impacts on GRSG habitat (as described under the *Nature and Type of Effects*) would be greater by 80 additional acres since protections would apply to both PHMA and GHMA. Site-specific travel planning to be completed in the next five years would designate specific roads and trails to be open, closed, or seasonally closed in the planning area.

Since this alternative carries forward the Limited designation (OHVs limited to existing road and trails) from the Montana-Dakotas OHV ROD, it would meet the COT report Conservation Option 1 under Recreation to: "Close important sage-grouse use areas to off-road vehicle use." Off-road vehicle use has not been allowed in the planning area since 2003.

COT Report Threat—Fire

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be largely similar to those described for Alternative B, but would be applied to a slightly larger area (PHMA and GHMA), and would thus provide greater protection for GRSG and their habitat over the long term, though it is unknown to what extent firebreaks or post-fire restoration would be employed in the planning area. Although fire is still a threat listed in the COT report, fires have only burned two percent of the entire planning area in the past 10 years (or about 21,000 acres).

BLM would meet the COT report Conservation Option 4 under Fire to: "Renew and implement the BLM IM 2011-138 Sage-grouse Conservation Related to Wildlife Fire and Fuels Management…" Many of the other Conservation Options for Fire in the COT report are included as RDFs in **Appendix B** and are applicable to Alternatives B-D. Alternative C also meets the Conservation Measures 2 and 5 to: eliminate intentional fires in sagebrush habitats and immediately suppressing fire in all sagebrush habitat.

COT Report Threats—Grazing and Range Management Structures

Impacts from Range Management

Impacts from range management would be similar to those described for Alternative B. In addition, grazing would be reduced by 50 percent on all allotments within the Big Gumbo area (2,041 AUMs) and 3,739 AUMs would be available in other areas. By reducing AUMs, Alternative C would reduce the risk of nest trampling and loss of herbaceous understory cover in GRSG nesting habitat. New water developments for diversion from seeps or springs would not be authorized, which would prevent impacts on riparian areas and seasonal GRSG habitat by avoiding livestock traffic and loss of water flow to these areas.

However, with reduced grazing, vegetation would accumulate extra litter, which increases the fuel load and could result in a higher fire hazard. In the short term, reduced grazing would maintain uplands and improve riparian vegetative diversity; however, in the long term reduced grazing would increase the spread of invasive plants, such as bromes, Kentucky bluegrass, and little bluestem, and would reduce the diversity of native bunchgrasses. Litter would increase, further choking out desired species, decreasing diversity and affecting canopy cover and the ability of plants to receive adequate moisture. This shift in the species community would reduce the ability of the rangeland to respond to environmental pressures, such as drought and fire. These long-term effects could jeopardize the allotments' ability to meet the Standards for Rangeland Health. Reducing native grasses and forbs would also reduce the suitability of the habitat for GRSG.

In addition, a reduction in available federal grazing land could have the indirect impact of making adjacent private ranch operations economically infeasible, increasing the potential that ranches are converted for other use or sold for development, resulting in permanent loss of GRSG habitat.

With the current Biodiversity Standard in the Standards for Rangeland Health, in the short term, this alternative would help meeting Conservation Option 1 under Grazing to "ensure that allotments meet ecological potential and wildlife habitat requirements…" This alternative would incorporate GRSG habitat objectives and management considerations into all allotments through AMPs or permit renewals, and would thus work towards meeting Conservation Option 3 to "Incorporate sage-grouse habitat needs or habitat characteristics into

relevant resource and allotment management plans…" Conservation Measures 2, 4, and 5 also have similar management actions under this alternative (e.g., work cooperatively on integrated ranch planning, prioritize completion of Standards for Rangeland Health within PHMA, and manage for vegetation composition and structure consistent with ecological site potential).

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 would be largely similar to those described for Alternative B, but would be applied to a slightly larger area (80 additional acres of GHMA). It is unknown how many vegetation management projects would be undertaken in the decision area for conservation or restoration of GRSG habitat.

This alternative would meet COT report Conservation Objective under Pinyon-juniper Expansion to: "Remove pinyon-juniper from areas of sagebrush that are most likely to support sage-grouse (post-removal)…" as well as Conservation Measure 1 under Invasive Plant Species to" "Retain all remaining large intact sagebrush patches…"

COT Report Threat—Recreation

Impacts from Recreation
Impacts from recreation management under Alternative C would be the same as under Alternative B.

Although there are no developed recreation facilities in the planning area, this alternative would not meet the COT report Conservation Option 2 under Recreation to "Avoid development of recreational facilities… in sage-grouse habitats" because there is no specific action addressing future recreation development (not an issue in this part of the NDFO); however, SRPs would only be issued if they were neutral or beneficial to PHMA and GHMA. See *Impacts from Travel and Transportation Management* sections for Conservation Option 1.

4.3.7 Alternative D

COT Report Threat—Isolated/Small Populations, Agriculture, and Ex-Urban Development

Impacts from Land Tenure Decisions
No lands in PHMA would be available for disposal under Alternative D. Impacts from land tenure decisions would be the same as Alternative B. Alternative D would meet the COT report Conservation Option 5 under Ex-Urban Development to "…not relinquish public lands…," and it would also meet

Conservation Option 2 to: "Acquire and manage GRSG habitat to maintain intact ecosystems."

Impacts from ACECs
Impacts would be the same as Alternative A.

COT Report Threats—Energy and Mining

Impacts from Fluid Minerals
Under Alternative D, all PHMA would be open to leasing subject to an NSO stipulation. These lands would cover 61,197 acres. BLM would apply restrictions on geophysical exploration and development to protect leks and nesting habitat Conservation measures would be different from those described for Alternative B, and incorporate surface disturbance reduction, West Nile virus prevention, and guidance for mitigation. RDFs in **Appendix B** would be mandatory as COA in PHMA. 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.

As shown below in **Table 4-5**, Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative D and Proposed Plan Amendment, 282 current and projected pads under existing leases on BLM-administered land are anticipated to disturb 767 acres short term, 49 fewer than Alternative A. In the long term, 18 fewer acres would be disturbed and fragmented compared to Alternative A. These reductions would conserve more GRSG habitat than Alternative A, but substantially less than Alternatives B or C.

Alternative D meets COT report Conservation Measures 1-3 to: avoid energy development in PACs (new leases), use adequate buffers for valid existing rights, and use reasonable alternative avoidance measures (see actions in **Table 2-4** under Alternative D for Unleased and Leased Fluid Mineral in **Chapter 2** for all conservation measures).

Impacts from Solid Minerals
Impacts under Alternative D would be similar to those described for Alternative B. For locatable mineral development, proposed actions would be analyzed on a case-by-case basis in cooperation with the State of North Dakota and RDFs (**Appendix B**) would be applied to the extent consistent with applicable law to avoid unnecessary degradation of GRSG habitat. These actions would not eliminate impacts, but would result in beneficial impacts from locatable mineral development compared to Alternative A, including those described under *Nature and Type of Effects*. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on GRSG or their habitat but it would preclude any potential future development.

Table 4-5
Disturbance Associated with Existing Wells Pads and Projected Active Well Pads under Alternative D and Proposed Plan Amendment

	Total Pads	Total Wells	BLM-Administered Pads	BLM-Administered Wells	Total Acres	BLM-Administered Acres
Short-Term Disturbance[1]						
New exploratory and development well pads/wells	376	376	51	51	2,028	288
Existing and projected well pads/wells	894	894	231	231	2,455	479
Total Well Pads/Wells	*1,270*	*1,270*	*282*	*282*	*4,483*	*767*
Long-Term Disturbance[2]						
New producing well pads/wells	308	308	42	42	756	107
Existing and projected well pads/wells	793	793	211	211	2,144	422
Total Well Pads/Wells	*1,101*	*1,101*	*252*	*252*	*2,899*	*530*

[1]Short-term disturbance is a calculation of the cumulative disturbance that would occur to the end of the plan from the new wells projected in the North Dakota RFD scenario for oil and gas, plus those presently considered to be active (unplugged and unreclaimed).
[2]Long-term disturbance is a calculation of unreclaimed disturbance that would be present at the end of 2029.
Source: BLM 2013b

This alternative would meet the COT report Conservation Option 1 under Mining to: "Avoid new mining activities and/or associated facilities within occupied habitats, including seasonal habitats."

Impacts from Lands and Realty

Lands and realty management proposed under Alternative D would provide increased protection of GRSG and their habitat compared to Alternative A. PHMA would be managed as ROW avoidance areas (32,900 acres), although PHMA would be a ROW exclusion area for wind and solar energy permits. ROW avoidance areas for non-wind and solar projects would allow for management flexibility and avoid displacing ROWs onto non-federal land. 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. ROWs would be allowed in GHMA (80 acres) with appropriate mitigation measures. Other measures and impacts would be as described under Alternative B.

The net impact of the ROW avoidance area is less because a portion of the PHMA is a unitized oil and gas field (this means facilities such as roads and pipelines needed for the development of the field are covered under a separate agreement between the operator and the BLM vs. the realty program). All other utilities would be subject to the ROW avoidance area in PHMA.

By making PHMA a ROW avoidance area this alternative would partially meet the COT report Conservation Option to: "Avoid construction of these features in sage-grouse habitat…" This partially meets because there would still be construction of some of these features for valid existing rights and it is not an exclusion area (except for wind energy).

Impacts from Travel and Transportation Management
Measures proposed under Alternative D would result in beneficial 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. Other measures would be as described under Alternative B, but would apply to both PHMA and GHMA (80 additional acres). Overall, management under Alternative D would result in beneficial impacts on GRSG and their habitat from activities associated with travel and transportation in the planning area compared to Alternative A.

Since this alternative carries forward the Limited designation (OHVs limited to existing road and trails) from the Montana-Dakotas OHV ROD, it would meet the COT report Conservation Option 1 under Recreation to: "Close important sage-grouse use areas to off-road vehicle use." Off-road vehicle use has not been allowed in the planning area since 2003.

COT Report Threat—Fire

Impacts from Fire and Fuels Management
Fuels treatment policies and restrictions would be designed and implemented as described in Alternative B. 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 PHMA if the COT objectives were addressed and met, thereby, 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*, though it is unknown to what extent firebreaks or post-fire restoration would be employed in the planning area. Although fire is still a threat listed in the COT report, fires have only burned two percent of the entire planning area in the past 10 years (or about 21,000 acres), and no fires were located on BLM-administered lands.

BLM would meet the COT report Conservation Option 4 under Fire to: "Renew and implement the BLM IM 2011-138 Sage-grouse Conservation Related to Wildlife Fire and Fuels Management…" Many of the other Conservation Options for fire in the COT report are included as RDFs in **Appendix B** and are applicable to Alternatives B-D. Alternative D also meets

the Conservation Measures 2 and 5 to: eliminate intentional fires in sagebrush habitats and immediately suppressing fire in all sagebrush habitat.

COT Report Threats—Grazing and Range Management Structures

Impacts from Range Management
Management under Alternative D would be similar to that described for Alternative B, with increased collaboration with stakeholders to improve rangeland health and increased tools available to improve flexibility in management. As such, impacts would likely be similar to Alternative B, though increased management flexibility may improve management by targeting those areas that need most protection.

With the current Biodiversity Standard in the Standards for Rangeland Health, this alternative would help meeting Conservation Option 1 under Grazing to "ensure that allotments meet ecological potential and wildlife habitat requirements…" This alternative states to incorporate GRSG habitat objectives and management considerations into all allotments through AMPs or permit renewals, and would thus work towards meeting Conservation Option 3 to "Incorporate sage-grouse habitat needs or habitat characteristics into relevant resource and allotment management plans…" Conservation Measures 2, 4, and 5 also have similar management actions under this alternative (e.g., work cooperatively on integrated ranch planning, prioritize completion of Standards for Rangeland Health within PHMA, and manage for vegetation composition and structure consistent with ecological site potential).

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 would be similar to Alternative B. However, this alternative includes consideration of other threatened, endangered, or sensitive species in addition to GRSG, which may reduce protection for GRSG and their habitat in certain instances of competing priorities. In addition, conifer encroachment treatments would improve GRSG habitat.

This alternative would meet COT report Conservation Objective under Pinyon-juniper Expansion to: "Remove pinyon-juniper from areas of sagebrush that are most likely to support sage-grouse (post-removal)…" as well as Conservation Measure 1 under Invasive Plant Species to" "Retain all remaining large intact sagebrush patches…"

COT Report Threat—Recreation

Impacts from Recreation
Impacts from recreation management under Alternative D would be the same as Alternative B.

Although there are no developed recreation facilities in the planning area, this alternative would not meet the COT report Conservation Option 2 under Recreation to "Avoid development of recreational facilities… in sage-grouse habitats" because there is no specific action addressing future recreation development (not an issue in this part of the NDFO); however, SRPs would only be issued if they were neutral or beneficial to PHMA. See *Impacts from Travel and Transportation Management* sections for Conservation Option 1.

4.3.8 Proposed Plan Amendment

COT Report Threat—Isolated/Small Populations, Agriculture, and Ex-Urban Development

Impacts from Land Tenure Decisions
Impacts from land tenure decisions would be the same as Alternative C. While there would be exceptions to allow land disposal, they would be implemented only if there would be a net conservation gain to GRSG or if there would be no adverse impact on the species. The Proposed Plan Amendment would meet the COT report Conservation Option 5 under Ex-Urban Development to "…not relinquish public lands…," and it would also meet Conservation Option 2 to: "Acquire and manage GRSG habitat to maintain intact ecosystems."

Impacts from ACECs
No ACECs would be established under the Proposed Plan Amendment. Impacts would be the same as Alternative A.

COT Report Threats—Energy and Mining

Impacts from Fluid Minerals
The Proposed Plan Amendment would prioritize leasing and development outside PHMA and GHMA. This would provide more opportunities to protect GRSG from disturbances and loss of PHMA and GHMA related to fluid mineral activities, as described under *Nature and Type of Effects*. Similar to Alternative D, all PHMA (61,197 acres) would be open to leasing subject to an NSO stipulation. However, granting no waivers or modifications would provide more certainty of protections to GRSG from NSOs. 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 were in these areas. 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, lek buffers would be applied on a project-specific basis to further reduce impacts and protect PHMA from human disturbances. RDFs in **Appendix B** would be mandatory as COAs for leased federal mineral estate within PHMA. 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 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 BSUs and is 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.

As shown above in **Table 4-5**, 282 current and projected pads under existing leases on BLM-administered land are anticipated to disturb 767 acres short term, 49 fewer than Alternative A. Impacts would be the same as Alternative D.

The Proposed Plan Amendment meets COT report Conservation Measures 1-3 to: avoid energy development in PACs (new leases), use adequate buffers for valid existing rights, and use reasonable alternative avoidance measures (see actions in **Section 2.6.2** under the Proposed Plan Amendment for Unleased and Leased Fluid Mineral in **Chapter 2** for all conservation measures).

Impacts from Solid Minerals

Impacts under the Proposed Plan Amendment would be similar to 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 under *Nature and Type of Effects*. The Proposed Plan Amendment would meet the COT report Conservation Option 1 under Mining to: "Avoid new mining activities and/or associated facilities within occupied habitats, including seasonal habitats."

Impacts from Lands and Realty

PHMA (32,900 acres) would be managed as ROW avoidance area for high-voltage transmission lines (100kv and over), large pipelines (24 inches in width and over), and minor ROWs. However, PHMA would be a ROW exclusion area for wind and solar energy permits. ROW avoidance areas for non-wind and solar projects would allow for management flexibility and avoid displacing

ROWs onto non-federal land. New ROWs would be collocated 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. ROWs would be allowed in GHMA (80 acres) with appropriate mitigation measures. Other measures and impacts would be as described under Alternative B. However, 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.

By making PHMA a ROW avoidance area (except for wind and solar) this alternative would partially meet the COT report Conservation Option to: "Avoid construction of these features in sage-grouse habitat…" This partially meets because there would still be construction of some of these features for valid existing rights and it is not an exclusion area (except for wind energy).

Impacts from Travel and Transportation Management

Impacts from travel and transportation would be similar to Alternative D. Additionally, potential temporary closures of areas to vehicles would reduce potential disturbance of GRSG and their habitat, as described under *Nature and Type of Effects*. Impacts from applying lek buffers and density and disturbance caps would be the same as described above for fluid minerals. Overall, management under the Proposed Plan Amendment would result in beneficial impacts on GRSG and their habitat from activities associated with travel and transportation in the planning area compared to Alternative A.

Since the Proposed Plan Amendment carries forward the Limited designation (OHVs limited to existing road and trails) from the Montana-Dakotas OHV ROD, it would meet the COT report Conservation Option 1 under Recreation to: "Close important sage-grouse use areas to off-road vehicle use." Off-road vehicle use has not been allowed in the planning area since 2003.

COT Report Threat—Fire

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to Alternative D. Fuels treatment policies and restrictions would be designed and implemented as described in Alternative D, except sagebrush canopy cover would not be reduced to less than 15 percent, providing more opportunities to protect PHMA from fuels management activities. In addition, fuels management projects in PHMA would be designed to incorporate greater flexibility to maximize the acreage protected. Prescribed fires would be used only in GRSG habitat if the four criteria are met in the Burn Plan, thereby, 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*, though it is unknown to what extent firebreaks or post-fire restoration would be employed in the planning area.

BLM would meet the COT report Conservation Option 4 under Fire to: "Renew and implement the BLM IM 2011-138 Sage-grouse Conservation Related to Wildlife Fire and Fuels Management…" Many of the other Conservation Options for fire in the COT report are included as RDFs in **Appendix B** and are applicable to the Proposed Plan Amendment. The Proposed Plan Amendment also meets the Conservation Measures 2 and 5 to: eliminate intentional fires in sagebrush habitats and immediately suppressing fire in all sagebrush habitat.

COT Report Threats—Grazing and Range Management Structures

Impacts from Range Management

Impacts from range management would be similar to those described for Alternative D. As with the other alternatives, under the Proposed Plan Amendment, livestock grazing could be removed from public lands when a permittee or lessee voluntarily relinquishes a permit. With the current Biodiversity Standard in the Standards for Rangeland Health, the Proposed Plan Amendment would help meeting Conservation Option 1 under Grazing to "ensure that allotments meet ecological potential and wildlife habitat requirements…" The Proposed Plan Amendment states to incorporate GRSG habitat objectives and management considerations into all allotments through AMPs or permit renewals, and would thus work towards meeting Conservation Option 3 to "Incorporate sage-grouse habitat needs or habitat characteristics into relevant resource and allotment management plans…" Conservation Measures 2, 4, and 5 also have similar management actions under this alternative (e.g., work cooperatively on integrated ranch planning, prioritize completion of Standards for Rangeland Health within PHMA, and manage for vegetation composition and structure consistent with ecological site potential).

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 would be similar to Alternative D. However, in all PHMA, the desired condition is to maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover (see **Table 2-2**).

This alternative would meet COT report Conservation Objective under Pinyon-juniper Expansion to: "Remove pinyon-juniper from areas of sagebrush that are most likely to support sage-grouse (post-removal)…" as well as Conservation

Measure 1 under Invasive Plant Species to" "Retain all remaining large intact sagebrush patches…"

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 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.

Although there are no developed recreation facilities in the planning area, this alternative would not meet the COT report Conservation Option 2 under Recreation to "Avoid development of recreational facilities… in sage-grouse habitats" because there is no specific action addressing future recreation development (not an issue in this part of the NDFO); however, SRPs would only be issued if they were neutral or beneficial to PHMA. See *Impacts from Travel and Transportation Management* sections for Conservation Option 1.

4.3.9 Impacts Summary

Table 4-6, Comparison of Alleviated Threats to GRSG in North Dakota by Alternative, provides a summary comparison how each alternative alleviates COT report threats to GRSG Listed as "Present and Widespread" and "Present but Localized" for North Dakota.

Table 4-6
Comparison of Alleviated Threats to GRSG in North Dakota by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
COT Report Threat—Isolated/Small Populations, Agriculture, and Ex-urban Development[1]					
Acres delineated as PHMA	0	32,900	32,900	32,900	32,900
Acres delineated as GHMA	0	80	80	80	80
Summary of Impacts on GRSG from Isolated/Small populations	Alternative A does not delineate any PHMA or GHMA. However, all action alternatives, including the Proposed Plan Amendment delineate PHMA and GHMA; constraints placed on other resources/uses are listed below and these vary by alternative. PHMA for North Dakota was mapped to include 100% breeding bird density because of this population is on the fringe of the habitat and is a very small population. The action alternatives are in agreement with the following conservation measures identified in the COT report specific to PACs: • Retain GRSG habitats within PACs. • If PACs are lost to catastrophic events, implement appropriate restoration efforts. • Restore and rehabilitate degraded GRSG habitats in PACs.				
Areas identified for disposal (acres)	3,436	80	0	80	80
Summary of Impacts on GRSG from Agriculture/ Urbanization	Across all action alternatives and the Proposed Plan Amendment, the BLM would take advantage of opportunities to consolidate GRSG habitat. Alternative A technically allows for disposal of lands; however, GRSG habitat would be considered in the analysis. Although agriculture and urbanization have been identified as threats in North Dakota, the BLM has limited management authority over those types of activities. Many of these COT objectives are outside the scope of this planning document; however, see **Chapter 5** for SGI projects that have been completed on private lands within the GSRG habitat. The action alternatives and the Proposed Plan Amendment are in agreement with the following conservation options identified in the COT report specific to ex-urban development: • Acquire and manage GRSG habitat to maintain intact ecosystems. • Do not relinquish public lands for the purpose of urban development in GRSG habitat.				

[1]Urbanization is listed as **Not Known to be Present** in the COT report threats list; however, the alternatives for NDFO contain actions under the realty program that would address this issue (e.g., no disposal of BLM-administered lands within PHMA).

Table 4-6
Comparison of Alleviated Threats to GRSG in North Dakota by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
COT Report Threat—Energy and Mining					
Unleased Fluid Minerals					
Areas closed to fluid mineral leasing (acres)	0	61,197	66,293	0	0
Areas open to mineral leasing with NSO stipulation (acres)	9,780	0	0	61,197	61,197
Acres of long-term surface disturbance	2,915 total (548 BLM minerals)	2,851 total (476 BLM minerals)	2,851 total (475 BLM minerals)	2,899 total (530 BLM minerals)	2,899 total (530 BLM minerals)
Well density—short term (wells/square mile)	0.84 planning area 2.5 BLM minerals	0.83 planning area 2.2 BLM minerals	0.83 planning area 2.2 BLM minerals	0.84 planning area 2.5 BLM minerals	0.84 planning area 2.5 BLM minerals
Well density—long term (wells/square mile)	0.74 planning area 2.3 BLM minerals	0.72 planning area 2.0 BLM minerals	0.71 planning area 2.0 BLM minerals	0.73 planning area 2.2 BLM minerals	0.73 planning area 2.2 BLM minerals
Leased Fluid Minerals					
Restrictions on surface disturbance for leased fluid minerals	Lowest level of protection for GRSG in GHMA and PHMA	High level of protection for GRSG in PHMA	Highest level of protection for GRSG in PHMA and GHMA	High level of protection for GRSG in PHMA	High level of protection for GRSG in PHMA
Summary of Impacts on GRSG from Oil and Gas Development	Alternative C closes PHMA and GHMA to leasing and Alternatives B closes PHMA to leasing. PHMA is open to leasing with NSO stipulations and GHMA is open to leasing with CSU stipulations under Alternative D and the Proposed Plan Amendment. Since most of the high development potential has already been leased, and due to the small amount of BLM minerals in the planning area, the surface disturbance and well densities do not change significantly among the alternatives (even between the alternatives that have no lease vs. the no-action). The action alternatives and Proposed Plan Amendment are in agreement with the following conservation measures identified in the COT report specific to Energy Development: • Avoid energy development in PACs (Doherty et al. 2010). Identify areas where leasing is not acceptable, or not acceptable without stipulations for surface occupancy that maintains GRSG habitats. • If avoidance is not possible within PACs due to pre-existing valid rights, adjacent development or split estate				

Table 4-6
Comparison of Alleviated Threats to GRSG in North Dakota by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	issues, development should only occur in non-habitat areas, including all appurtenant structures, with an adequate buffer that is sufficient to preclude impacts on GRSG habitat from noise and other human activities.				
	By limiting disturbances within PHMA (Alternative B, C, D, and the Proposed Plan Amendment) and GHMA (Alternative C, D, and Proposed Plan Amendment), the action alternatives would work towards the objective of reducing threats to intact shrubland. Alternative C would have more restrictions on fluid mineral development than Alternatives B, D, and Proposed Plan Amendment, and Alternative A would have the fewest restrictions of all alternatives.				
			Mining		
Locatable minerals—recommended for withdrawal (acres)	0	46,397 Recommend a withdrawal from locatable minerals entry in PHMA	49,970 Recommend a withdrawal from locatable minerals entry in PHMA and GHMA	0 No new recommended withdrawal from locatable minerals entry	0 No new recommended withdrawal from locatable minerals entry
Salable minerals/mineral materials (acres)	0	46,397 PHMA would be closed to mineral materials sales	49,970 PHMA and GHMA would be closed to mineral materials sales	46,397 PHMA would be closed to mineral materials sales	46,397 PHMA would be closed to mineral materials sales
Coal mining - areas identified as available for further consideration of coal leasing with surface restrictions (acres)	0	87,443	166,207	87,443	87,443
Summary of Impacts on GRSG from Mining	Alternatives B and C would be more protective to GRSG and GRSG habitat than Alternatives A, D, and the Proposed Plan Amendment (Alternative D and the Proposed Plan Amendment are the same as B except PHMA is not recommended for withdrawal from locatable mineral entry due to the very low potential). However, all the action alternatives are in agreement with the following COT conservation options: • Avoid new mining activities and/or any associated facilities within occupied habitat, including seasonal habitats.				

Table 4-6
Comparison of Alleviated Threats to GRSG in North Dakota by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
COT Report Threat—Infrastructure					
ROW avoidance areas (acres)	0 No ROW avoidance areas	80 GHMA would be an avoidance area	0 No new acres of avoidance since PHMA and GHMA would be an exclusion area	32,900 Specific criteria would have to be met in order to permit disturbances	32,900[2] Specific criteria would have to be met in order to permit disturbances
ROW exclusion areas (acres)	0 No ROW exclusion areas	32,900 PHMA would be a ROW exclusion area	32,980 PHMA and GHMA would be a ROW exclusion area	0 No ROW exclusion areas	0[3] No ROW exclusion areas
Wind and solar energy development	No specific management actions in the North Dakota RMP for GRSG	Wind energy projects would not be sited in PHMA and would be avoided in GHMA	Wind energy projects would not be sited in PHMA and GHMA	Wind energy projects would not be sited in PHMA and would be avoided in GHMA	Wind and solar energy projects would not be sited in PHMA and would be avoided in GHMA
Travel management all limited areas (acres)	33,030	33,030	33,030	33,030	33,030
Summary of Impacts on GRSG from Infrastructure	Alternatives B, C, D and Proposed Plan Amendment restrict ROWs in PHMA, which responds to the need (identified in the COT report) to stop population decline and habitat loss by eliminating activities known to negatively impact GRSG and their habitats through reduction in the threat of habitat loss, degradation and fragmentation. The action alternatives are in agreement with the following conservation objectives/options identified in the COT report specific to infrastructure:				

[2]Wind and solar authorizations excluded from PHMA and avoidance in GHMA.
[3]Wind and solar authorizations excluded from PHMA.

Table 4-6
Comparison of Alleviated Threats to GRSG in North Dakota by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	• Avoid development of infrastructure within PACs (objective). • Avoid construction of these features in GRSG habitat, both within and outside of PACs. • Restrictions limiting use of roads should be enforced. Alternative A, in general, has the least protections for GRSG and GRSG habitat from development of infrastructure. All alternatives limit OHV use to existing roads and trails, but Alternative C also contains a 4-mile buffer from leks for route construction. The Proposed Plan Amendment also would apply a like buffer to potentially reduce disturbance to GRSG and habitat. Applying density and disturbance caps under Alternative B and the Proposed Plan Amendment would also protect habitat. All action alternatives have limitations on route construction and realignments to minimize impacts on GRSG.				
COT Report Threat—Fire					
Fire and Fuels					
Fire and fuels management	Treatments considered on a case-by-case basis, and not prioritized specific to GRSG habitat	Sagebrush canopy cover would not be reduced to less than 15% in PHMA unless to meet a management objective. No treatments would be allowed in known winter range in PHMA, unless treatment is designed to strategically reduce wildfire risk around or in winter range and would maintain winter habitat range quality	Sagebrush canopy cover would not be reduced to less than 15% unless to meet a management objective. No treatments would be allowed in known winter range in PHMA and GHMA, unless treatment is designed to strategically reduce wildfire risk around or in winter range and would maintain winter habitat range quality	Sagebrush canopy cover would not be reduced to less than 8% in PHMA unless to meet a management objective. No treatments would be allowed in known winter range in PHMA, unless treatment is designed to strategically reduce wildfire risk around or in winter range and would maintain winter habitat range quality	Sagebrush canopy cover would not be reduced to less than 15% in PHMA unless to meet a management objective. No treatments would be allowed in known winter range in PHMA, unless treatment is designed to strategically reduce wildfire risk around or in winter range and would maintain

Table 4-6
Comparison of Alleviated Threats to GRSG in North Dakota by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
					winter habitat range quality
		Wildfire			
Fire operations	Control wildfires on BLM-administered land—no specific RMP direction for GRSG	Prioritize suppression, immediately after life and property, to conserve the habitat (though Alternatives B and D, and Proposed Plan Amendment apply this to PHMA, there are only 80 BLM surface acres in GHMA).			
Summary of Impacts on GRSG from Fire Management	Alternative A would implement conservation measures as described by BLM WO-IM-2011-138 (and updates to this IM), which would provide conservation measures to protect GRSG from fire. Alternative B, C, and D and the Proposed Plan Amendment would implement those measures as required design features (**Appendix B**) as well include additional fire management actions that would result in improved protection of GRSG from the effects of wildfire as compared to Alternative A.				
	COT Report Threats—Grazing and Range Management Structures				
Areas available for livestock grazing (acres)	32,945 BLM-administered surface lands within the planning area would be available for livestock grazing	32,945 BLM-administered surface lands within the planning area would be available for livestock grazing	32,945 BLM-administered surface lands within the planning area would be available for livestock grazing; however, the largest 4 allotments in PHMA would have a 50% reduction in AUMs	32,945 BLM-administered surface lands within the planning area would be available for livestock grazing	32,945 BLM-administered surface lands in the planning area would be available for livestock grazing
Available AUMs	5,780	5,780	3,739	5,780	5,780
Summary of Impacts on GRSG from Grazing	GRSG habitat considerations within livestock grazing allotments would be similar across all action alternatives. Range improvements are more restricted under Alternatives B, C, D, and Proposed Plan Amendment than under Alternatives A. Under all alternatives, grazing would be managed to achieve the standards of rangeland health. Under Alternative A, this includes a biodiversity standard; however, under the action alternatives and Proposed Plan Amendment, specific GRSG habitat objectives would be developed (in cooperation with NDGFD and USFWS). Under				

Table 4-6
Comparison of Alleviated Threats to GRSG in North Dakota by Alternative

Resource/Resource Use	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
	the action alternatives and Proposed Plan Amendment, new range improvements would be approved if they conserve, enhance, or restore GRSG habitat. Under the Proposed Plan Amendment, in all PHMA, the desired condition is to maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent canopy cover (see **Table 2-2**).				
COT Report Threats - Sagebrush Elimination, Conifer Invasion[4], Invasive Species (Vegetation Management)					
Areas prioritized for vegetation treatments	No specific habitat restoration or vegetation management actions in the North Dakota RMP for GRSG	Across all action alternatives and the Proposed Plan Amendment, treatments would be prioritized to consider GRSG habitat requirements			
Summary of Impacts on GRSG from Vegetation Management	The action alternatives and Proposed Plan Amendment are in agreement with the following conservation objective/conservation measures from the COT report: • Avoid sagebrush removal or manipulation in GRSG breeding or wintering habitats (objective). • Retain all remaining large intact sagebrush patches, particularly at low elevations.				
COT Report Threat—Recreation[5]					
Issuance of SRPs	All alternatives limit vehicle use to existing roads and trails (33,030 acres of BLM surface)				
Summary of Impacts on GRSG from Recreation	There are no areas open to off-road travel within the planning area in any alternative. The Proposed Plan Amendment would provide opportunities to not construct recreation facilities in PHMA if a net conservation gain for GRSG habitat were not achieved. All alternatives are in agreement with the following conservation option from the COT report: • Close important GRSG use areas to off-road vehicle use.				

[4]Conifers were listed as **Unknown** in the COT report threats list; however, the alternatives do contain an action to reduce juniper encroachment.
[5]Recreation was listed as **Not Known to be Present** in the COT report; however, the alternatives for NDFO do contain an action for SRPs. Travel Management is listed under Infrastructure section above.

4.4 LANDS AND REALTY

4.4.1 Methods and Assumptions

Indicators

Table 4-7, Comparison of Lands and Realty Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on lands and realty under each alternative.

Table 4-7
Comparison of Lands and Realty Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres of BLM surface ownership in the planning area	33,030	33,030	33,030	33,030	33,030
Number and type of land tenure adjustments (i.e., lands identified for disposal, withdrawal, or acquisition)	3,436 acres for disposal	130 acres available for disposal	50 acres available for disposal	130 acres available for disposal	50 acres available for disposal
Number, acres/miles, and types of surface-disturbing ROWs and leases, including communication sites	371 acres	Decrease of existing surface disturbance if buried or removed; decrease of new surface disturbance due to ROW avoidance and exclusions and disturbance cap	Decrease of existing surface disturbance if buried or removed; decrease of new surface disturbance due to ROW exclusions	Decrease of existing surface disturbance if buried or removed; decrease of new surface disturbance due to ROW avoidance and disturbance cap	Decrease of existing surface disturbance if buried or removed; decrease of new surface disturbance due to ROW avoidance, lek buffers, and density and disturbance caps

Assumptions

The analysis includes the following assumptions:

- Existing ROWs 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 steadily increase over the life of this RMPA.
- Maintaining and upgrading utilities, communication sites, and other ROWs is preferred 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 through the term provided by the Public Land Order or other official document unless the initiating agency or the 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 ROW exclusion and avoidance areas and stipulations in order to protect resources. A ROW exclusion area is one that is not available for new ROW location under any conditions. In a ROW avoidance area, new ROW development would ideally be avoided; however, the area may be available for ROW development subject to additional requirements, such as resource surveys and reports, construction and reclamation engineering, long-term

monitoring, special design features, special siting requirements, TLs, and rerouting. Such requirements could restrict project location, 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. Colocation 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 efficient management of BLM-administered lands. However, while consolidation may be beneficial for certain resources and uses, it may not necessarily reduce effects on GRSG habitat.

The BLM does not require a ROW authorization in circumstances where actions are tied to leases that are part of a unit. For example, a fluid mineral leaseholder wanting to install a pipeline within a unitized area would be exempt from acquiring a ROW authorization as long as the pipeline is contained in the unit.

Implementing management for the following resources would have negligible or no impact on lands and realty and are therefore not discussed in detail: recreation, range management, mineral development, fire and fuels management, and habitat restoration/vegetation management.

4.4.3 Impacts Common to All Alternatives

Impacts from Travel and Transportation Management

Under all alternatives, the BLM would complete a travel and transportation management plan, designating certain routes as open, closed, or limited to motorized travel. While the BLM would not close access to valid existing rights, travel management decisions that make access to existing or desirable future

ROW locations more difficult would discourage collocation in existing ROWs and new ROW development.

Impacts from Lands and Realty

Under all alternatives, the BLM would continue to manage 33,030 acres of BLM-administered land in the planning area, including 32,900 acres in PHMA and 80 acres in GHMA. Alternatives B, C, and D include objectives to acquire lands in PHMA. However, none of the alternatives propose a specific change in the amount of land currently administered by the BLM in the planning area. Therefore, under all alternatives, the distribution of surface ownership in the planning area would remain unchanged.

Table 4-8, ROW Exclusion and Avoidance Areas in GRSG Habitat (PHMA and GHMA) provides ROW exclusion and avoidance areas by alternative. For oil and gas activities, net exclusion and avoidance areas are those areas not within the boundaries of a unitized area.

Table 4-8
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)	0	80	0	32,900	Major ROWs (>100kV transmission lines; >24" pipelines)	32,980
					Minor ROWs (<100kV transmission lines; <24" pipelines) and other land use authorizations (e.g., comm sites)	32,900
ROW exclusion area (acres)	0	32,900	32,980	0	Major ROWs (>100kV transmission lines; >24" pipelines)	0
					Minor ROWs (<100kV transmission lines; <24" pipelines) and other land use	0
Unitized areas	24,842	24,842	24,842	24,842		24,842
Net exclusion area for oil and gas activities	0	8,058	8,138	0		0
Net avoidance area for oil and gas activities	0	80	0	8,058		8,058

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).

4.4.4 Alternative A

Impacts from Travel and Transportation Management

Under Alternative A, travel would continue to be allowed on all existing roads and trails until site-specific planning is completed. Existing transportation routes would continue to provide motorized access to ROW infrastructure and communication sites for construction and maintenance.

Impacts from Lands and Realty

Under Alternative A, approximately 368 acres of existing ROWs in the decision area would continue to provide opportunities for colocation of new infrastructure. The BLM would continue to allow ROW development on 33,090 acres in the decision area and no lands within the decision area would be specifically designated as ROW exclusion or avoidance. BLM-administered lands would continue to be available for multiple-use and single-use communication sites and road access ROW on a case-by-case basis pursuant to Title V of FLPMA, and 43 CFR 2800 regulations. All ROW applications would be reviewed using the criteria of following existing corridors wherever practical and avoiding the proliferation of separate ROWs.

Renewable energy projects such as wind and solar facilities would be permitted through the ROW authorization process. Refer to **Section 4.21**, Renewable Energy, for impact analysis regarding solar and wind energy development. Additionally, under Alternative A, 3,436 acres of BLM-administered land would be available for disposal. While land tenure adjustments, especially those that result in a more consolidated ownership pattern, can improve BLM administration of public lands, a change in surface ownership from the BLM to another entity could impact GRSG habitat if the new ownership does not provide the same habitat protections as on BLM-administered land.

Impacts from ACECs

There are no designated ACECs in the planning area under Alternative A, and, as a result, no impacts from ACEC management actions on lands and realty.

4.4.5 Alternative B

Impacts from Travel and Transportation Management

The 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 in *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 which would limit new ROW authorizations and new road construction as compared to

Alternative A. Access would be accommodated via the 112 miles of existing roadways crossing PHMA. Road surfaces account for approximately 3 percent (1,120 acres) of the decision area in PHMA. Limitations on new road construction could make certain areas in the remaining 97 percent of the decision area where a roadway is not present impractical for new ROW authorizations.

Impacts from Lands and Realty

Under Alternative B, PHMA (32,900 acres) would be ROW exclusion area and GHMA (80 acres) would be a ROW avoidance area. The BLM would also take advantage of opportunities to remove, bury, or modify existing power lines within the 368 acres of existing ROWs in 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. ROW exclusion and avoidance designations could extend processing time for renewals of existing ROW authorizations, and make siting of new linear or block ROWs more difficult than under Alternative A. New development related to oil and gas activities would continue to be allowed within the 24,842 acres of unitized lease areas.

The BLM would retain administration of 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. In addition, the BLM would seek to acquire North Dakota School Trust and private lands to conserve, enhance, or restore 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

Impacts would be the same as under Alternative A.

4.4.6 Alternative C

Impacts from Travel and Transportation Management

Alternative C would prohibit new road construction within four miles of active leks. Because of the density of active lek sites, new road construction would be limited to 638 acres (two percent of the decision area), 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 (32,980 acres) would be designated as exclusion area for new ROW authorizations Impacts on ROW authorizations from the exclusion designation would be similar Alternative B. Impacts on unitized areas from exclusions would be the same as Alternative B.

The BLM would retain public ownership in PHMA and GHMA with no exceptions and seek to acquire important private lands. The effects of land tenure adjustment decisions would be similar to Alternative B, but would include an additional 80 acres of GHMA retained.

Impacts from ACECs

Under Alternative C, the BLM would designate PHMA (32,900 acres) as a new ACEC with management tailored to protect the GRSG habitat. There would be no additional management actions related to the ACEC; therefore, the impacts on lands and realty would be the same as those described under sections above.

4.4.7 Alternative D

Impacts from Travel and Transportation Management

Impacts from travel and transportation management under Alternative D would be similar to under Alternative B.

Impacts from Lands and Realty

Under Alternative D, PHMA (32,900 acres) would be managed as ROW avoidance for new ROW authorizations. PHMA would be designated as wind energy ROW exclusion, while GHMA would be designated as wind energy ROW avoidance. Impacts on unitized areas from exclusions would be the same as Alternative B. The designation of PHMA as ROW exclusion and GHMA as avoidance would limit the placement of new above ground wind energy 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 as well as the wind energy resource available.

Impacts from land tenure adjustments would be the same as those described under Alternative B.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.4.8 Proposed Plan Amendment

Impacts from Travel and Transportation Management

Impacts would be the same as those described under Alternative B.

Impacts from Lands and Realty

Impacts would be similar to those described under Alternative D. PHMA (32,900 acres) would be managed as ROW avoidance for high-voltage transmission lines (100kv and over) and large pipelines (24 inches in width and over), and minor ROWs. However, PHMA would be a ROW exclusion area for wind and solar energy permits. ROW avoidance areas for non-wind and solar projects would allow for management flexibility and displacing ROWs onto non-federal land would be avoided. New ROWs would be collocated in existing ROWs if possible. Managing PHMA as ROW avoidance would limit the placement of new infrastructure, increasing effects on the lands and realty actions, as described under *Nature and Type of Effects*, compared to Alternative A. The extent of the effects would be based on the location and type of any proposed new ROW, as well as the wind energy resource available.

Applying lek buffers and density and disturbance caps on ROW activities could restrict development opportunities in GRSG habitat. Ensuring a net conservation gain to GRSG under the regional mitigation strategy may require projects to avoid, minimize, or compensate for their potential impacts on GRSG and habitat.

Impacts from ACECs

Impacts would be the same as those under Alternative A.

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 4-9, Comparison of Vegetation Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on vegetation under each alternative.

Table 4-9
Comparison of Vegetation Indicators by Alternative

Indicator	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Acres meeting Rangeland Health standards	Current level	Stable	Possible increase from grazing limit	Stable	Possible increase
Acres of sagebrush (PHMA/GHMA)	9,711	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	Current level	Increase	Increase	Increase	Increase
Acres of riparian/wetland vegetation	1,463	Stable or increasing	Stable or increasing	Stable or increasing	Stable or increasing
Change in spread of noxious weeds	Stable	Stable or decreasing	Stable or decreasing	Stable	Stable

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 localized situations where plantings are used to defer livestock use on native pasture.
- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors, including location in the watershed; 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 over longer than two years.

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 be 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). 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., limited habitat fragmentation), GRSG require high-quality habitat conditions including a diversity of herbaceous species, vegetative and reproductive health of native grasses, as well as an abundance of sagebrush, making management for high condition in seasonally important habitats important (Connelly et al. 2004). Given the limited acreage of suitable sagebrush habitats and the cost of habitat restoration, management plans that protect intact sagebrush and restore impacted areas strategically to enhance existing habitats (for example, connectivity of intact sagebrush) have the best chance of increasing the amount and quality sagebrush cover (Knick and Connelly 2011). Sagebrush-promoting vegetation treatments would enhance native vegetation and overall ecosystem productivity, while reducing the distribution of invasive species and some woody species.

Invasive plants can alter plant community structure and composition, productivity, nutrient cycling, and hydrology, and may competitively exclude 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, and may also increase the risk of wildfire. The spread of invasive plants such as cheatgrass (*Bromus tectorum*) has increased the frequency and intensity of fires (Balch et al. 2012). An assortment of nonnative annuals and perennials and native conifers are currently invading sagebrush ecosystems.

Although not a substantial threat in North Dakota, expansion of conifer woodlands, especially juniper (*Juniperus spp.*) present a threat to GRSG in other parts of the range, because the mature trees do not provide suitable habitat, and displace shrubs, grasses and forbs through direct competition for resources. Mature trees may offer perch sites for raptors; thus, woodland expansion may also represent expansion of predation threat, similarly to perches on power lines and other structures (Holloran 2005; Aldridge and Boyce 2007).

Current treatments and active vegetation management typically focus on vegetation composition and structure for fuels management, habitat management, and productivity manipulation for improving the habitat and forage conditions for ungulates and other grazers, using surface soil stabilization to manipulate vegetation composition or increase productivity, or by removing invasive plants. Locally and regionally, the distribution of these treatments can affect the distribution of GRSG and sagebrush habitats (Knick and Connelly 2011). Vegetation treatments would cause short-term disturbance to vegetation from vegetation removal, but would result in long-term improvements to habitat quality and rangeland health.

Management of vegetation resources to protect GRSG would alter vegetative communities by promoting increases in sagebrush height and herbaceous cover and vegetation productivity, in order to improve rangeland health and enhance sagebrush ecosystems. Treatments designed to prevent encroachment of shrubs, non-native species or woody vegetation would alter the condition of native vegetation communities by changing the density, composition, and frequency of species within plant communities (Connelly et al. 2004).

Vegetation manipulations in the riparian zone, such as weed treatments, native plantings, and erosion control in the channel, would improve the acreage of riparian vegetation and the condition of the riparian vegetation species, and the 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 acreage to support GRSG would limit or modify uses in this habitat type. Such 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 fragmentation and 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) coupled with high rates of disturbance and conversion to introduced plant cover are partly responsible for the loss of sagebrush acreage and the fragmentation of GRSG habitat (Beck and Mitchell 2000). Thus, preservation of sagebrush ecosystems 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), but these policies alter the successional pattern of vegetation in the landscape. When management reduces wildland fire frequency by controlling natural ignitions, the indirect impact is that vegetation ages, and early successional vegetation communities are diminished. Fire suppression may preserve condition of some sagebrush 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 noxious weeds, such as cheatgrass, to expand (Balch et al. 2012), so fire suppression can indirectly limit this expansion. However, fire suppression can also lead to increased fuel loads, which can lead to more damaging or larger-scale fires in the long term.

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 involves vegetation removal, which in the short term would disturb native vegetation communities, including sagebrush, and individual native plant species, and, in the long term, may alter age class distribution, reduce connectivity, and encourage the spread of invasive weeds. ROWs may extend for many miles or acres, fragmenting habitat and increasing the potential for weeds to be introduced or 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.

ROW exclusion areas would prohibit all development of ROWs in PHMA, with the exceptions provided (including allowing ROW development within unitized areas), 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 non-federal land-ownership areas are mixed and exclusion areas may result in more widespread development on non-federal lands.

Land exchanges or acquisitions to reduce the fragmentation of GRSG habitat and could improve the BLM's ability to implement management actions that would improve the condition of native vegetation communities.

Mineral Resources

The basins where most sagebrush ecosystems reside are the also the center of major oil and gas reserves, which has created a long history of industrial use, particularly on eastern portions of the range, which include North Dakota. Energy development requires construction of roads, well pads, wells and other infrastructure, and associated noise, traffic and lights, that alter, degrade and/or entirely displace native ecosystems and disturb wildlife (Naugle et al. 2011). Surface disturbance associated with mineral development 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 significant closures of BLM-administered lands to oil and gas leasing within PHMA and GHMA, current leases are substantial across GRSG ranges (Connelly et al. 2004). If mineral development is shifted away from sagebrush habitat to other areas to protect GRSG, fragmentation and degradation of sagebrush habitat would be reduced for the areas protected, but impacts could still occur or increase in non-federal lands that remain open to mineral leasing and development.

Recreation

Recreation is not considered a substantial threat to GRSG in the planning area (USFWS 2013). Moderate recreational use of GRSG habitat is generally benign, but excessive recreational use may cause degradation of sagebrush vegetation from activities such as camping, bicycling, off-road vehicle use and hunting. Potential impacts from excessive recreational use include trampling of vegetation, soil compaction, erosion, spread of invasive plants, and generation of fugitive dust (NTT 2011). Recreational use can also increase the potential for wildfire caused by invasive plant spread or human error (Knick and Connelly 2011). Most impacts occur in easily accessible areas and in areas open to cross-country travel, particularly motorized 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, motorized vehicles, dust, and spread of invasive weeds. Such restrictions could involve seasonal area closures or other limitations, to be addressed in future site-specific travel planning.

Travel and Transportation

Road construction divides and fragments GRSG habitat, and causes erosion and nutrient leaching. The use of roads creates soil compaction, and allows the spread of human disturbance, including wildfire and invasive plant species (Connelly et al. 2004; Lyon and Anderson 2003). Invasive weeds 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 may be seasonally or permanently closed, traffic may be restricted to designated routes, and new route construction avoided in PHMA to the maximum extent possible (NTT 2011). The more areas that are closed to motorized vehicle use, the less impact on vegetation from surface disturbance, such as vehicle and human trampling of vegetation, soil compaction, and spread of dust and weeds, would be expected.

Livestock Grazing

Livestock grazing is the most widespread land use across the sagebrush biome (Connelly et al. 2004). Livestock grazing is a "diffuse" form of biotic disturbance that exerts repeated pressure over many years on a system; unlike point-sources of disturbance (e.g., fires), livestock grazing exerts repeated pressure across the landscape. Thus, effects of grazing are not likely to be detected as disruptions, but as differences in the processes and functioning of the sagebrush system. 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). Grazing may reduce herbaceous understory cover for nesting GRSG, but also may enhance rangeland health by limiting the growth of introduced annual plants. 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 and Connelly 2011).

At unsustainable levels, grazing can lead to loss of vegetative cover, reduced water infiltration rates, reduced nutrient cycling, decreased water quality, increased soil erosion, and reduced habitat quality for wildlife, including GRSG (Knick and Connelly 2011). Land health evaluations are used to assess rangeland condition; if rangelands are meeting land health standards, then it is assumed that current livestock grazing intensity and duration are not degrading the landscape and are compatible with providing wildlife habitat and maintaining rangeland health. Conversely, in areas where land health standards are not being

met, these assessments help to identify areas where changes in grazing management would be beneficial.

Livestock often use riparian and wetland areas for water and shade; if in excess, livestock use may reduce riparian acreage meeting PFC, by disrupting vegetation condition and hydrologic functionality. Grazing could also reduce litter and fine fuel loading, which could reduce fire size and severity. Grazing systems that provide for closer management of allotments in GRSG habitat and aim to protect sagebrush and riparian ecosystems would enhance sagebrush and understory vegetation by allowing more plant growth, and reducing trampling and introduction of noxious weeds.

Impacts from mineral split estate are covered under the discussions of impacts from fluid and solid minerals. As such, there will be no further discussion of mineral split estate in this section.

4.5.3 Impacts Common to All Alternatives

Under all alternatives, the same acreage of vegetation communities would be open to livestock grazing (**Table 4-10**, Acres Open to and Unallocated for Grazing under All Alternatives). As a result, the potential for impacts caused by livestock grazing would be greatest in prairie and sagebrush habitats, where the greatest acres would be open to grazing.

Table 4-10
Acres Open to and Unallocated for Grazing under All Alternatives

Resource Use	Sagebrush	Conifer Steppe	Prairie	Wetland/ Riparian	Other
Open to grazing	7,722	1,988	17,563	1,313	4,305
Unallocated for grazing	29	1	44	6	1

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 the potential for introduction of invasive plants, potential for wildfire, compaction of soil, fragmentation, and other effects as discussed under *Nature and Type of Effects.*

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 trampling of vegetation, soil compaction, erosion, spread of invasive plants, and generation of fugitive dust.

Impacts from Lands and Realty

Alternative A includes no specific lands and realty management related to GRSG or their habitat, although some measures to site ROWs in a way that minimizes surface disturbance and avoids environmentally sensitive areas would be applied. **Table 4-11**, ROW Exclusion and Avoidance Areas in GRSG Habitat under each Alternative, below, shows the acres of ROW exclusion and avoidance areas in GRSG habitat under each alternative. There would be no exclusion or avoidance areas within the planning area. In addition, allowing ROW development within unitized areas (24,842 acres) would potentially result in loss or disturbance of vegetation from these activities.

Table 4-11
ROW Exclusion and Avoidance Areas in GRSG Habitat under each Alternative

Resource Use	Acreage	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ROW avoidance (acres)	Total	0	80	0	32,900	32,980[1]
	Sagebrush	0	3	0	7,748	7,748
ROW exclusion (acres)	Total	0	32,900	32,980	32,900[2]	32,900[3]
	Sagebrush	0	7,748	7,752	0	0

[1]Wind and solar energy development would be avoidance in GHMA.
[2]PHMA would be exclusion for new ROW wind energy developments.
[3]PHMA would be exclusion for new ROW wind and solar energy developments.

Land tenure adjustments would be subject to current disposal/exchange/acquisition criteria, which include retaining lands with threatened or endangered species, high quality riparian habitat, or plant and animal populations or natural communities of high interest. Retention of these areas would reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove vegetation.

Impacts from Range Management

Under Alternative A, 32,945 acres of GRSG habitat in the planning area would continue to be open for livestock grazing, with 5,780 available AUMs, while 85 acres would be unallocated. Livestock grazing would continue to be managed through existing grazing plans, with methods and guidelines from the existing RMP followed to maintain ecological conditions according to Standards for Rangeland Health. The Montana/Dakotas Drought Policy (**Appendix H**) would be followed to prevent impacts on rangelands under drought conditions. Continuation of these policies could indirectly preserve existing sagebrush habitat.

Riparian habitats would be managed to achieve PFC, and livestock would be restricted from riparian areas. Together, these management actions would help

to improve 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 and range health objectives, and 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, NSO stipulations would be applied within 0.25 mile of active leks and no seismic exploration or other development would be allowed within two miles of leks during the breeding season. Currently, no acres in the planning area are closed to fluid mineral leasing, while 73,435 BLM-administered acres are open to leasing. Of these, 25,130 acres are under standard terms and conditions, while 9,780 acres are NSO, 21,235 acres are CSU, and 38,504 acres are under TL. As discussed above under *Nature and Type of Effects*, mineral exploration and extraction directly disturb vegetation. Therefore, restrictions on mineral leasing would protect vegetation in these areas. **Table 4-12**, Acres Leased for Minerals or Available for Leasing in Sagebrush Habitat under each Alternative, below, shows the acres of sagebrush habitat that would be open to leasing under each alternative.

Table 4-12
Acres Leased for Minerals or Available for Leasing in Sagebrush Habitat under each Alternative

Resource Use	Alternative A (surface/ subsurface)	Alternative B (surface/ subsurface)	Alternative C (surface/ subsurface)	Alternative D (surface/ subsurface)	Proposed Plan Amendment (surface/ subsurface)
Closed to fluid mineral leasing	0/0	6,679/7,098	6,682/7,117	0/0	0/0
Open to fluid mineral leasing	790/7,117	3/20	0/0	790/7,117	790/7,117
NSO	1,158/1,073	0/0	0/0	6,680/7,098	6,680/7,098
CSU	2,238/2,338	0/0	0/0	0/0	0/0
Open to locatable mineral exploration	6,640/3,008	3/18	0/0	6,640/3,008	6,640/3,008
Areas withdrawn or petitioned from locatable mineral entry	0/0	6,637/5,282	6,640/5,406	6,637/5,282	6,637/5282

As described in **Table 4-1**, there would be approximately 816 acres of short-term disturbance and 548 acres of long-term disturbance on BLM-administered lands related to existing and potential development. However, oil and gas development would have limited impacts on vegetation because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on vegetation related to removal or degradation of vegetation, and potential spread of invasive species.

Impacts from Solid Minerals

Under Alternative A, 242,743 acres would be available for consideration for coal mining, although there are no existing coal leases and development of federal coal resources within GRSG habitat is not anticipated during the life of this plan. Therefore, no impacts on vegetation are expected from coal.

For locatable minerals, mineral materials, and nonenergy leasable minerals, a total of 56,681 BLM-administered acres would continue to be open to exploration and development. Impacts on vegetation from surface disturbance, as described under *Nature and Type of Effects*, would continue.

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 where appropriate in support of resource management objectives, including improving vegetation condition.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative A, Integrated Vegetation Management Handbook policies would be followed and would provide guidance on which treatments and chemicals can be used. Application of these policies would improve vegetation management in sagebrush habitat thereby likely improving vegetation conditions in these areas.

Impacts from ACECs

No ACECs would be designated under Alternative A; therefore, there would be no impacts on vegetation from management for ACECs.

4.5.5 Impacts Common to Alternatives B, C, and 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 roads and motorized vehicles by limiting motorized vehicles to existing roads and trails in PHMA and GHMA, evaluating the need to permanently or seasonally close roads or areas to traffic in PHMA, and restoring roads by re-seeding with appropriate seed mixes and considering the use of transplanted sagebrush. Restoration of sagebrush habitat and minimizing surface disturbances in sagebrush habitat would enhance vegetation and restore habitat to a greater extent than current policy under Alternative A.

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 (32,900 acres), with limited exceptions. Similar to Alternative A, allowing ROW development within unitized areas (24,842 acres) would potentially result in loss or disturbance of vegetation from these activities. GHMA would be ROW avoidance areas (80 acres). Out-of-use ROWs would be reclaimed, which would increase the extent and connectivity of vegetation communities. These measures would increase the acres of vegetation that would be protected by lands and realty management compared to Alternative A (see **Table 4-11** above).

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 North Dakota school trust or private lands.

Impacts from Range Management

There would be no change to the acreage open for grazing or available AUMs described under Alternative A. However, Alternative B includes a number of management actions in PHMA to incorporate GRSG habitat objectives and management considerations into livestock grazing management. Together, these efforts would reduce, but would not eliminate, impacts from grazing on vegetation communities described under *Nature and Type of Effects*, and would

promote the health of GRSG habitats, including sagebrush steppe, riparian areas, and wet meadows.

Impacts from Fluid Minerals

Restrictions and RDFs on fluid mineral leasing and development proposed under Alternative B would reduce the impacts on vegetation compared to Alternative A. Under this alternative, 61,197 acres in the planning area would be closed to fluid mineral leasing, while 12,238 acres would remain open to leasing. All acres would be under standard terms and conditions. PHMA would be closed to fluid mineral leasing under Alternative B, and existing leases would not be renewed. Conservation measures would be applied as COAs. These restrictions on fluid mineral leasing and development would protect more acres of vegetation from associated activities compared to Alternative A, and would reduce the likelihood of impacts from fluid mineral exploration and development described under *Nature and Type of Effects*.

As described in **Table 4-1**, there would be approximately 624 acres of short-term disturbance and 476 acres of long-term disturbance on BLM-administered lands related to existing and potential development. Impacts on vegetation in these areas would be the same as Alternative A but would occur over a smaller area. Similar to Alternative A, oil and gas development would have limited impacts on vegetation because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts related to removal or degradation of vegetation, and potential spread of invasive species. **Table 4-12** shows the acreage of sagebrush available for mineral leasing under each alternative. Within sagebrush vegetation, approximately 6,679 acres of surface and 7,098 acres of subsurface would be closed to fluid mineral leasing, compared to zero acres closed under Alternative A.

Impacts from Solid Minerals

The management actions and RDFs proposed under Alternative B would reduce impacts on vegetation associated with solid mineral exploration and extraction activities compared with Alternative A (see **Table 4-12**). Approximately 3 acres of surface and 18 acres of subsurface would be open to locatable mineral exploration in sagebrush habitat, compared to 6,640 acres of surface and 3,008 acres of subsurface under Alternative A. All coal would be found to be available for further consideration of coal leasing, with surface restrictions, in PHMA (87,443 acres), and PHMA would be recommended for withdrawal from locatable mineral entry. For nonenergy leasable minerals, PHMA would be closed to leasing and to mineral material sales. RDFs would be applied to existing leases and locatable mineral claims to the extent consistent with applicable law, and restoration would be required for existing salable mineral

pits[1]. 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 on vegetation described under *Nature and Type of Effects*. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on vegetation but it would preclude any potential future development.

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 vegetation from the destructive effects of wildfire, but could result in increased fuel load and spread of noxious weeds.

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 would be the same as Alternative A.

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

[1]Although there are no authorized mineral pits in the planning area, any trespass pits found in the planning area would be subject to restoration.

leave only approximately 600 acres in PHMA for future road construction and would help prevent fragmentation of vegetative communities.

Impacts from Recreation

Impacts on vegetation from recreation management under Alternative C would be the same as under Alternative B.

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 (32,980 acres), with limited exceptions (See **Table 4-11** above). Wind energy projects would not be sited in PHMA and GHMA. Management of ROW exclusion zones would decrease impacts (described under the *Nature and Type of Effects*) on sagebrush and vegetation. However, ROW exclusion areas could result in displacing ROW development onto adjacent non-federal lands thereby negating their beneficial effects. Similar to Alternative A, allowing ROW development within unitized areas (24,842 acres) would potentially result in loss or disturbance of vegetation from these activities.

As under Alternative B, public ownership would be maintained in PHMA, but without the exceptions provided under that alternative. Private and North Dakota School Trust lands could be acquired in ACECs to enhance the GRSG conservation value of existing lands. Although it is uncertain how much 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 reduced by 50 percent on all allotments within the Big Gumbo area. There would be 3,739 AUMs available in the long term, compared to 5,780 AUMs under Alternative A. By reducing AUMs, BLM would reduce trampling and removal of vegetation in these areas.

A 50 percent reduction in grazing would increase residual groundcover at the end of the growing season, providing for more wildlife habitat and vegetation diversity. However, in the absence of grazing pressure, invasive annual plants may out-compete both grasses and forbs, which would reduce species diversity.

New water developments for diversion from seeps or springs would not be authorized, which would prevent impacts on wet meadows by maintaining the existing vegetation in these areas. Other impacts would be similar to those described for Alternative B, but would provide slightly greater protection to vegetation since they would be applied to both PHMA and GHMA.

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 conservation measures, 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. For example, under Alternative C, 66,293 acres in the planning area would be closed to fluid mineral leasing, while 7,142 acres remain open to leasing. All acres would be under standard terms and conditions.

As described in **Table 4-1**, there would be approximately 621 acres of short-term disturbance and 475 acres of long-term disturbance on BLM-administered lands related to existing and potential development. Similar to Alternative A, oil and gas development would have limited impacts on vegetation because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts related to removal or degradation of vegetation, and potential spread of invasive species. **Table 4-12** shows the acreage of sagebrush available for mineral leasing under each alternative. Within sagebrush vegetation, approximately 6,682 acres of surface and 7,117 acres of subsurface would be closed to fluid mineral leasing, compared to zero acres closed under Alternative A.

Impacts from Solid Minerals

Impacts from solid minerals management would be similar to 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. Zero acres of surface and subsurface would be open to locatable mineral exploration in sagebrush habitat, compared to 6,640 acres of surface and 3,008 acres of subsurface under Alternative A. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on vegetation but it would preclude any potential future development.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be largely 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 largely similar to those described for Alternative B, but would be applied to a slightly larger area (PHMA and GHMA), and would thus provide greater protection for vegetation over the long term.

Impacts from ACECs

An ACEC to protect GRSG would be designated as sagebrush reserves on PHMA, covering 32,900 acres under this alternative. Vegetation within the ACEC would be protected 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. Other measures would be as described under Alternative B, but would apply to both PHMA and GHMA. Overall, management under Alternative B 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 from recreation management under Alternative D 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 managed as ROW avoidance areas (32,980 acres), although PHMA would be an exclusion area for wind energy ROW authorizations (**Table 4-11**). ROW avoidance areas would allow for management flexibility to avoid displacing ROWs onto non-federal land. These measures would improve management and would reduce impacts from ROW development as described under *Nature and Type of Effects*, compared to Alternative A. ROWs would be allowed in GHMA with appropriate mitigation measures. Other measures and impacts would be as described under Alternative B.

Impacts from land tenure decisions would be the same as Alternative B.

Impacts from Range Management

Management under Alternative D would be similar to that described for Alternative B, with increased collaboration with stakeholders and increased tools available to improve flexibility in management. As such, impacts would likely be similar to Alternative B, though increased management flexibility may improve management by targeting those areas that need most protection.

Impacts from Fluid Minerals

Under Alternative D, all PHMA would be open to leasing subject to an NSO stipulation. Conservation measures would be different from those described for

Alternative B, and would incorporate surface disturbance reduction and guidance for mitigation. Such management would reduce disturbance to vegetation associated with fluid mineral development relative to Alternative A.

As described in **Table 4-1**, there would be approximately 767 acres of short-term disturbance and 530 acres of long-term disturbance on BLM-administered lands related to existing and potential development. Similar to Alternative A, oil and gas development would have limited impacts on vegetation because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts related to removal or degradation of vegetation, and potential spread of invasive species. Like Alternative A, zero acres of sagebrush vegetation would be closed for mineral leasing (**Table 4-12**).

Impacts from Solid Minerals

Impacts under Alternative D would be similar to those described for Alternative B. Although 6,640 acres of surface and 3,008 acres of subsurface would be open to locatable mineral exploration in sagebrush habitat, proposed actions for locatable mineral development would be analyzed on a case-by-case basis in cooperation with the State of North Dakota and RDFs would be applied to the extent consistent with applicable law to avoid unnecessary degradation of GRSG habitat. These actions would reduce, but would not eliminate, impacts from locatable mineral development on vegetation compared to Alternative A, including those described under *Nature and Type of Effects*. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on vegetation but it would preclude any potential future development.

Impacts from Fire and Fuels Management

Fuels treatment policies and restrictions would be designed and implemented as described in Alternative B, except sagebrush canopy cover would not be reduced to less than 15 percent. In addition, fuels management projects in PHMA would be designed to incorporate greater flexibility to maximize the acreage protected. 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 A.

4.5.9 Proposed Plan Amendment

Impacts from Travel and Transportation Management

Impacts from travel and transportation management would be similar to those under Alternative D. However, there would be potential beneficial impacts on vegetation from applying the lek buffers and density and disturbance caps. These measures could reduce the likelihood of loss or disturbance of vegetation from travel and transportation management, as described under *Nature and Type of Effects*.

Impacts from Recreation

Impacts from recreation management would be similar to those described under Alternative B. However, the Proposed Plan Amendment would provide additional incidental protection to vegetation by limiting construction of new recreation facilities in PHMA. The potential beneficial impacts on vegetation from applying the lek buffers, and density and disturbance caps would be similar to travel and transportation management.

Impacts from Lands and Realty

Impacts from ROW management would be similar to those under Alternative D. However, under the Proposed Plan Amendment, both PHMA and GHMA would be managed as ROW avoidance areas (32,980 acres) for high-voltage transmission lines (100kv and over) and large pipelines (24 inches in width and over). Additionally, PHMA would be managed as an avoidance area for minor ROWs, including communication sites and towers. RDFs and BMPs would be applied to further reduce impacts described under *Nature and Type of Effects*. Ensuring a net conservation gain to GRSG under the regional mitigation strategy may require projects to avoid, minimize, or apply compensatory mitigation for their potential impacts on GRSG. This could reduce the loss or disturbance of vegetation from specific projects. These measures could increase the level of protection from disturbance and habitat loss over Alternative A. The potential beneficial impacts on vegetation from applying the lek buffers, and density and disturbance caps would be similar to travel and transportation management.

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. 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 reviewing and processing grazing permits and leases in PHMA,

particularly in areas not meeting Land Health Standards. Impacts on GRSG and its habitat would be considered when developing or modifying water developments in GRSG habitat. In PHMA, new water developments would be developed only when they would maintain or benefit GRSG habitat. Existing developments may be modified to maintain the continuity of predevelopment riparian areas in PHMA, depending on other water uses. Together, these measures would help to improve and protect habitat quality throughout the planning area and therefore would have a beneficial incidental impact, 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. The Proposed Plan Amendment would prioritize leasing and development outside PHMA and GHMA, providing more opportunities to protect vegetation from fluid minerals activities and disturbance. Similar to Alternative D, all PHMA would be open to leasing, subject to an NSO stipulation. However, granting no waivers or modifications would provide more certainty of protections to vegetation from NSOs.

Conservation measures would incorporate surface disturbance reduction, and guidance for mitigation, as under Alternative D. Such management would reduce the disturbance to vegetation associated with fluid mineral development relative to Alternative A. However, if the resources were drilled from adjacent private lands and minerals, disturbance could still occur. Ensuring a net conservation gain to GRSG under the regional mitigation strategy may require projects to avoid, minimize, or apply compensatory mitigation for their potential impacts on GRSG. This could provide beneficial impacts on vegetation.

In addition, the BLM would implement density and disturbance caps for PHMA. If a cap were exceeded, the BLM would permit no further human disturbances until the disturbance has been reduced to less than the cap. As discussed in **Section 2.6.2**, the cap applies to BSUs and is subject to applicable laws and regulations and valid existing rights. The density and disturbance caps could apply to impacts from fluid minerals and would provide beneficial incidental impacts on vegetation, as described under *Nature and Type of Effects*.

Impacts from Solid Minerals

Impacts from solid mineral management under the Proposed Plan Amendment would be similar to those described for Alternative D. The additional potential beneficial impacts on vegetation from implementing the density and disturbance caps and mitigation strategy would be similar to those described for fluid minerals.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to those described for Alternative D. In addition, if prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan 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;
- a risk assessment to address how potential threats to GRSG habitat would be minimized.

Sagebrush canopy cover would not be reduced to less than 15 percent in PHMA, providing opportunities to conserve vegetation cover in these areas. This would provide additional incidental protections on vegetation by reducing risks to GRSG habitat from use of prescribed fire, as described under *Nature and Type of Effects.*

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, in all PHMA, the desired condition is to maintain a minimum of 70 percent of lands capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover (see **Table 2-2**). The Proposed Plan Amendment also proposes removing conifers where they are encroaching 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 A.

4.6 WILDLAND FIRE MANAGEMENT AND ECOLOGY

4.6.1 Methods and Assumptions

Indicators

Table 4-13, Comparison of Wildland Fire Management and Ecology Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on wildland fire management and ecology under each alternative.

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.

Table 4-13
Comparison of Wildland Fire Management and Ecology Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Alteration of vegetative cover that is likely to result in a substantial shift in FRCC across the planning area	No change	Potential minor increase	Potential minor increase	Potential minor increase	Potential minor increase
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 more restrictions	Fires less likely to occur due to more restrictions	Fires less likely to occur due to more restrictions	Fires less likely to occur due to more restrictions
Changes in suppression or fuels treatment costs and firefighter exposure to wildfire hazard	No change	No change	Increase	No change	No change

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. Actions which change FRCC from highly altered ecosystems 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 wildfire 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 non-native 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 cheatgrass, 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.

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 associate fire risk. For example, ROW 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 increases 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. Additional limitations on mineral development would have an indirect effect of decreased fire. This would be due to less development, fewer vehicles, and less construction equipment, all of which would serve to decrease the chance of human-caused ignition. Development of federal minerals underlying non-federal surface ownership may impact fire management on BLM-administered lands, particularly when ownership is in a checkerboard pattern, as fires ignited on non-federal lands may quickly spread onto and impact BLM-administered lands.

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.

Range 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, so a reduction in grazing intensity or change in grazing location may lead to changes in fuel levels at site specific locations.

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 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. In addition, allowing a range of fuel treatment options and providing the possibility to use unplanned wildfire for resource benefit where appropriate provides needed management flexibility to reduce large fire costs and achieve fire and fuels goals and objectives. 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.

Implementing management for mineral split estate would have negligible or no impact on wildland fire management and ecology under Alternatives A through D; therefore, it was not discussed in detail for those alternatives.

4.6.3 Impacts Common to All Alternatives

Given the lack of wildfire in the planning area over the past two decades, the risk of wildfire is likely to remain relatively low under all alternatives. Changes in management actions for other resources and resource uses may however, impact the chance of ignition and intensity of fire should it occur. Similarly, the use of prescribed fire is likely to continue to have only a minor role in vegetation management in the planning area across all alternatives.

Impacts from Solid Minerals

Coal management is not expected to impact fire management because there is no coal activity in the planning area, nor is there expected to be any activity in the foreseeable future. In addition, there is no locatable mineral potential, nor any interest in developing locatable minerals within GRSG habitat. As a result, withdrawing an area or leaving an area open to locatable minerals is not expected to impact fire risk or fire management activities.

4.6.4 Alternative A

Impacts from Travel and Transportation Management

Management under Alternative A would limit motorized and mechanized travel to existing routes on 33,030 acres, and fire risk from human-caused ignitions 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. When plans are complete the likelihood of human caused ignition may decrease slightly due to site-specific restriction on access.

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 Recreation

Under Alternative A, management actions for recreation would be relatively flexible, which increases the risk of fire through increased exposure to sources of human-caused ignitions.

Impacts from Lands and Realty

Under Alternative A, no ROW exclusion or avoidance areas would be present in the decision area. In addition, oil and gas development on existing leases within unitized areas (24,842 acres) would be allowed. 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 the highest potential for impacts from lands and realty on fire management. ROW authorizations are compared across alternatives in **Table 4-14**, Comparison of Lands and Realty Actions Across Alternatives.

Table 4-14
Comparison of Lands and Realty Actions Across Alternatives

Alternative	A	B	C	D	Proposed Plan Amendment
ROW exclusion areas (acres)	0	32,900	32,980	32,900[1]	32,900[2]
ROW avoidance areas (acres)	0	80	0	32,980	32,980[3]
Unitized areas (acres)	24,842	24,842	24,842	24,842	24,842

[1]PHMA would be exclusion areas for new ROW wind energy developments.
[2]PHMA would be exclusion areas for new ROW wind and solar energy developments.
[3]Wind and solar energy development would be avoidance in GHMA.

Impacts from Range Management

Under Alternative A, grazing would be allowed on all lands identified as suitable (approximately 32,945 acres). Additionally, under Alternative A the BLM would allocate up to about 5,780 AUMs for livestock in the long term. Use of livestock

grazing can result in site-specific reduction in fuels and the associated risk of wildland fire as described under *Nature and Type of Effects*.

Impacts from Fluid Minerals

Alternative A places some restrictions on surface occupancy and seismic exploration, construction, and development near strutting grounds. However, Alternative A would include the fewest restrictions on fluid minerals out of all the alternatives. Due to this, the chance of human ignition under this alternative would be greater than under the other alternatives and could indirectly effect fire management through increased fire risk. Under Alternative A, there are no areas closed to fluid mineral leasing, while 73,435 acres of BLM, private, and North Dakota school trust lands are open to fluid mineral leasing.

Overall, oil and gas development would have limited impacts on fire management because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on fire risk or related fire management activity.

Impacts from Solid Minerals

Under Alternative A, no portions of the decision area would be withdrawn from salable-non energy mineral application or closed to mineral material development. As a result, there is potential for human ignition and increased fire risk from these types of solid mineral development.

Impacts from Fire and Fuels Management

Management actions under Alternative A would place minimal restrictions on fuels management and fire control methods, and therefore would have few impacts on fire management. Under Alternative A, the BLM would allow for the preparation of prescribed burn plans for vegetative manipulations where needed and would control wildfire on BLM-administered land, but otherwise does not specify management actions. Due to the flexibility in management of prescribed and wildland fires, fire suppression costs are likely to be the lower in Alternative A as compared to all action alternatives. Potential fuels treatment and suppression costs are compared by alternative in **Table 4-15**, Relative Comparison of Fuels Treatment and Fire Suppression Costs Across Alternatives.

Table 4-15
Relative Comparison of Fuels Treatment and Fire Suppression Costs Across Alternatives

Alternative	A	B	C	D	Proposed Plan Amendment
Relative fuels treatment costs	$$ Variable costs based on other resource needs	$$ Restrictions on fuels treatments in PHMA	$ Restrictions on fuels treatments in PHMA and GHMA	$$ Restrictions on fuels treatments in PHMA	$$ Restrictions on fuels treatments in PHMA
Relative suppression costs	$ No specific suppression measures for GRSG habitat	$$$ Suppression of fire emphasized in PHMA	$$$$ Suppression of fire emphasized in PHMA and GHMA	$$$ Suppression of fire emphasized in PHMA with local modification	$$$ Suppression of fire emphasized in PHMA with local modification

Note: The $ symbol represents the relative costs of fuels treatment and suppression across alternatives, with $ representing the lowest cost and $$$$ the highest cost. This information is for comparison only, and no specific dollar amount is forecasted here.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative A, no specific direction is provided in the RMP for restoration and management. Vegetation could be managed to alter fuel loads and management activities could be conducted as appropriate. This could impact fire management options and costs.

Impacts from ACECs

Under Alternative A, no ACECs would be established. This enables fire and fuels treatments to continue to function with more flexibility because of the lack of restrictions placed on ACECs.

4.6.5 Impacts Common to Alternatives B, C, and 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 could result in habitat improvement and reduced fire risk in the long term. 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

Under Alternative B, as in all alternatives, travel would be limited to existing routes. In PHMA, activity level travel plans would be completed within five years of the ROD. Additional restrictions would be in place 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

that could cause ignitions. Road closure could, however, result in some impacts on ability to respond to fire due to reduced access.

Impacts from Recreation

Under Alternative B, SRPs would only be allowed in PHMA when the PHMA would benefit or experience no effects of the permits. Because issuance of permits may increase exposure of the area to human activity and, consequently, the likelihood of human-caused ignitions, wildfire risk from recreation activities may be decreased under this alternative as compared to Alternative A.

Impacts from Lands and Realty

Under Alternative B, management of PHMA as an exclusion area for new ROW authorizations would reduce the potential for development and the associated fire risk and suppression costs; therefore, impacts would be reduced as compared to Alternative A (see **Table 4-14**).

Impacts from Range Management

Under Alternative B, the BLM would have the same amount of acres open for grazing and would allot the same number of AUMs as Alternative A; however, other management actions may impact fire management. For example, retirement of permitted grazing use if approved by permittee, may lead to increased fuels in those site-specific locations and result in a slightly higher risk of fire as compared to Alternative A. However, Alternative B also has management focused on achieving ecological site potential, which would likely aim to reduce invasive species and increase habitat health and could decrease the risk of fire.

Assessment of land health and changes to grazing systems to achieve objectives would be prioritized in PHMA; therefore, any changes to fuels would be focused on these areas.

Impacts from Fluid Minerals

Under Alternative B, the BLM would place some limitations on fluid mineral exploration and extraction, which would indirectly effect fire management through a decreased risk of fire due to less development, fewer vehicles, and less construction equipment, resulting in less of a chance of human ignition. The BLM would also place greater restrictions on fluid mineral leasing in PHMA as compared with Alternative A, including some seasonal restrictions. In addition, this alternative prohibits new surface occupancy on federal leases within PHMA (with some exceptions allowed).

Under Alternative B, 61,197 acres would be closed to fluid mineral leasing (61,197 more acres than Alternative A), while 12,238 acres of BLM, private and North Dakota school trust lands would be open to fluid mineral leasing (61,197 less than Alternative A), resulting in fewer impacts on fire management. Similar to Alternative A, overall oil and gas development would have limited impacts on fire management because, although there is high potential in GRSG habitat, most

of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on fire risk or related fire management activity.

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 mineral material development and nonenergy leasable mineral leasing. As a result, fire risks would decrease from these types of mineral developments. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on fire risk but it would preclude any potential future development.

Impacts from Fire and Fuels Management

Under Alternative B, the BLM would place restrictions on fire and fuels management when it would be beneficial to PHMA. 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 less than 15 percent unless a fuels management objective requires additional reduction in sagebrush cover. Restrictions placed on fire and fuels management under this alternative such as seasonal closures, no treatments in known winter range, 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 Alternative B, the BLM would prioritize the suppression of fire in order to conserve both GHMA and PHMA. This could result in an increased need for fire management and additional costs for the fire management program.

Impacts of activities would vary based on the FRCC of the area impacted, as described in *Nature and Type of Effects*. The majority of the lands for both PHMA and GHMA are in FRCC II, which means the fire regimes have been moderately altered from their historical range by either increased or decreased frequency. A moderate risk of losing key ecosystem components is identified for lands in this class; therefore, management actions restoring habitat to a more natural vegetation structure would improve fire regime under this and all action alternatives.

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 activities and could therefore increase costs of treatment compared to Alternative A.

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 those described in Alternative B but restrictions would also be applied to 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 with Alternative A.

Impacts from Recreation
Impacts under Alternative C are the same as those under Alternative B, but would apply to both GHMA and PHMA; therefore, the likelihood of human-caused ignition would be further reduced as compared to Alternative A.

Impacts from Lands and Realty
Under Alternative C, impacts would be similar to those described for Alternative B but would be applied across PHMA and GHMA (see **Table 4-14**). Due to the restrictions on ROW development in PHMA and GHMA under this alternative, fire risks from lands and realty actions would be the least of any alternative.

Impacts from Range Management
Under Alternative C, there would continue to be 32,945 acres open to grazing; however, permitted AUMs in the planning area would be reduced to 3,739 due to the approximately 50 percent reduction of AUMs in the Big Gumbo area. This could result in a larger need for fire management actions than under Alternative A, particularly in the Big Gumbo region because the fuel load reduction would not be as great. However, as stated in *Nature and Type of Effects*, it is difficult to predict the impacts of grazing on wildfire and so the analysis of the impact of more AUMs on fire management is inconclusive.

Other impacts under Alternative C would be similar to those discussed under Alternative B, *Impacts from Range Management.* However, Alternative C management actions would apply to both PHMA and GHMA and impacts could be slightly intensified.

Impacts from Fluid Minerals
Impacts under Alternative C would be similar to those under Alternative B, but would apply to both PHMA and GHMA. Under Alternative C, 66,293 acres would be closed to fluid mineral leasing (compared to zero acres closed under Alternative A), while 7,142 acres of BLM, private and North Dakota School Trust lands would be open to fluid mineral leasing (66,293 less than Alternative A), resulting in fewer impacts on fire management. Overall, restrictions to fluid

mineral development under Alternative C would be greater than under the other alternatives. This would have the potential to indirectly effect fire management through a decreased risk of fire due to less development, fewer vehicles, and less construction equipment, resulting in less chance of human ignition.

Similar to Alternative A, overall oil and gas development would have limited impacts on fire management because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on fire risk or related fire management activity.

Impacts from Solid Minerals

Under Alternative C, restriction on mineral development would be the broadest of all alternatives, with limitations on leasing and development as described in Alternative B, but expanded to GHMA as well as PHMA. Fire risks related to nonenergy leasables and mineral materials development would be minimal under this alternative due to the limitations placed on these types of minerals. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on fire risk but it would preclude any potential future development.

Impacts from Fire and Fuels Management

Management actions under Alternative C would also place more restrictions on fire and fuels management than Alternative A. Management and impacts under Alternative C would be similar to management under Alternative B, but would apply to both GHMA and PHMA, therefore suppression costs may be slightly increased.

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 increased.

Impacts from ACECs

Under Alternative C, PHMA would be designated as an ACEC. The ACEC would cover 32,900 acres. There could be reduced flexibility for hazardous fuels treatments on the 32,900 acres managed as an ACEC, which could reduce the efficiency with which fires are suppressed and increase fire management costs.

4.6.8 Alternative D

Impacts from Travel and Transportation Management

Impacts would be similar to that described in Alternatives B and C.

Impacts from Recreation

Impacts under Alternative D are the same as those under Alternative B.

Impacts from Lands and Realty

Under Alternative D, PHMA would be managed as a ROW avoidance area and additionally, as an exclusion area for new wind and solar energy ROW authorizations. ROWs would be allowed in GHMA (wind and solar would be avoidance) with measures to minimize surface disturbing and disruptive activities. Impacts on fire management from ROW development would therefore be decreased as compared to Alternative A (see **Table 4-14**).

Impacts from Range Management

Total acres available for grazing and permitted AUMs would be the same as described for Alternatives A and B. Other management actions would be the similar to Alternative B but would emphasize working with state and local agencies to develop standards. As a result, impacts on fire management would be similar to those described in Alternative B but may be more suited to site-specific conditions, including the habitat needs of other high priority species, resulting in improved ecological conditions and decreased fire risk.

Impacts from Fluid Minerals

Similar to Alternative A, Alternative D does not close any acres to fluid mineral leasing and has 73,435 acres open to fluid mineral leasing. Under Alternative D, however, NSO restrictions would apply in PHMA and there would be a minor decrease in forecasted wells; therefore, development and related impacts on fire management would be reduced as compared to Alternative A. The chance of ignition from fluid mineral development would still be present.

Similar to Alternative A, overall oil and gas development would have limited impacts on fire management because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on fire risk or related fire management activity.

Impacts from Solid Minerals

Under Alternative D, impacts from solid mineral development would be similar to those described under Alternative A; however, PHMA would be closed to mineral material development, with reduction in surface disturbance and road use and related impacts on fire risk as compared with Alternative A. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on fire risk but it would preclude any potential future development.

Impacts from Fire and Fuels Management

Impacts from Alternative D would be similar to those under Alternative B

Impacts from Habitat Restoration and Vegetation Management
Impacts under Alternative D would be similar to those under Alternative B, as Alternative D also focuses on restoring native plant communities based on local site conditions and information, which could further reduce the risk of fires.

Impacts from ACECs
Impacts would be the same as Alternative A.

4.6.9 Proposed Plan Amendment

Impacts from Travel and Transportation Management
Impacts would be similar to those described in Alternative D. The Proposed Plan Amendment would also allow for the temporary closure or restriction of routes or areas if an authorized officer determines off-highways vehicles are causing or would cause harm to natural, historical, or cultural resources. These increased restrictions on access would reduce the risk of human-caused ignitions as compared to Alternative A.

Impacts from Recreation
Impacts under the Proposed Plan Amendment are similar to those under Alternative D. 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 reduce the risk of human-caused ignitions as compared to Alternative A.

Impacts from Lands and Realty
Impacts under the Proposed Plan Amendment would be similar to those 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. This would minimize surface-disturbing and disruptive activities in a broader area, and could decrease the risk of human-caused ignitions. The BLM would also enforce density and disturbance caps on development in GRSG habitat. As a result, development and related risk of ignition would be reduced in GRSG habitat, but it could shift to areas outside of GRSG habitat if the cap were reached.

Impacts from Range Management
Total acres available for grazing and permitted AUMs would be the same as described for Alternative D. Other management actions would be the similar to 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. These measures would help to improve and protect habitat quality in PHMA, likely reducing the spread of invasive grasses and related fire risk.

As under all alternatives, the Proposed Plan Amendment would allow for review of voluntarily relinquished allotments to determine whether they should remain

available for grazing. Conversion of relinquished allotments could lead to increased fuels in those site-specific locations, and potentially result in a slightly higher risk of fire. However, the Proposed Plan Amendment also has management focuses on achieving ecological site potential which would likely reduce annual invasive grasses and increase habitat health, minimizing the risk of wildfire.

Impacts from Fluid Minerals

Impacts would be similar to those under Alternative D. In addition, under the Proposed Plan Amendment, priority for leasing and development of fluid minerals would be given for non-PHMA and GHMA habitat. The BLM would also enforce density and disturbance caps on development in PHMA. As a result, development and related risk of ignition would be reduced in PHMA but potentially shift to areas outside of PHMA.

However, similar to Alternative A, overall oil and gas development would have limited impacts on fire management overall because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on fire risk or related fire management activity.

Impacts from Solid Minerals

Under the Proposed Plan Amendment, impacts would be similar to those described under Alternative D. The BLM would also enforce density and disturbance caps on development in PHMA. As a result, development and related risk of ignition would be reduced in PHMA, but it could shift to areas outside of PHMA.

Impacts from Fire and Fuels Management

Impacts under the Proposed Plan Amendment would be the similar to those under Alternative C. As with Alternatives B and C, 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. In addition, Burn Plans, including additional NEPA analysis, would be required under the Proposed Plan Amendment if prescribed fire is used in GRSG habitat and 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.

Impacts from Habitat Restoration and Vegetation Management

Impacts under the Proposed Plan Amendment would be similar to those under Alternative D, except that the Proposed Plan Amendment would extend removal of conifers encroaching into all sagebrush habitat, which could reduce the risk of fire by reducing the fuel load. Additionally, in all PHMA, the desired condition is to maintain a minimum of 70 percent of lands capable of producing

sagebrush with 10 to 30 percent sagebrush canopy cover (see **Table 2-2**). This could increase the risk of fire, but these risks could be mitigated with other fuels management activities.

Impacts from ACECs

Impacts would be the same as Alternative A.

4.7 FLUID MINERALS

4.7.1 Methods and Assumptions

Analysis of impacts on fluid 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 fluid minerals would result from closure of an area to fluid 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 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 4-16**, Comparison of Fluid Minerals Indicators by Alternative, illustrates how the indicators vary under each alternative.

Where information is available, consideration is given to the potential for fluid mineral resources on lands closed to leasing. For example, an indicator of an impact on fluid minerals is if there were substantial reductions in federal leasing and development of fluid mineral resources in high potential areas.

Assumptions

The analysis includes the following assumptions:

- Existing fluid mineral leases would not be affected by the closures proposed under this RMPA.
- 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. New stipulations proposed under this RMPA would apply only on new leases.

Table 4-16
Comparison of Fluid Minerals Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
The amount of unleased land identified as closed to mineral exploration and development (acres)	0	18,817	22,491	0	0
The amount of land subject to NSO stipulations (acres)	9,780	0	0	61,197	61,197
The amount of land subject to CSU stipulations (acres)	21,235	0	0	5,090	5,090
The amount of land subject to TLs (acres)	38,504	0	0	0	0
Application of COAs on fluid mineral development activities on leased parcels for the protection of GRSG (acres)	No change	Increase	Increase	Increase	Increase
Restrictions on geophysical exploration in GRSG habitat	No change	Increase	Increase	Increase	Increase
The amount of land managed as ROW avoidance areas for oil and gas-related activities (acres)	0	80	0	32,900	32,900
The amount of land managed as ROW exclusion areas for oil and gas-related activities (acres)	0	32,900	32,980	0	0

Source: BLM 2012a

- 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 is 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 will the demand for extracting energy resources.
- Stipulations also apply to fluid mineral leasing on lands overlying federal mineral estate, which includes federal mineral estate underlying BLM-administered lands and non-BLM-administered lands. There are 396,053 acres of federal mineral estate within the planning area (30,574 acres of BLM-administered surface with federal minerals and 365,479 acres of split estate). The decisions in this plan amendment will not affect federal minerals underlying National Forest System lands or other federal agency-administered surface.
- As discussed in **Section 3.8**, Fluid Minerals, market circumstances will likely result in continued industry emphasis on increasing oil supplies and searching for additional natural gas supplies in the planning area. Much of the oil and gas supply growth within the planning area is expected to come from production in existing reservoirs, with new reservoir discoveries most likely to come from areas outside the planning area (BLM 2009a).

4.7.2 Nature and Type of Effects

Closing areas within GRSG habitat to fluid mineral leasing would directly impact the fluid minerals program by prohibiting the development of those resources on federal mineral estate. Fluid mineral operations would be limited in their choice of project locations and may be forced to develop in areas that are challenging to access or have less economic resources because more ideal areas could be closed to leasing.

Management actions that prohibit or restrict surface occupancy or disturbance (such as TLs, NSO, CSU, and limitations on the total amount of surface disturbance in areas) overlying federal fluid mineral resources would also directly impact the development of those resources by limiting the siting, design, and operations of fluid mineral development projects. This, in turn, could force operators to use more costly development methods than they otherwise might have used. Equipment shortages could result from application of TLs because a bottleneck may be created during the limited time period in which activity would be allowed.

In areas where NSO stipulations are applied, federal fluid minerals could be leased, but the leaseholder/operator would have to use offsite methods such as directional drilling to access the mineral resource. The area where directional drilling can be effectively used is limited, meaning some minerals may be inaccessible in areas where an NSO stipulation covers a large area or where no leasing is allowed on surrounding lands.

Application of CSU stipulations allows some use and occupancy of the surface. While less restrictive than an NSO, a CSU stipulation allows the BLM to require special operational constraints, to shift the surface-disturbing activity associated with fluid mineral leasing more than the standard 200 meters (656 feet), or to require additional protective measures (e.g., restrictions on noise levels) to protect GRSG. While not prohibiting surface-disturbing activities, a CSU stipulation does influence the location and level of operations within the subject area.

TL stipulations may be necessary to protect GRSG from impacts of development. These stipulations are necessary if impacts cannot be mitigated within the standard 60-day suspension of operation period afforded by regulation. Areas where TL stipulations are applied would be temporarily closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames based on seasons or GRSG breeding times. While some operational activities would be allowed at all times (e.g., vehicle travel and maintenance), construction, drilling, completions, and other operations considered to be intensive in nature would not be allowed during the restricted time frame. Most activities, however, can be initiated and completed outside of the restricted dates specified in the TL stipulation.

Applying COAs, which include RDFs (per **Appendix B**) and conservation measures outlined in **Chapter 2** (**Section 2.6.2** and **Table 2-4**), to existing leases would directly impact fluid mineral operations. 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 operations by increasing costs if it resulted in the application of additional requirements 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. See **Section 2.4.3**, Management Common to Action Alternatives, for more information on when these exceptions to RDFs would apply.

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. TLs 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 reclamation 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. This would be a direct impact on fluid minerals.

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.

Management actions creating ROW exclusion or avoidance areas for oil and gas-related activities could indirectly increase the cost of fluid mineral extraction by limiting the available means for transporting fluid minerals to processing facilities and markets. For example, new natural gas pipelines could not be built in an ROW exclusion area. Impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs to satisfy valid existing rights.

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, range management, solid minerals, fire and fuels management, habitat restoration/vegetation management, and ACECs.

4.7.3 Impacts Common to All Alternatives

Impacts from Fluid Minerals

Under all alternatives, the BLM would continue to require a bond in accordance with 43 CFR 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 Lands and Realty

Under Alternative A, the entire planning area would continue to be open to ROW location. No areas would be managed as exclusion or avoidance;

therefore, there would be no impacts from lands and realty on fluid minerals under this alternative.

Impacts from Fluid Minerals

Under Alternative A, new oil and gas leases would continue to be subject to an NSO stipulation within 0.25 mile of active leks and to a TL stipulation within two miles of leks. The overall breakdown of acreages of oil and gas potential in various leasing categories in the decision area is included in **Table 4-17**, Oil and Gas Leasing Categories, Alternative A[1].

As discussed in **Section 3.8**, approximately 26,024 acres (35 percent) of oil and gas federal mineral estate in the decision area is unleased. Of these unleased acres, 7,081 (27 percent) have high potential. All unleased acreage in the decision area is open to fluid mineral leasing; however, 1,373 unleased acres (five percent of unleased oil and gas federal mineral estate) are subject to NSO stipulations. In addition, 5,799 unleased acres (23 percent of unleased oil and gas federal mineral estate) are subject to CSU stipulations. The most widely applied stipulations are TLs, covering 10,898 unleased acres (15 percent of unleased oil and gas federal mineral estate) in the decision area. Under Alternative A, it is projected that 60 new exploratory and development wells would be drilled on federal oil and gas estate during the life of the current RMP (see **Table 4-1**). Of these new wells, 49 are expected to be producing oil and gas wells through 2029 (BLM 2013b).

Under Alternative A, existing oil and gas leases would continue to be developed according to their lease terms, including a TL prohibiting exploration and development within two miles of leks between March 1 and June 15. COAs could be applied to mitigate or prevent impacts on BLM-administered lands or other resources. BMPs could be incorporated as a COA. 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.

Table 4-17
Oil and Gas Leasing Categories, Alternative A[1]

Oil and Gas Potential	Closed to Leasing (acres)	Open Subject to NSO Stipulations (acres)	Open Subject to CSU Stipulations (acres)	Open Subject to TL stipulations (acres)	Open Subject to Standard Terms and Conditions (acres)
High Potential	**0**	**9,583**	**17,427**	**29,840**	**6,676**
Total unleased	0	1,176	2,787	4,764	1,140
Total leased	0	8,407	14,640	25,076	5,536
BLM surface/ federal minerals	*0*	*6,444*	*10,781*	*18,085*	*2,194*
Unleased	*0*	*296*	*794*	*1,523*	*489*
Leased	*0*	*6,148*	*9,987*	*16,562*	*1,705*
Private or state surface/federal minerals	*0*	*3,139*	*6,646*	*11,755*	*4,482*
Unleased	*0*	*880*	*1,993*	*3,241*	*651*
Leased	*0*	*2,259*	*4,653*	*8,514*	*3,831*
Moderate Potential	**0**	**31**	**1,418**	**3,131**	**4,050**
Total unleased	0	31	728	1,495	2,689
Total leased	0	0	690	1,636	1,361
BLM surface/federal minerals	*0*	*0*	*442*	*1,165*	*836*
Unleased	*0*	*0*	*107*	*484*	*519*
Leased	*0*	*0*	*335*	*681*	*317*
Private or state surface/ federal minerals	*0*	*31*	*976*	*1,966*	*3,214*
Unleased	*0*	*31*	*621*	*1,011*	*2,170*
Leased	*0*	*0*	*355*	*955*	*1,044*
Low/No Known Potential	**0**	**166**	**2,390**	**5,533**	**14,404**
Total unleased	0	166	2,284	4,639	9,905
Total leased	0	0	106	894	4,499

Table 4-17
Oil and Gas Leasing Categories, Alternative A[1]

Oil and Gas Potential	Closed to Leasing (acres)	Open Subject to NSO Stipulations (acres)	Open Subject to CSU Stipulations (acres)	Open Subject to TL stipulations (acres)	Open Subject to Standard Terms and Conditions (acres)
BLM surface/federal minerals	*0*	*0*	*519*	*1,632*	*208*
Unleased	*0*	*0*	*413*	*1,158*	*169*
Leased	*0*	*0*	*106*	*474*	*39*
Private or state surface/federal minerals	*0*	*166*	*1,871*	*3,901*	*14,196*
Unleased	*0*	*166*	*1,871*	*3,481*	*9,736*
Leased	*0*	*0*	*0*	*420*	*4,460*
Total (All Potentials)	***0***	***9,780***	***21,235***	***38,504***	***25,130***
Total unleased	**0**	**1,373**	**5,799**	**10,898**	**13,734**
Total leased	**0**	**8,407**	**15,436**	**27,606**	**11,396**
BLM surface/federal minerals	***0***	***6,444***	***11,742***	***20,882***	***3,238***
Unleased	***0***	***296***	***1,314***	***3,165***	***1,177***
Leased	***0***	***6,148***	***10,428***	***17,717***	***2,061***
Private or state surface/federal minerals	***0***	***3,336***	***9,493***	***17,622***	***21,892***
Unleased	***0***	***1,077***	***4,485***	***7,733***	***12,557***
Leased	***0***	***2,259***	***5,008***	***9,889***	***9,335***

[1]Total acreage for stipulations is greater than the total acreage in the decision area because stipulations could overlap. It does not include 118,858 acres of federal mineral estate in the decision area that do not contain GRSG habitat.
Source: BLM 2012a

4.7.5 Alternative B

Impacts from Lands and Realty

Under Alternative B, all BLM-administered surface lands in PHMA (32,900 acres, or approximately 100 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all PHMA would be closed to fluid mineral leasing under Alternative B, managing areas as ROW exclusion in PHMA would have no impact on fluid minerals.

All BLM-administered surface lands in GHMA (totaling 80 acres, or less than one percent of BLM-administered surface in the decision area) would be managed as ROW avoidance under Alternative B. Fluid minerals beneath those 80 acres would be impacted by the ROW avoidance area as described under *Nature and Type of Effects*. Impacts would increase in comparison with Alternative A.

Impacts from Fluid Minerals (Including Mineral Split Estate)

Table 4-18, Oil and Gas Leasing Categories, Alternative B, shows the overall breakdown of acreages of oil and gas potential in various leasing categories in the decision area. Under Alternative B, all federal oil and gas estate within PHMA (61,182 acres or 83 percent of the decision area) would be closed to fluid mineral leasing, which would increase impacts on fluid minerals in comparison with Alternative A. These closures would include 18,817 acres of unleased federal oil and gas estate, of which 7,056 acres (37 percent) have high potential. Impacts of these closures would be the same type as those described under *Nature and Type of Effects*. Existing leases would remain valid through their term but could not be renewed.

The 5,008 acres of federal oil and gas estate within GHMA (seven percent of the decision area) would be subject to the same stipulations as those under Alternative A; however, new leases in GHMA would be subject to RDFs, which would increase impacts on fluid minerals in comparison with Alternative A. The RDFs would require operators to limit their surface disturbance and noise levels, discourage raptor perching, reclaim disturbed areas to set standards, and take other measures to protect GRSG. Impacts of requiring these RDFs would be the same type as described under *Nature and Type of Effects*.

Under Alternative B, it is projected that 26 new exploratory and development wells would be drilled on federal oil and gas estate over 20 years. Of these new wells, 21 are expected to be producing oil and gas wells through 2029 (see **Table 4-1**). This represents a 57 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b).

Table 4-18
Oil and Gas Leasing Categories, Alternative B[1]

Oil and Gas Potential	Closed to Leasing	Open Subject to NSO Stipulations	Open Subject to CSU Stipulations	Open Subject to TL Stipulations	Open Subject to Standard Terms and Conditions
High Potential	**45,651**	**0**	**0**	**0**	**441**
Total unleased	7,056	0	0	0	16
Total leased	38,595	0	0	0	425
BLM surface/federal minerals	*2,307*	*0*	*0*	*0*	*0*
Unleased	*2,307*	*0*	*0*	*0*	*0*
Leased	*24,416*	*0*	*0*	*0*	*0*
Private or state surface/federal minerals	*4,749*	*0*	*0*	*0*	*441*
Unleased	*4,749*	*0*	*0*	*0*	*16*
Leased	*14,179*	*0*	*0*	*0*	*425*
Moderate Potential	**6,731**	**2**	**3**	**3**	**322**
Total unleased	4,209	2	3	3	4
Total leased	2,522	0	0	0	318
BLM surface/federal minerals	*1,003*	*0*	*0*	*0*	*0*
Unleased	*1,003*	*0*	*0*	*0*	*0*
Leased	*998*	*0*	*0*	*0*	*0*
Private or state surface/federal minerals	*3,206*	*2*	*3*	*3*	*322*
Unleased	*3,206*	*2*	*3*	*3*	*4*
Leased	*1,524*	*0*	*0*	*0*	*318*
Low/No Known Potential	**8,800**	**0**	**0**	**0**	**4,319**
Total unleased	7,552	0	0	0	3,648
Total leased	1,248	0	0	0	671
BLM surface/federal minerals	*1,245*	*0*	*0*	*0*	*78*
Unleased	*1,245*	*0*	*0*	*0*	*40*
Leased	*473*	*0*	*0*	*0*	*38*

Table 4-18
Oil and Gas Leasing Categories, Alternative B[1]

Oil and Gas Potential	Closed to Leasing	Open Subject to NSO Stipulations	Open Subject to CSU Stipulations	Open Subject to TL Stipulations	Open Subject to Standard Terms and Conditions
Private or state surface/federal minerals	*6,307*	*0*	*0*	*0*	*4,241*
Unleased	*6,307*	*0*	*0*	*0*	*3,608*
Leased	*775*	*0*	*0*	*0*	*638*
Total (All Potentials)	***61,182***	***2***	***3***	***3***	***5,082***
Total unleased	**18,817**	**2**	**3**	**3**	**3,668**
Total leased	**42,365**	**0**	**0**	**0**	**1,414**
BLM surface/federal minerals	***30,442***	***0***	***0***	***0***	***78***
Unleased	***4,555***	***0***	***0***	***0***	***40***
Leased	***25,887***	***0***	***0***	***0***	***38***
Private or state surface/federal minerals	***30,740***	***2***	***3***	***3***	***5,004***
Unleased	***14,262***	***2***	***3***	***3***	***3,628***
Leased	***16.478***	***0***	***0***	***0***	***1,376***

[1]Total acreage for stipulations is greater than the total acreage in the decision area because stipulations could overlap. It does not include 118,858 acres of federal mineral estate in the decision area that do not contain GRSG habitat.
Source: BLM 2012a

Conservation measures in addition to RDFs would be applied as COAs to 135 existing leases on 42,367 acres (70 percent) of PHMA overlying federal oil and gas estate. These actions would increase impacts on fluid minerals in comparison with Alternative A. In addition to limitations on surface disturbance and timing of exploratory drilling, the COAs would require unitization when necessary to minimize harm to GRSG and would call for 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.

Geophysical exploration would be allowed, except for in PHMA, where geophysical exploration would be limited to casual use (foot traffic) or helicopter-portable methods on the 61,197 acres of federal oil and gas estate but would be subject to TLs and other restrictions, reducing exploration opportunities. Impacts of these restrictions on geophysical exploration would be the same type as those described under *Nature and Type of Effects*.

Overall, as a result of increased restrictions and limitations as compared to Alternative A, Alternative B would result in an increase in the magnitude and duration of effects on fluid minerals development over time.

4.7.6 Alternative C

Impacts from Lands and Realty

Under Alternative C, all PHMA and GHMA (32,980 acres, or approximately 100 percent of BLM-administered surface in the decision area) would be managed as ROW exclusion areas. However, because all PHMA and GHMA would be closed to fluid mineral leasing under Alternative C, managing areas as ROW exclusion in PHMA and GHMA would have no impact on fluid minerals.

Impacts from Fluid Minerals (Including Mineral Split Estate)

Table 4-19, Oil and Gas Leasing Categories, Alternative C, shows the overall breakdown of acres of oil and gas potential in various leasing categories in the decision area. Under Alternative C, all federal oil and gas estate in PHMA and GHMA (66,275 acres, or 90 percent of the decision area) would be closed to fluid mineral leasing, which would increase impacts on fluid minerals in comparison with Alternative A. Approximately 22,489 acres (86 percent) of unleased federal oil and gas estate in the decision area would be closed, of which 7,056 acres (PHMA) and 16 acres (GHMA) have high potential. Closure of these 7,072 high potential acres would close approximately 100 percent of the unleased acres with high oil and gas potential in the decision area. Impacts would be the same type as those described under *Nature and Type of Effects*.

Table 4-19
Oil and Gas Leasing Categories, Alternative C[1]

Oil and Gas Potential	Closed to Leasing	Open Subject to NSO Stipulations	Open Subject to CSU Stipulations	Open Subject to TL Stipulations	Open Subject to Standard Terms and Conditions
High Potential	**46,092**	**0**	**0**	**0**	**0**
Total unleased	7,072	0	0	0	0
Total leased	39,020	0	0	0	0
BLM surface/federal minerals	*2,307*	*0*	*0*	*0*	*0*
Unleased	*2,307*	*0*	*0*	*0*	*0*
Leased	*24,416*	*0*	*0*	*0*	*0*
Private or state surface/federal minerals	*4,765*	*0*	*0*	*0*	*0*
Unleased	*4,765*	*0*	*0*	*0*	*0*
Leased	*14,604*	*0*	*0*	*0*	*0*
Moderate Potential	**7,057**	**0**	**0**	**0**	**0**
Total unleased	4,217	0	0	0	0
Total leased	2,840	0	0	0	0
BLM surface/federal minerals	*1,003*	*0*	*0*	*0*	*0*
Unleased	*1,003*	*0*	*0*	*0*	*0*
Leased	*998*	*0*	*0*	*0*	*0*
Private or state surface/federal minerals	*3,214*	*0*	*0*	*0*	*0*
Unleased	*3,214*	*0*	*0*	*0*	*0*
Leased	*1,842*	*0*	*0*	*0*	*0*
Low/No Known Potential	**13,126**	**0**	**0**	**0**	**0**
Total unleased	11,200	0	0	0	0
Total leased	1,926	0	0	0	0
BLM surface/federal minerals	*1,285*	*0*	*0*	*0*	*0*
Unleased	*1,285*	*0*	*0*	*0*	*0*
Leased	*512*	*0*	*0*	*0*	*0*

Table 4-19
Oil and Gas Leasing Categories, Alternative C[1]

Oil and Gas Potential	Closed to Leasing	Open Subject to NSO Stipulations	Open Subject to CSU Stipulations	Open Subject to TL Stipulations	Open Subject to Standard Terms and Conditions
Private or state surface/federal minerals	*9,915*	*0*	*0*	*0*	*0*
Unleased	*9,915*	*0*	*0*	*0*	*0*
Leased	*1,414*	*0*	*0*	*0*	*0*
Total (All Potentials)	**66,275**	**0**	**0**	**0**	**0**
Total unleased	**22,489**	**0**	**0**	**0**	**0**
Total leased	**43,786**	**0**	**0**	**0**	**0**
BLM surface/federal minerals	***30,521***	***0***	***0***	***0***	***0***
Unleased	***4,595***	***0***	***0***	***0***	***0***
Leased	***25,926***	***0***	***0***	***0***	***0***
Private or state surface/federal minerals	***35,754***	***0***	***0***	***0***	***0***
Unleased	***17,894***	***0***	***0***	***0***	***0***
Leased	***17,860***	***0***	***0***	***0***	***0***

[1]Total acreage for stipulations is greater than the total acreage in the decision area because stipulations could overlap. It does not include 118,858 acres of federal mineral estate in the decision area that do not contain GRSG habitat.
Source: BLM 2012a

Under Alternative C, it is projected that 25 new exploratory and development wells would be drilled on federal oil and gas estate over 20 years. Of these new wells, 21 are expected to be producing oil and gas wells through 2029 (see **Table 4-1**). This represents a 57 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b).

Management actions applicable to existing leases under Alternative C would be similar to those under Alternative B, but they would apply to 16 existing leases on 1,425 acres of federal oil and gas estate within GHMA in addition to 135 leases on 42,367 acres of federal oil and gas estate within PHMA. In addition to applying the restrictive management under Alternative B 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. Impacts of these operating and siting restrictions would be the same type as those described under *Nature and Type of Effects*.

Geophysical exploration would be allowed, except for in PHMA and GHMA, where geophysical exploration would be limited to casual use (foot traffic) or helicopter-portable methods on the 66,293 acres of federal oil and gas estate but would be subject to TLs and other restrictions, reducing exploration opportunities. Impacts of these restrictions on geophysical exploration would be the same type as those described under *Nature and Type of Effects*.

Overall, as a result of increased restrictions and limitations as compared to Alternative A, Alternative C would result in an increase in the magnitude and duration of effects on fluid minerals development over time.

4.7.7 Alternative D

Impacts from Lands and Realty

Under Alternative D, all BLM-administered surface in PHMA (32,900 acres, or approximately 100 percent of BLM-administered surface in the decision area) would be managed as ROW avoidance areas for oil and gas-related activities. However, because all fluid mineral development in PHMA would be subject to NSO stipulations under Alternative D, managing ROW avoidance areas in PHMA would have no impact on fluid minerals.

All GHMA would be open to ROW location for oil and gas-related activities under Alternative D. However, identification of conservation measures to minimize surface disturbance and disrupting activities could increase the expense of developing facilities for oil and gas operations by limiting routing options and requiring the use of more expensive technology.

Impacts from Fluid Minerals (Including Mineral Split Estate)

Table 4-20, Oil and Gas Leasing Categories, Alternative D and Proposed Plan Amendment[1], shows the overall breakdown of acreages of oil and gas potential in various leasing categories in the decision area. Under Alternative D, all federal oil and gas estate in PHMA (61,185 acres or 83 percent of the decision area) would be open to fluid mineral leasing subject to NSO stipulations. The 18,817 acres of unleased federal oil and gas estate in PHMA (72 percent of unleased acres in the decision area) would be subject to these stipulations. Of these unleased acres that would be subject to NSO stipulations, 7,056 acres have high potential. These acres make up approximately 100 percent of all the unleased high potential federal oil and gas estate in the decision area. Over 99 percent of the unleased high potential acres are in PHMA.

All GHMA (5,088 acres of federal oil and gas estate, or seven percent of the decision area) would be subject to CSU stipulations under Alternative D. Impacts of these stipulations would be the same type as those described under *Nature and Type of Effects*.

Under Alternative D, it is projected that 51 new exploratory and development wells would be drilled on federal oil and gas estate in the short term. Of these new wells, 42 are expected to be producing oil and gas wells in the long term (see **Table 4-1**). This represents a 14 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b).

For existing leases, 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 prevent or minimize disturbance to GRSG and their habitat. Unitization would occur on a case-by-case basis.

In addition to RDFs and limitations on disturbance, structure height restrictions would apply under Alternative D. Cost impacts of these operating and siting constraints would be the same type as those described under *Nature and Type of Effects*.

Management of geophysical exploration under Alternative D would be similar to Alternative B; however, exploration could also use existing roads and trails, as well as helicopter-portable methods in PHMA. This would allow more opportunities for exploration than Alternative B.

Overall, as a result of increased restrictions and limitations as compared to Alternative A, Alternative D would result in an increase in the magnitude and duration of effects on fluid minerals development over time.

Table 4-20
Oil and Gas Leasing Categories, Alternative D and Proposed Plan Amendment[1]

Oil and Gas Potential	Closed to Leasing	Open Subject to NSO Stipulations	Open Subject to CSU Stipulations	Open Subject to TL Stipulations	Open Subject to Standard Terms and Conditions
High Potential	**0**	**45,651**	**441**	**0**	**0**
Total unleased	0	7,056	16	0	0
Total leased	0	38,595	425	0	0
BLM surface/federal minerals	*0*	*26,723*	*0*	*0*	*0*
Unleased	*0*	*2,307*	*0*	*0*	*0*
Leased	*0*	*24,416*	*0*	*0*	*0*
Private or state surface/federal minerals	*0*	*18,928*	*441*	*0*	*0*
Unleased	*0*	*4,749*	*16*	*0*	*0*
Leased	*0*	*14,179*	*425*	*0*	*0*
Moderate Potential	**0**	**6,733**	**328**	**0**	**0**
Total unleased	0	4,211	10	0	0
Total leased	0	2,522	318	0	0
BLM surface/federal minerals	*0*	*2,001*	*0*	*0*	*0*
Unleased	*0*	*1,003*	*0*	*0*	*0*
Leased	*0*	*998*	*0*	*0*	*0*
Private or state surface/federal minerals	*0*	*4,732*	*328*	*0*	*0*
Unleased	*0*	*3,208*	*10*	*0*	*0*
Leased	*0*	*1,524*	*318*	*0*	*0*
Low/No Known Potential	**0**	**8,801**	**4,319**	**0**	**0**
Total unleased	0	7,552	3,648	0	0
Total leased	0	1,249	671	0	0
BLM surface/federal minerals	*0*	*1,719*	*78*	*0*	*0*
Unleased	*0*	*1,245*	*40*	*0*	*0*
Leased	*0*	*474*	*38*	*0*	*0*

Table 4-20
Oil and Gas Leasing Categories, Alternative D and Proposed Plan Amendment[1]

Oil and Gas Potential	Closed to Leasing	Open Subject to NSO Stipulations	Open Subject to CSU Stipulations	Open Subject to TL Stipulations	Open Subject to Standard Terms and Conditions
Private or state surface/federal minerals	*0*	*7,082*	*4,241*	*0*	*0*
Unleased	*0*	*6,307*	*3,608*	*0*	*0*
Leased	*0*	*775*	*633*	*0*	*0*
Total (All Potentials)	**0**	**61,185**	**5,088**	**0**	**0**
Total unleased	**0**	**18,819**	**3,674**	**0**	**0**
Total leased	**0**	**42,366**	**1,414**	**0**	**0**
BLM surface/federal minerals	***0***	***30,443***	***78***	***0***	***0***
Unleased	***0***	***4,555***	***40***	***0***	***0***
Leased	***0***	***25,888***	***38***	***0***	***0***
Private or state surface/federal minerals	***0***	***30,742***	***5,010***	***0***	***0***
Unleased	***0***	***14,264***	***3,634***	***0***	***0***
Leased	***0***	***16,478***	***1,376***	***0***	***0***

[1]Total acreage for stipulations is greater than the total acreage within the decision area because stipulations could overlap. Acreages do not include 118,858 acres of federal mineral estate within the decision area that do not contain GRSG habitat.
Source: BLM 2012a

4.7.8 Proposed Plan Amendment

Impacts from Lands and Realty

Impacts of lands and realty management on fluid minerals would be the same under the Proposed Plan Amendment as they would be under Alternative D.

Impacts from Fluid Minerals (Including Mineral Split Estate)

Leasing categories for oil and gas under the Proposed Plan Amendment would be the same as those under Alternative D (see **Table 4-20**). Impacts under the Proposed Plan Amendment would be similar to those under Alternative D, except that the lack of waivers and modifications, combined with the limited exceptions for NSO stipulations under the Proposed Plan Amendment, would further restrict oil and gas activities.

Well projections for the Proposed Plan Amendment are the same as those for Alternative D.

Impacts on existing leases under the Proposed Plan Amendment would be similar to those under Alternative D.

Application of the density and disturbance caps in PHMA and lek buffers in PHMA and GHMA could impact both new and existing oil and gas activities by preventing or restricting new surface development. New oil and gas activities could be precluded if the cap were exceeded in a BSU or a proposed project analysis area. 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. Applying lek buffer distances when approving actions could also restrict development of infrastructure-related fluid mineral development.

Management of geophysical exploration under the Proposed Plan Amendment would be the same as that under Alternative D and with the same impacts.

Overall, as a result of increased restrictions and limitations as compared to Alternative A, the Proposed Plan Amendment would result in an increase in the magnitude and duration of effects, as described under *Nature and Type of Effects*, on fluid minerals development over time.

4.8 COAL

As discussed in **Section 3.9**, Coal, there has been no coal development within the planning area. While the Bowman-Gascoyne Known Recoverable Coal Resource Area intersects PHMA and GHMA, no development of this field is anticipated within the life of the North Dakota RMP. The Known Recoverable Coal Resource Area has low development potential, and no interest has been expressed in developing the area.

Lignite is being mined in these other areas. In addition, the 2010 Analysis of the Management Situation for North Dakota analyzed coal development potential in the state when designating new Coal Study Areas. Only areas with sufficient economic coal resources to make them likely to be developed within the next 15 to 20 years were designated as Coal Study Areas. The Known Recoverable Coal Resource Area within the planning area was not designated as a Coal Study Area because it was determined not to have sufficient economic coal resources (BLM 2010a). Because no coal development is foreseeable in the planning area, coal resources in the planning area are not expected to be impacted by management actions proposed in this RMPA. However, potential future surface mining could be precluded as a result of suitability determinations in PHMA (87,443 acres) in Alternatives B and D, and the Proposed Plan Amendment. Potential future surface mining could be precluded in PHMA and GHMA (166,207 acres) in Alternative C.

4.9 LOCATABLE MINERALS

As discussed in **Section 3.10**, Locatable Minerals, no locatable mineral development is anticipated within GRSG habitat over the next 20 years. Although uranium deposits exist within GHMA in Bowman County, these deposits have low development potential and are not expected to be developed during the next 20 years. As a result, locatable minerals in the planning area are not expected to be impacted by management actions proposed in this RMPA. However, potential future development would be precluded in PHMA (46,397 acres) in Alternative B, and PHMA and GHMA (49,970 acres) in Alternative C.

4.10 MINERAL MATERIALS

4.10.1 Methods and Assumptions

Analysis of impacts on mineral materials 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 mineral materials would result from closure of an area to mineral material sales disposal. 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 mineral materials are described under *Indicators*, below.

Indicators

Table 4-21, Comparison of Mineral Materials Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on mineral materials under each alternative.

Where information is available, consideration is given to the potential for mineral materials on lands closed to mineral material disposal. For example, an indicator of an impact on mineral materials is if there were substantial closures to mineral material disposal in high potential areas.

Table 4-21
Comparison of Mineral Materials Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
The amount of land closed to mineral material disposal (acres)	0	46,397	49,970	46,397	46,397
The amount of land managed as ROW avoidance areas (acres)	0	80	0	32,900	32,980[1]
The amount of land managed as ROW exclusion areas (acres)	0	32,900	32,980	32,900	32,900[2]
Restrictions on mineral material pits[1] no longer in use	No change	Increase	Increase	Increase	Increase

[1]Wind and solar energy development would be avoidance in GHMA.
[2]PHMA would be exclusion areas for new ROW wind and solar energy developments.

In areas that are open to mineral material disposal, factors that affect mineral material 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 mineral material development, are considered below in the analysis of each alternative.

Assumptions
The analysis includes the following assumptions:

- While mineral material potential exists within PHMA, there is no development on federal mineral material estate in this area.
- Management actions also apply to mineral material development on lands overlying federal mineral estate, which includes federal mineral estate underlying BLM-administered lands and non-BLM administered lands. There are 56,681 acres of federal mineral material estate within the planning area (30,408 acres of BLM-administered surface with federal minerals and 26,273 acres of split estate).

4.10.2 Nature and Type of Effects

The predominant mining method for mineral materials is surface mining; therefore, any restrictions on surface-disturbing activities effectively close the

[1]Although there are no authorized mineral pits in the planning area, any trespass pits found in the planning area would be subject to restoration.

subject areas to mineral material mining. Demand for mineral materials is generated primarily from road maintenance needs. Closure of areas to mineral material sales could result in pits relocating nearby.

Managing areas as ROW avoidance or exclusion could result in impacts on mineral materials because construction of new roads in these areas would likely decrease. As a result, demand for mineral materials needed for construction and maintenance would also decrease.

Implementing management for the following resources would have negligible or no impact on mineral materials and are therefore not discussed in detail: travel and transportation management, recreation, range management, fluid minerals, coal, locatable minerals, fire and fuels management, habitat restoration/vegetation management, and ACECs.

4.10.3 Impacts Common to All Alternatives

There are no impacts that are common to all alternatives.

4.10.4 Alternative A

Impacts from Lands and Realty

Under Alternative A, all BLM-administered surface within the decision area would continue to be open to ROW authorization, allowing the most flexibility for development. The effects would be the same as described above in *Nature and Type of Effects*.

Impacts from Mineral Materials

All federal mineral estate in the decision area would remain open to mineral material disposal under Alternative A, allowing the greatest development potential. Effects would be similar to those described in the *Nature and Type of Effects* above.

4.10.5 Alternative B

Impacts from Lands and Realty

Approximately 32,900 acres in PHMA (100 percent of BLM-administered surface in the decision area) would be managed as an ROW exclusion area under Alternative B. However, because all PHMA would also be closed to mineral material disposal under this alternative, the ROW exclusion area would not impact the mineral materials program.

Under Alternative B, approximately 80 acres in GHMA (less than one percent of the decision area) would be managed as an ROW avoidance area. Impacts of this management would be the same type as those described under *Nature and Type of Effects*, but with a slight increase in areas affected over Alternative A.

Impacts from Mineral Materials

Under Alternative B, all of the federal mineral material estate in PHMA (totaling 46,397 acres, or 82 percent of the locatable federal mineral estate in the decision area) would be closed to mineral material disposal. The types of impacts from these closures would be the same as those discussed under *Nature and Type of Effects*, and represents an increase in the area affected as compared to Alternative A.

In PHMA, mineral material pits no longer in use would be restored to meet GRSG habitat conservation 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*.

Overall, as a result of increased restrictions as compared to Alternative A, Alternative B would result in an increase in the area of effects on mineral materials development over time.

4.10.6 Alternative C

Impacts from Lands and Realty

Approximately 32,980 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 mineral materials disposal under this alternative, the ROW exclusion areas would not impact the mineral materials program.

Impacts from Mineral Materials

Under Alternative C, approximately 49,970 acres of federal mineral material estate in PHMA and GHMA (88 percent of federal mineral estate in the decision area) would be closed to mineral materials disposal. This would include (46,397 acres of PHMA and 3,573 acres of GHMA), the most acres of any alternative. The types of impacts from these closures would be the same as those discussed under *Nature and Type of Effects*, and occur over a large area.

Similar to Alternative B, mineral material pits no longer in use would be restored to meet GRSG habitat conservation 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 are the same as those described under *Nature and Type of Effects*, but occur over a much larger area than under Alternative A.

Overall, as a result of increased restrictions as compared to Alternative A, Alternative C would result in an increase in the area of effects on mineral materials development over time.

4.10.7 Alternative D

Impacts from Lands and Realty

Under Alternative D, 32,900 acres in PHMA (100 percent of BLM-administered surface in the decision area) would be managed as an ROW avoidance area (wind and solar would be exclusion areas). However, because all PHMA would be closed to mineral materials disposal, the ROW avoidance area would have no impact on the mineral materials program.

All 80 acres of GHMA would be open to ROW location (wind and solar would be avoidance) under Alternative D. Impacts would be similar to those under Alternative A, except that the demand for mineral materials to construct ROW facilities could decrease due to the restrictions on wind and solar development in GHMA. Impacts of this decrease in demand would be the same type as those described under *Nature and Type of Effects*.

Impacts from Mineral Materials

Management and impacts under Alternative D would be the same as those under Alternative B.

Overall, as a result of increased restrictions as compared to Alternative A, Alternative D would result in an increase in the area of effects on mineral materials development over time.

4.10.8 Proposed Plan Amendment

Impacts from Lands and Realty

Management and impacts under the Proposed Plan Amendment would be similar to those under Alternative D.

Impacts from Mineral Materials

Management and impacts under the Proposed Plan Amendment would be similar to those under Alternative B.

4.11 COMPREHENSIVE TRAVEL AND TRANSPORTATION MANAGEMENT

Comprehensive Travel and Transportation Management typically supports and creates impacts on other resources and uses. Impacts on travel and transportation from other resource areas include management prescriptions that alter the existing transportation system, for instance, through the physical removal of routes (i.e. reclaiming and revegetating the ROW) or by way of limiting or closing routes to certain modes of travel (such as designating routes as closed to motorized travel).

In the RMPA/EIS planning area, motorized travel, including OHV travel, is limited to existing routes. Since motorized travel can impact GRSG populations and habitat, management prescriptions associated with the proposed action alternatives (Alternatives B, C, and D, and the Proposed Plan Amendment)

would result in the closure of routes to motorized travel and in some cases reclaiming of road surfaces.

4.11.1 Methods and Assumptions

Indicators

Table 4-22, Comparison of Comprehensive Travel and Transportation Management Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on Comprehensive Travel and Transportation Management under each alternative.

Table 4-22
Comparison of Comprehensive Travel and Transportation Management Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres where new road development would not be allowed	0	0, with mitigation	32,342	0, with mitigation	0, with mitigation

Assumptions

The analysis includes the following assumptions:

- 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 is not responsible for the maintenance of federal, state, or county roads on BLM-administered lands.
- The travel designations would not affect ROW holders, permitted uses, county or state roads, or other valid existing rights. Travel closures/limitations apply primarily to public access.
- 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 during a future site-specific travel planning process 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 Comprehensive Travel and Transportation Management are those that restrict travel (e.g., managing areas as closed or limited to motorized travel and seasonal travel limitations). Current BLM management limits motorized travel to existing roads and trails. New travel and transportation management actions in response to GRSG habitat protection strategies could impact the number of acres where motorized travel is allowed on existing roads and trails. Seasonal travel restrictions to prevent disruption of GRSG breeding and brood rearing activities would allow motorized and mechanized travel in defined areas only at specific times of the year. Full closure of certain areas would direct travelers elsewhere in the transportation network, potentially resulting in impacts on those areas from the added activity. Additionally, management actions that restrict future route construction would 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.

Management for all other resources and uses would have negligible or no impact on Comprehensive Travel and Transportation Management and are therefore not discussed in detail.

4.11.3 Impacts Common to All Alternatives

Under all alternatives, travel would be limited to existing roads and trails with no areas designated as entirely open to motorized cross-country travel, and no routes or areas specifically closed to motorized or mechanized travel. Under Alternatives B, C, and D and the Proposed Plan Amendment, the BLM would complete activity-level travel management plans within five years of signing of the ROD, while Alternative A, does not contain a specified timeframe.

Table 4-23, Areas Open/Closed to New Road Construction by Alternative, provides a comparison of areas open and closed to new road construction by alternative. Closed areas are based on the total area covered by 4-mile buffers placed around active lek sites.

Table 4-23
Areas Open/Closed to New Road Construction by Alternative

	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Area open to new construction (acres)	32,980	32,980	638	32,980	32,980
Area closed to new construction (acres)	0	0	32,342	0	0

4.11.4 Alternative A

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 114 miles of roads and trails throughout the decision area. 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. While the BLM would develop a transportation management plan, it would not be required to do so within a specified timeframe, continuing existing impacts, as described above in the *Nature and Types of Effects*, into the foreseeable future.

4.11.5 Alternative B

Impacts from Travel and Transportation Management

BLM management prescriptions under Alternative B to protect GRSG habitat would result in the potential for more access limitations when compared to Alternative A. The BLM would develop a travel and transportation management plan within five years of the ROD. Also under Alternative B, the BLM would only allow new roads where access to valid existing rights is necessary and does not currently exist, therefore restricting new roads and/or ROWs and access through PHMA. This would extend effects as described above in *Nature and Type of Effects* across more of the decision area than under Alternative A.

During travel and transportation management planning, should the BLM determine there is a need to close certain routes, those closures would impact the existing travel and transportation network, including the types of travel allowed on routes, as described above in *Nature and Type of Effects*.

4.11.6 Alternative C

Impacts from Travel and Transportation Management

BLM management prescriptions under Alternative C to protect GRSG habitat would result in the potential for more impacts on travel and transportation management when compared to Alternative A.

BLM management actions under Alternative C for GRSG habitat protection and subsequent impacts on travel and transportation management would be the same as those described under Alternative B, with the exception that no new road construction would be allowed within four miles of active GRSG leks. The 4-mile lek buffers cover 32,342 acres (98 percent of the decision area). As a result, new road construction would be limited to 638 acres in the decision area. This prohibition on new road construction would preclude the construction of new roads where they might otherwise be needed to improve access or the functionality of the network.

4.11.7 Alternative D

Impacts from Travel and Transportation Management

BLM management prescriptions under Alternative D to protect GRSG habitat would result in the potential for more impacts on travel and transportation management when compared to Alternative A and would be similar to those described under Alternative B.

4.11.8 Proposed Plan Amendment

Impacts from Travel and Transportation Management

Management and impacts under the Proposed Plan Amendment would be similar to those under Alternative D. Applying the lek buffer distances and density and disturbance caps on linear features (roads) could restrict development opportunities in PHMA. Ensuring a net conservation gain to GRSG under the regional mitigation strategy may require projects to avoid, minimize or apply compensatory mitigation for their potential impacts.

While the Proposed Plan Amendment specifically includes an action for implementing possible emergency route closures in accordance with the CFR, this authority is available to the BLM under all other alternatives as well.

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 activities would result in a direct impact. Indirect impacts are those that change the physical, social, or administrative setting within which recreation activities take place.

Indicators

Table 4-24, Comparison of Recreation Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on recreation under each alternative.

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.

Table 4-24
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 PHMAs	No change	Opportunity for increase due to restrictions on surface disturbance	Greatest opportunity for increase due to restrictions on surface disturbance	Opportunity for increase due to restrictions on surface disturbance	Opportunity for increase due to restrictions on surface disturbance
Change in the number and type of SRPs issued on an annual basis within the planning area and PHMA	No change	Potential limit on the number and type of new SRPs in PHMA	Potential limit on the number and type of new SRPs in PHMA	Potential limit on the number and type of new SRPs in PHMA	Potential limit on the number and type of new SRPs in PHMA

- 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.
- There would continue to be no or little demand for SRPs.
- The BLM would 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. Depending on the location, development in utility corridors impacts recreation opportunities during construction and operation. Managing areas as ROW avoidance can limit development that would be incompatible with recreation in these areas.

On lands open to fluid mineral leasing, oil and gas facilities, equipment, noise, dust, vehicles, night lighting, pipelines, and human activity affect the recreation setting during construction and operation. Fluid mineral development that requires surface occupancy generally impacts recreation management objectives, opportunities, and activities. Even with CSU stipulations, oil and gas

development can impact recreation opportunities if the development conflicts with existing recreation activities. However, applying NSO stipulations preserves the natural character of landscapes and protects GRSG habitat. Stipulations maintain current recreation settings and preserve recreation opportunities in those areas in the long term.

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.

Comprehensive Travel and Transportation 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. Additionally, management actions that restrict future route construction limit the ability of the travel network to accommodate increased travel demands, such as increased OHV use, over time. Conflicts among route users could increase if the existing network becomes congested; however, limitations on new road construction and route upgrading would maintain dispersed recreational experiences associated with activities such as hunting, especially in areas where few to no routes exist.

Where lands are open to livestock grazing, impacts on recreation can result. The intensity of the impact varies based on recreation activity and visitor expectation. Range improvements help to reduce conflicts by keeping grazing animals away from recreation areas. 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 farms and associated transmission infrastructure, could result in the loss of recreation opportunities. Management of certain areas as ROW exclusion or avoidance areas would eliminate or minimize impacts from renewable energy projects.

Impacts on recreation from ACECs would vary depending on the relevant and important values for which the ACEC was established to protect. Often times, BLM management for ACECs include 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 will therefore not be discussed in detail. Resources not likely to have an effect on recreation include: fire and fuels management and habitat restoration/vegetation management. In addition, although there is one existing gravel mine in Bowman County, no mineral materials mining operations currently exist on BLM-administered land in the planning area. Nor is there any foreseeable coal or locatable mineral potential in the decision area. Therefore management decisions for these resources would not affect recreation opportunities in the planning area and are not included in the following analysis.

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 wall or fence, removal of the feature could improve recreation user experiences. Removal of roads, however, could negatively impact recreation opportunities if the routes are used for recreational activities, such as OHV use or for access to hunting areas.

4.12.4 Alternative A

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 114 miles of roads and trails throughout the decision area. Motorized and non-motorized road and trail based recreation opportunities, and the overall recreation experience would be maintained into the foreseeable future.

Impacts from Recreation

Under Alternative A, the BLM would continue to manage for dispersed recreation activities, particularly big game hunting. Existing impacts on recreation from other resources and uses would be as described above in *Nature and Type of Effects*, and continue with little or no change over existing conditions.

Impacts from Lands and Realty

Under Alternative A, 371 total acres of existing ROW authorizations would continue to impact recreation opportunities. No lands within the planning area would be designated as ROW avoidance or exclusion areas; therefore, there would be potential impacts on recreation during construction and operation of facilities throughout the planning area as described in *Nature and Type of Effects*.

Impacts from Range Management

Under Alternative A, 32,945 acres of suitable grazing lands would continue to be open with a long-term allocation of 5,781 AUMs. Impacts on recreation users from conflicts with grazing animals and infrastructure would be consistent with the *Nature and Types of Effects* described above, especially where cattle grazing areas overlap prime big-game hunting areas. Impacts of grazing to new SRPs would be evaluated on a case-by-case basis through the SRP issuance process.

Impacts from Fluid Minerals

Conventional oil and gas development under Alternative A would continue at high production rates, particularly in Bowman County where there are 577 production wells. However, oil and gas development peaked in 2008 and is consistently declining (North Dakota Industrial Commission 2012), therefore limiting the expected amount of new oil and gas development. Under Alternative A, oil and gas production would continue to impact recreational opportunities throughout the planning area as described in *Nature and Types of Effects* above, but would likely decline as the trend for new oil and gas developments continues to decline. Impacts on recreation users would include activities and disturbance related to exploration, development, and operations.

Impacts from ACECs

There would be no designated ACECs in the planning area under Alternative A; therefore, there would be no impacts from ACEC management actions on recreation activities.

4.12.5 Alternative B

Impacts from Travel and Transportation Management

Under Alternative B, the BLM would allow motorized travel on existing roads and trails while at the same time evaluate the need for permanent or seasonal road closures. Should the BLM determine there is a need to close certain routes those closures could impact recreation opportunities. Areas where routes would be closed could include areas where recreation activities take place. Additional impacts would be consistent with the *Nature and Types of Effects*.

Dispersed recreation activities, which primarily include big game hunting, would be less susceptible to impacts from route designations. However, permanent or seasonal closure of travel routes and limitations on new road development could impact recreation by limiting motorized travel on routes used for access to hunting, fishing, and other popular recreation activities.

Under Alternative B, the BLM would only allow new roads where access to valid existing rights is necessary and does not currently exist. While new roads 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 as compared to Alternative A.

Impacts from Recreation

Under Alternative B, the BLM would only issue SRPs that have a neutral or beneficial effect on PHMA, which could limit future opportunities for SRPs in PHMA as compared to Alternative A.

Impacts from Lands and Realty

Under Alternative B, PHMA would be designated as exclusion areas for new ROW authorizations and GHMA would be designated ROW avoidance areas. 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. Dispersed recreation activities, which primarily include big game hunting, would be less susceptible to impacts from ROW development. However, permanent or seasonal closure of travel routes and limitations on new ROW development could impact recreation by limiting motorized travel on routes used for hunting, fishing, and other popular recreation activities.

Impacts from Range Management

Under Alternative B, the BLM would conduct land health assessments in PHMA to assess whether GRSG habitat objectives are being met. Based on these assessments, in cases where GRSG objectives are not being met, the BLM would evaluate and implement grazing decisions, conservation plans, or other agreements to meet those objectives. Management actions related to grazing systems could reduce the timing, distribution, type, intensity, and/or number of livestock allowed in PHMA. A reduction in total livestock number or seasonal grazing restrictions would reduce range management conflicts with recreation users, particularly big game hunters. Impacts on recreation users would be consistent with the *Nature and Types of Effects*, especially where cattle grazing areas overlap prime big-game hunting areas. Dispersed recreation activities, which primarily include big game hunting, would be less susceptible to impacts from grazing actions.

Impacts from Fluid Minerals

The closure of PHMA to fluid mineral development under Alternative B would eliminate the potential for new oil and gas development conflicting with recreation users. The benefits of reduced surface disturbance and no new construction activity associated with oil and gas development would be consistent with the *Nature and Types of Effects*. Restriction of geophysical exploration to helicopter-portable could impact certain recreation activities, such as hunting, if helicopter operations are in proximity to key big game or bird hunting areas. Dispersed recreation activities, which primarily include big game hunting, would be less susceptible to impacts from mineral development.

Impacts from ACECs

Impacts would be the same as Alternative A.

4.12.6 Alternative C

Impacts from Travel and Transportation Management

The types of impacts on recreation under Alternative C would the same as those described above under Alternative B, with the exception that the BLM would use a 4-mile buffer around leks to determine where limitations on new road construction would be necessary to minimize disturbance to GRSG habitat. In total, the 4-mile buffers account for 98 percent (32,342 acres) of the decision area in PHMA, including all BLM-administered land in the Big Gumbo Management Area. Prohibition of new road construction would limit motorized recreational use to the existing network of roads and trails. There would be no opportunity to accommodate any increase in recreational use or mitigate user conflicts by adding additional routes.

Impacts from Recreation

Impacts from recreation would be similar to those under Alternative B. Management actions would apply to both PHMA and GHMA, impacting a larger area resulting in a wider area where certain type of SRPs and the recreational opportunities they afford would be limited.

Impacts from Lands and Realty

Under Alternative C, PHMA and GHMAs would be designated as ROW exclusion areas for new ROW authorizations. Any new development would be allowed only if it could be contained within an existing ROW. The type of impacts on recreation opportunities would be similar to those under Alternative B; however, the impacts would be experienced over a larger area.

Impacts from Range Management

Under Alternative C, BLM range management would reduce the number of grazing allotments in the Big Gumbo Management Area by 50 percent to 2,041 AUMs. In the long term, the BLM would allocate up to 3,739 AUMs. A reduction in the allotted number of livestock would reduce the potential for livestock conflicts with big-game hunters and other recreation users.

Impacts from Fluid Minerals

Impacts under Alternative C from fluid minerals would be similar to those under Alternative B, with exception that GHMA would also be closed to fluid mineral leasing, resulting in improved opportunities for quiet and dispersed recreation over a greater area.

Impacts from ACECs

Under Alternative C, the BLM would designate PHMA (32,900 acres) of GRSG habitat as a new ACEC. Management for the ACEC would be tailored to protect the relevant and important values (i.e. GRSG habitat) for which the

ACEC would be designated. Designation of the ACEC could affect recreation opportunities by limiting new surface disturbing activities within the ACEC boundaries. Motorized access for hunting and other recreation activities could be impacted by the designation. The ACEC designation could limit the issuance of new SRPs if the requested activity is proposed within the ACEC boundary.

4.12.7 Alternative D

Impacts from Travel and Transportation Management
Impacts on recreation under Alternative D would be similar to those described above under Alternative B.

Impacts from Recreation
Impacts from recreation management would be similar to Alternative B.

Impacts from Lands and Realty
Under Alternative D, PHMA would be managed as ROW avoidance areas for new ROW authorizations and exclusion areas for new wind and solar energy projects. ROWs would continue to be allowed in GHMAs; however GHMA would be designated as wind and solar energy ROW avoidance. Any new development would be allowed only if it could be contained within an existing ROW. Consistent with the *Nature and Types of Effects,* managing areas as ROW avoidance could limit development that would be incompatible with recreation in these areas.

Impacts from Range Management
Impacts on recreation from BLM range management actions proposed under Alternative D would be the same as those described above under Alternative B.

Impacts from Fluid Minerals
Under Alternative D, PHMAs would be open to oil and gas development; however, surface occupancy would be prohibited. Within three miles of active leks, BLM management would prohibit geophysical exploration and development during mating season (March 1 through June 15). The BLM would prohibit all exploration and development within 0.6 miles of a lek. Similar to Alternatives B and C, the use of helicopters for exploration could impact certain recreation activities. Reduced surface oil and gas development would minimize potential impacts on recreation by reducing disturbance related to these activities, as described in *Nature and Types of Effects* compared to Alternative A.

Impacts from ACECs
Impacts would be the same as Alternative A.

4.12.8 Proposed Plan Amendment

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 Alternative B, except that there would be a prohibition on new recreation facilities that do not provide a net conservation benefit to GRSG habitat. If proposed facilities (e.g., campgrounds, trails, or trailheads) could not offset impacts on PHMA through design elements or mitigation option, then there could be a long-term reduction in recreation opportunities and activities in PHMA. However, the Proposed Plan Amendment would continue to allow facilities for visitor health and safety or resource protection, ensuring these two objectives are met over the long term.

Impacts from Lands and Realty

Impacts from ROW management in PHMA would be similar to Alternative D. GHMA would be managed as ROW avoidance areas for high-voltage transmission lines and large pipelines; this would reduce short- and long-term disturbance to recreation opportunities and activities in these areas. Minor ROWs would continue to be allowed in GHMA. New distribution line or similar minor ROW development would increase short- and long-term disturbance to recreation opportunities and activities in GHMA. Managing GHMA as ROW avoidance areas for new solar and wind energy authorizations would reduce, but not eliminate, development that would be incompatible with recreation in these areas. Applying lek buffer distance, density and disturbance caps, and regional mitigation strategy to conserve GRSG could also reduce development incompatible with recreation.

Impacts from Range Management

Impacts on recreation from range management would be similar to those described for Alternative B; the difference would be the added emphasis on reviewing leases and permits for modification and renewal may indirectly benefit recreation activities and opportunities, as described under *Nature and Type of Effects*, especially those that use riparian areas and wet meadows.

Impacts from Fluid Minerals

Impacts would be similar to those under Alternative D, except that the added emphasis on leasing fluid minerals outside of PHMA and GHMA would protect recreation activities and opportunities in PHMA and GHMA by reducing surface disturbance, as described in *Nature and Types of Effects*. Applying lek buffer distance, density and disturbance caps, and regional mitigation strategy to conserve GRSG could also reduce incompatible development for recreation areas.

Impacts from ACECs

Impacts would be the same as Alternative A.

4.13 RANGE MANAGEMENT

4.13.1 Methods and Assumptions

Indicators

Table 4-25, Comparison of Range Management Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on range management under each alternative.

Table 4-25
Comparison of Range Management Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Permitted AUMs in PHMA and GHMA	5,772	5,772	3,731	5,772	5,772
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 in PHMA	0	0	0	0	0
Acres open to livestock grazing in PHMA	32,820	32,820	32,820	32,820	32,820
Acres open to livestock grazing in GHMA	80	80	80	80	80
Changes to timing, duration or frequency of permitted use	No change	Potential increase	Potential 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 BLM Authorized Officer to achieve the management and resource condition objectives for BLM-administered lands and to meet land health standards.
- 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 (e.g., fires), livestock grazing exerts repeated pressure across the landscape.
- Vegetation could be treated to allow the current level of AUMs to be maintained or increased in the project area or specific allotments.

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 permittees/lessees or impact the ability of permittees/lessees to fully utilize permitted AUMs. For example, management actions to enhance habitat for GRSG could affect livestock grazing by restricting grazing intensity, retiring permitted grazing use in some areas, or changing livestock rotation patterns, in order to maintain residual herbaceous cover in sagebrush habitat (NTT 2011). Grazing allotments containing sagebrush habitat would be managed to maximize cover and forage for GRSG, not to maximize livestock forage, which could necessitate change in livestock management.

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, such as those specified by Connelly et al. (2000).

Similarly, vegetation management designed to curb incursion of non-native annual grasses such as cheatgrass, encroachment of shrubs or woody vegetation, 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 grazers or other restriction on livestock management, these limitations could result in increased costs to permittees/lessees if changes resulted in AUM reduction or increased livestock management costs.

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 and livestock shooting. 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; thus, 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. However, limitations on cross-country travel may impact permittees/lessees ability to effectively manage livestock if exemptions are not granted for access to allotments. 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 allows for spread of cheatgrass and other invasive species (NTT 2011). Wildland fire would remove vegetation and forage over the short term. Additional impacts on livestock operations could 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). Lands and realty actions taken to protect GRSG habitat would involve avoiding or excluding ROWs (e.g., for power lines, pipelines, other structures) or land transfers in PHMA or GHMA. However, the areas outside of GRSG habitat to which ROWs are could be relocated may see an increase in construction-related effects.

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/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, limits 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 BMPs and reclamation mitigation measures would likely improve rangeland health and forage levels for livestock. Reduction in mineral development in GRSG habitat could reduce potential impacts on grazing, described above.

Management for energy and mineral development on split estate lands would not impact permittees/lessees with BLM-administered leases; however, impacts could occur to livestock grazing on private, North Dakota School Trust, 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. Short-term and long-term costs to permittees/lessees could increase, or AUMs could decrease for some permittees/lessees 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

These management requirements could result in economic impacts on individuals and the community at large, both direct and indirect. For example, if a ranch is dependent seasonally on federal forage, a reduction or eliminations of federal AUMs may create forage imbalances that produce a greater reduction in grazing capacity than just the loss of federal AUMs (Torell et al. 2002).

Some management changes may require a short-term output of cost for permittees/lessees, 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 could impact the livestock permittees/lessees economically in the short term. 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 permittees/lessees.

Retirement of privileges would likely result in a reduction in conflicts between grazing and other land uses and may improve range health and forage conditions for remaining permitted use in the area.

ACECs may be designated to protect sensitive habitat for the benefit of GRSG. Grazing availability would depend on the designated ACEC management objectives. Restrictions could include reduction in grazing in 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, motorized vehicles would be designated as limited to existing roads and trails, thereby limiting the impacts on livestock grazing from dispersed travel as discussed under *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 Solid Minerals

Due to the lack of current coal leasing in the project area and lack of coal development potential in the planning area, there is low potential for management of coal resources to have impacts on range management in any alternatives. In addition, there is no locatable mineral potential, nor any interest in developing locatable minerals within GRSG habitat. As a result, withdrawing an area or leaving an area open to locatable minerals is not expected to impact range management.

4.13.4 Alternative A

Impacts from Travel and Transportation Management

Under Alternative A, as under all alternatives, motorized travel would be limited to designated routes, and site-specific travel management planning would be developed, limiting disturbance to livestock. Effects would be the same as those described above in *Nature and Type of Effects*.

Impacts from Recreation

Under this alternative, there would be no restrictions to SRPs in the decision area; therefore, livestock could be disturbed by recreational activities or groups in the planning area. However, due to the current lack of SRPs and limited interest in future SRPs in the planning area, impacts would likely be minimal. Human disturbance and rangeland degradation from general recreational activities would be as described under *Nature and Type of Effects*.

Impacts from Lands and Realty

Under Alternative A, no new ROW exclusion or avoidance areas would be present in the decision area. Disturbance of livestock could result from development of ROWs; therefore, this alternative would have the highest potential for impacts from lands and realty on range management, and impacts would be as described under *Nature and Type of Effects*, including dust, displacement, and noxious weeds.

Impacts from Range Management

Under Alternative A, livestock grazing would be allowed on all BLM-administered lands identified as authorized (approximately 32,945 acres in the planning area, including 32,900 acres in PH) for a total 28 allotments with 5,780 AUMs in the planning area, including 27 allotments with 5,772 AUMs in GRSG habitat (see **Table 4-25**). All permits/leases under Alternative A would be required to meet or make progress towards meeting standards defined in the North and South Dakota Standards for Rangeland Health and Guidelines for Livestock Grazing Management (BLM 1997). Lands would be maintained and restored to maintain healthy native plant and animal species, and efforts to manage public rangeland under drought conditions would be directed first to allotments with resource concerns; therefore, impacts on grazing management options or permitted AUMs would most likely change in these areas (approximately 1,309 acres) found to be not meeting land health standards as a result of livestock grazing at last assessment.

Similarly, the focus in riparian areas and wetlands would be to improve functioning-at-risk and non-functioning riparian areas and wetlands towards PFC. As described under *Nature and Type of Effects*, 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. Such changes in grazing management options may result in an increase in costs and time required for permittees/lessees in these areas.

Range improvements, including fences and vegetation treatments as well as water developments, would be allowed in the decision area when needed to support grazing systems or improve livestock distribution, allowing for options for management for permittees/lessees. Fences would be constructed to protect and benefit livestock and wildlife, but no specific provision are included for GRSG so additional costs could be limited.

Impacts from Fluid Minerals

Under Alternative A, no lands in the planning area would be closed to leasing. The largest number of BLM-administered lands would be open to fluid mineral leasing with standard terms and conditions; approximately 30,450 acres would also be open to livestock grazing; therefore, conflicts between grazing and mineral development would be more likely to occur in this area.

Table 4-26, Fluid Mineral Impacts on Range Management by Alternative, provides information on areas open to grazing and mineral development and areas open with stipulations by alternative.

Table 4-26
Fluid Mineral Impacts on Range Management by Alternative

Management Action	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Acres open to grazing and open to fluid mineral development (BLM surface and federal minerals)	30,450	80	0	30,450	30,450
Acres open to grazing and closed to fluid mineral development (BLM surface and federal minerals)	0	30,370	30,450	0	0
Acres open to grazing with NSO/CSU/TL restrictions for fluid mineral development (BLM surface and federal minerals)	27,267	0	0	30,370	30,370

Protection for GRSG would be provided from CSU, TL, and NSO stipulations. Restrictions would also be applied through site-specific conditions on approval for leases. While some decrease in disturbance to range management could occur as a result of surface use restrictions, there is the potential for disturbance in the majority of the decision area as discussed under *Nature and Type of Effects*. Of the area open for mineral development, approximately 27,267 acres open to grazing would be available for leasing with stipulations under Alternative A (see **Table 4-26**).

Overall, oil and gas management would have limited impacts on range management under Alternative A because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on disturbance to livestock or impact range management activities.

Impacts from Solid Minerals

Under Alternative A, no portions of the decision area would be withdrawn from mineral entry, salable-non energy mineral application or closed to mineral material development. As a result there is potential for impacts on range management from mineral development as described under *Nature and Type of Effects.*

Impacts from Mineral Split Estate

Across all alternatives, federal 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, standard regulations are in place for mineral development on non-federal surface lands, including permitting and reclamation requirements.

Impacts from Fire and Fuels Management

Under Alternative A, fire could be utilized as a resource for vegetation manipulation for range management as needed, allowing for options for management for permittees/lessees. Impacts would vary based on site-specific management actions, but fire could be utilized to maintain optimal forage for livestock in the long term.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative A, no specific direction for GRSG is provided in the RMP for restoration and management actions. Vegetation could be managed to improve forage and impacts on range management from vegetation would be minimal.

Impacts from ACECs

No new ACECs would be designated under Alternative A; therefore, there would be no impacts on range management.

4.13.5 Alternative B

Impacts from Travel and Transportation Management

In PHMA and GHMA, motorized travel would be limited to existing roads as described under Alternative A. Travel plans to be completed (within five years of ROD signing) would analyze PHMA for the need for road closures, and limitations would be implemented during development of new roads. Some reduction in routes and limitations on new routes as well as upgrades to existing routes would be added compared to Alternative A, which could result in indirect reduction in disturbance to livestock in PHMA.

Impacts from Recreation

SRPs in PHMA would be limited when they were found to have negative impacts on GRSG; potentially limiting disturbance to grazing from recreational use. Due to the current lack of SRPs and limited interest in future SRPs in the planning area, impacts would likely be minimal.

Impacts from Lands and Realty

Under Alternative B, management of PHMA as an exclusion area for new ROWs authorizations could slightly reduce the potential for disturbance of livestock in this area, which covers the majority of the allotments in the planning area (and 26 out of 27 allotments in GRSG habitat).

Impacts from Range Management

Under Alternative B, as in all alternatives, approximately 32,945 acres in the planning area (including 32,820 acres in PHMA) would be open to grazing. A total of 28 allotments with 5,780 AUMs would be authorized (including 27 allotments with 5,772 AUMs in PHMA or GHMA), the same as Alternative A (see **Table 4-25**). Under Alternative B, all GRSG habitat objectives and management would be incorporated into AMP and permit renewals; therefore, impacts would occur at a site-specific level during the permit renewal process. Completion of land health assessments and permits would be prioritized within PHMA, particularly those with the best opportunity to conserve, enhance or restore habitat for GRSG. As a result, impacts on range management would be most likely to occur in these areas.

Under Alternative B, management actions (grazing decisions, AMP/Conservation Plan development, or other agreements) to modify grazing management would be made to meet seasonal GRSG habitat requirements (Connelly et al. 2011a). As described under *Nature and Type of Effects*, this could require changes to management of a given allotment such as in class of livestock permitted, changes to livestock rotation or season of grazing permitted. Such changes would have the potential to decrease management options and, therefore, result in increased time and costs required for permittees/lessees.

Work would be done with area ranchers so that operations within GRSG habitat could be planned as single units; therefore, the time and cost required to implement these changes could be reduced, although they would still be higher than under current conditions where no change would be required.

In addition, retirement of permitted grazing use from willing permittees would be an option in PHMA. As described under *Nature and Type of Effects*, conflicts with other land uses would be reduced and land health and forage could be improved.

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 when treatments would not benefit GRSG, and the ability to fully utilize permitted AUMs could be impacted in such cases. Land health assessment utilizing ESDs would be required to determine if standards of rangeland health as well as GRSG habitat objectives were being met. In many cases, treatments may improve both rangeland health and GRSG habitat; therefore, impacts on rangeland management would be minimized.

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 to manage distribution of livestock so that pressure on these systems is limited this could result in increased costs or time by permittees.

Specific objectives to conserve, enhance, or restore PHMA based on ESDs would be developed and land health assessment to measure progress towards these objectives would be conducted. If it was found that allotments were not meeting standards, changes to grazing systems or AUM levels could be required and may result in increased costs or time for permittees.

Under Alternative B, structural range improvements such as fences and exclosures would be allowed in PHMA, but must be developed to conserve or enhance GRSG habitat. In addition, fences would require flagging to lessen risk for GRSG impacts. The time and cost of building or maintaining these structures may be increased as compared with Alternative A. Similarly, new water developments from diversion from spring or seep sources would only be permitted when GRSG habitat would also benefit. The ability to construct these developments would be strictly limited.

Impacts from Fluid Minerals

Under Alternative B, PHMA would be closed to fluid mineral leasing, with no new nominations accepted upon termination of existing leases. BLM-administered lands open to fluid mineral leasing with standard terms and conditions would cover 80 acres, more than 99 percent less than Alternative A (see **Table 4-26**). For existing leases, conservation measures would prohibit surface occupancy on federal leases within PHMA during certain time periods in order to preserve GRSG habitat. As a result, disturbance and impacts on range management would be reduced.

In addition, similar to Alternative A, the limited reasonably foreseeable development of oil and gas would result in minimal impacts on range management from fluid mineral development.

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 mineral material development, nonenergy leasable mineral leasing and recommended for withdrawal from mineral leasing. As a result, disturbance from mineral development and impacts on range management would decrease as all but one allotment in the GRSG habitat in the planning area is located within PHMA. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on range management but it would preclude any potential future development.

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, fuel treatments would be designed and implemented in PHMA to protect existing GRSG ecosystems, including the potential for livestock utilization to strategically reduce fine fuels. As discussed under *Nature and Type of Effects*, fuels projects and fire suppression to protect sagebrush ecosystems and associated GRSG habitat would benefit livestock grazing where areas available to grazing overlap this habitat. This would be due to a long-term reduction in the likelihood of high intensity wildfire. Short-term fuels reduction projects may temporarily reduce available forage on a site-specific basis. As a result, there is the potential for the need for grazing system modification to meet GRSG objectives, with increased costs or time for permittees. Suppression of wildland fires could reduce disruption of grazing in the short term but may not provide optimal livestock forage conditions in the long term.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative B, restoration projects would be designed and prioritized to benefit GRSG. In PHMA, implementation of projects to remove non-native species and improve habitat could improve livestock forage but may also result in the need to adjust grazing management with potential for increased costs or time for permittees.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.13.6 Alternative C

Impacts from Travel and Transportation Management

Under Alternative C, additional restriction on road construction would be implemented, new road construction within four miles of active GRSG leks would be prohibited, and new road construction in PHMA and GHMA would be avoided. As a result, new disturbance in allotments within PHMA and GHMA would be limited. Furthermore, due to the reduction of grazing in PHMA, impacts from travel management would be limited.

Impacts from Recreation

Impacts from recreation on grazing would be limited due to reduction of grazing in PHMA under Alternative C.

Impacts from Lands and Realty

Under Alternative C, impacts would be similar to those described for Alternative B but would be applied across PHMA and GHMA. Due to the restrictions on ROW development and the reduction of grazing in PHMA under Alternative C, disruption of grazing from lands and realty actions would be limited.

Impacts from Range Management

Under Alternative C, as in all alternatives, approximately 32,945 acres in the planning area (including 32,820 acres in PHMA) would be available for livestock grazing. However, permitted AUMs in the Big Gumbo area would be reduced by 50 percent (3,739 total AUMs, including 3,731 AUMs on 4 allotments in PHMA or GHMA, a total reduction of 36 percent of AUMs in the planning area).

The reduction in AUMs in PHMA would result in a potential for economic impacts on permittees/lessees both in the short and long term. As discussed under *Nature and Type of Effects*, permittees/lessees 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. Reduction in permitted AUMs would also impact ability of permittees/lessees to utilize seasonal rotations or other management strategies that utilize both public and private lands. Permittees/lessees who currently rotate pastures between private and public lands may need to construct additional water developments or other structural range improvements on private pastures, resulting in increased time and costs.

In the long term, there is potential for indirect impacts in the Big Gumbo area as a result of changes to vegetation communities due to the reduction in grazing. Should the vegetation class represent non-optimal conditions for livestock, adjustments to management could be required.

As a result of reduction in grazing, there is also the potential for increased conflicts between grazing and other resources and resource uses on lands of other surface ownership should livestock grazing increase in this area.

Management actions for range management, including those for incorporation of GRSG standards and objectives, land health assessments, and changes to grazing systems to meet GRSG objectives, would be similar to those described for Alternative B, but would be applied to GHMA as well as PHMA in many instances. The practical application of this difference on range management, however, would be limited due to the presence of the majority of the area open to grazing and active allotments in PHMA (32,820 out of 32,900 acres in PHMA or 99.8 percent).

Similarly, management of riparian areas and wet meadows would be as described for Alternative B, but apply to all PHMA and GHMA acreages instead of just at riparian and wetland meadow sites. Alternative C also includes a provision that at least six inches of stubble height must remain on all riparian/meadow area herbaceous species at all times. As a result, further restrictions could be placed on permittees, impacting their ability to distribute livestock and fully utilize allotted AUMs.

The ability to conduct vegetation treatments for the purpose of enhancing livestock forage as well as structural range improvements would be the most limited under this alternative for both PHMA and GHMA. As a result, the ability of permittees to effectively distribute livestock could be impacted, resulting in increases in cost or time for management.

Impacts from Fluid Minerals

Under Alternative C, both PHMA and GHMA would be closed to fluid mineral leasing. Restrictions as discussed under Alternative B would be applied but would be extended to GHMA as well as PHMA. There would be no overlap of areas open to grazing and also open to fluid mineral development under this alternative (see **Table 4-26**). As a result, impacts from fluid minerals on range management would be the lowest under this alternative.

In addition, similar to Alternative A, the limited reasonably foreseeable development of oil and gas would result in minimal impacts on range management from fluid mineral development.

Impacts from Solid Minerals

Under Alternative C, restriction on mineral development would be the broadest of all alternatives, with limitations on leasing and development as described in Alternative B, but expanded to GHMA as well as PHMA. Impacts from solid minerals on range management would be minimal under this alternative due to the limitations on nonenergy leasables and mineral materials, and the reduction of livestock grazing from in PHMA.

Impacts from Mineral Split Estate

As in Alternative A, there is no impact of split estate mineral development on BLM 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 Alternative C, management actions would be similar to that described for Alternative B, but applied to PHMA and GHMA and with additional restrictions on the use of fuels as vegetation treatment. Impacts on range management, however, would be reduced under this alternative, compared to Alternative A, due to the reduction in grazing in Alternative C.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative C, impacts from habitat and vegetation management would be similar to that described under Alternative B, but applied to both PHMA and GHMA. Due to the reduction in grazing in this alternative, however, impacts would be reduced in scale.

Impacts from ACECs

Under Alternative C, the 32,900 acres of PHMA on BLM-administered lands would be designated as an ACEC to protect GRSG. Potential impacts in this area would be as described under *Nature and Type of Effects*; however, due to the reduction of grazing in PHMA, impacts would be limited.

4.13.7 Alternative D

Impacts from Travel and Transportation Management

Under Alternative D, impacts would be similar to those described under Alternative B but would apply both to PHMA and GHMA. As a result, disturbance from travel management on livestock grazing would be limited.

Impacts from Recreation

Impacts from recreation would be the same as Alternative B.

Impacts from Lands and Realty

Under Alternative D, PHMA would be managed as a ROW avoidance area and additionally, as an exclusion area for new wind and solar energy ROW authorizations. ROWs would be allowed in GHMA (wind and solar energy would be avoidance) with measures to minimize surface disturbing and disruptive activities. Impacts on livestock grazing from ROW development would therefore be decreased as compared to Alternative A.

Impacts from Range Management

In Alternative D, as in all alternatives 32,945 acres (including 32,820 acres in PHMA) would be open to grazing. A total of 28 allotments with 5,780 AUMs would be authorized (including 27 allotments with 5,772 AUMs in PHMA or GHMA), the same as Alternative A (see **Table 4-25**).

GRSG habitat objectives and management considerations would be incorporated into BLM grazing allotments through AMPs or permit renewals, although under Alternative D, standards would be developed at the field office level in partnership with NDGFD and USFWS. As a result, impacts on grazing systems could occur upon lease renewal as discussed in Alternative B, but coordination with the NDGFD and the USFWS should decrease conflicts in standards and provide a location appropriate framework, assisting permittees ability to adopt these standards and reducing impacts.

Land health assessments would be required as discussed under Alternative B, with additional requirements to prioritize assessments for other priority species and riparian habitat in addition to GRSG with potential for broader impacts in the near-term in the planning area as more allotments would be prioritized for assessment.

Riparian and wetland habitat would be managed to move towards or maintain PFC and strive towards GRSG habitat objectives; however, under Alterative D,

objectives would be set with reference state vegetation relative to the ESD. Therefore, ability of permittees to meet these standards may be improved and the need to adjust management reduced.

Rangeland improvements under Alternative D would be permitted with limitations, with impacts as described in Alternative B. Overall, impacts would vary on a site-specific basis.

Impacts from Fluid Minerals

Under Alternative D, areas open and closed to leasing would be the same as described under Alternative A (see **Table 4-26**). However, prohibitions of surface occupancy and use within PHMA and CSU stipulations for GHMA would limit the impacts on range management as compared to Alternative A.

In addition, similar to Alternative A, the limited reasonably foreseeable development of oil and gas would result in minimal impacts on range management from fluid mineral development.

Impacts from Solid Minerals

Under Alternative D, impacts from solid mineral development would be similar to those described under Alternative A; however, PHMA would be closed to mineral material development, with reduction in surface disturbance and road use and related impacts on livestock. Some additional site-specific restrictions could occur in the form of RDFs. Impacts on livestock grazing from mineral development would therefore be reduced as compared with Alternative A. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on range management but it would preclude any potential future development.

Impacts from Mineral Split Estate

Under Alternative D, as described in Alternative A, there would be no impact on BLM-permittees. Conservation measures would be applied when federal action (mineral exploration or development) occurs, resulting in some potential reduction in disturbance for livestock on non-federal lands.

Impacts from Fire and Fuels Management

Under Alternative D, impacts would be similar to those described under Alternative B.

Impacts from Habitat Restoration and Vegetation Management

Under Alternative D, projects to reduce conifer encroachment would also benefit range management by improving forage conditions in the long term. As described under Alternative B, changes to livestock grazing systems could be required for post restoration management with potential impacts on costs or time for management by permittees.

Impacts from ACECs
Impacts would be the same as under Alternative A.

4.13.8 Proposed Plan Amendment

Impacts from Travel and Transportation Management
Impacts under the Proposed Plan Amendment would be similar to those described under Alternative D. The Proposed Plan Amendment would temporarily close or restrict routes or areas. As discussed under *Nature and Type of Effects*, limitations on cross-country travel may impact permittees' and lessees' ability to effectively manage livestock.

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 recreation, 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 (80 acres) by managing GHMA as ROW avoidance for high-voltage transmission lines and large pipelines. In addition, as discussed in **Section 2.6.2**, under the Proposed Plan Amendment, the BLM would enforce density and disturbance caps and would apply a lek buffer when approving actions in GRSG habitat. A regional mitigation strategy would also be implemented to achieve a net conservation gain to GRSG. These actions would minimize disturbance of livestock grazing from ROW development, as described under *Nature and Type of Effects*, as compared to Alternative A.

Impacts from Range Management
Under the Proposed Plan Amendment, as in all alternatives, 32,945 acres (including 32,820 acres in PHMA) would be open to grazing. A total of 28 allotments with 5,780 AUMs would be authorized (including 27 allotments with 5,772 AUMs in PHMA or GHMA), the same as Alternative A (see **Table 4-25**).

Impacts would be similar to those described under Alternative D. As under Alternative D, GRSG habitat objectives and management considerations would be incorporated into BLM grazing allotments through AMPs or permit renewals.

Impacts would occur on an allotment scale as changes to land assessments, permit renewal, and related management changes were implemented. existing permits and leases in PHMA would have priority, focusing on areas not meeting Land Health Standards and those containing riparian areas, including wet meadows. There would be a timeline for changes in management following this

priority. Specific areas meeting these criteria would be determined at the implementation level.

Based on current information, approximately 1,309 acres did not meet the BLM's Standards for Rangeland Health and approximately 1,313 acres, or 0.4 percent of land open to grazing, falls within riparian area or wet meadows.

Adjustments to grazing management or authorized grazing use level would be applied on a site-specific basis and would be tailored to achieve Land Health Standards and specific management thresholds, based on GRSG habitat objectives (**Table 2-2**) and on habitat type in the areas assessed (that is breeding, nesting, and wintering). Site-specific review of seasonal habitat type would be required for land assessment. Acres in nesting habitat may be more likely to require changes to grazing management, due to the desired conditions for this habitat type. This would include perennial grass height of at least 7 inches. The level and intensity of impacts would vary by site.

As with other alternatives, under the Proposed Plan Amendment, voluntary retirement 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.

This may result in long-term reduction of overall available AUMs, with a potential for economic impacts on local communities that depend on livestock grazing. Economic impacts are further discussed in **Section 4.22**, Social and Economic Conditions.

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.

Impacts from Fluid Minerals

Impacts would be similar to those described under Alternative D. In addition, under the Proposed Plan Amendment, priority for leasing and development of fluid minerals would be given for non-PHMA and GHMA habitat. The BLM would also enforce density and disturbance caps and would apply a lek buffer when approving actions in PHMA. A regional mitigation strategy would also be implemented to achieve a net conservation gain for GRSG. As a result, the overall level of development and related impacts on range management would be limited in GRSG habitat, but it could shift to areas outside of GRSG habitat. Similar to Alternative A, the limited reasonably foreseeable development of oil and gas would result in minimal impacts overall on range management from fluid mineral development.

Impacts from Solid Minerals

Impacts would be similar to those described under Alternative D. In addition, the BLM would also enforce density and disturbance caps and would apply a lek

buffer when approving actions in PHMA. A regional mitigation strategy also would be implemented to achieve a net conservation gain for GRSG. As a result, the overall level of development and related impacts on range management would be limited in GRSG habitat but could shift to areas outside of GRSG habitat. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on range management but would preclude any potential future development.

Impacts from Mineral Split Estate
Impacts would be the same as described under Alternative D.

Impacts from Fire and Fuels Management
Impacts would be the same to those described under Alternative B.

Impacts from Habitat Restoration and Vegetation Management
Impacts would be similar to that described under Alternative D. Conifer removal would be extended to include those encroaching onto sagebrush habitat. This action would benefit range management by improving forage conditions in the long term.

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. In this case, there are no existing ACECs, and the proposed GRSG ACEC would be designated to protect relevant and important values associated with PHMA. As such, this analysis focuses on the impacts on relevant and important PHMA from either the special management derived from ACEC designation or, under alternatives where the ACEC is not proposed for designation, the management actions and allocations for other resources and resource uses. All impacts discussed are direct impacts, though some may not occur immediately after implementation of management actions.

Indicators
Table 4-27, Comparison of ACEC Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on ACECs under each alternative.

Assumptions
The analysis includes the following assumptions:

- Permitted activities would not be allowed to impair the relevant and important values for which the ACEC is 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 mine plan to mitigate unnecessary and undue degradation.

Table 4-27
Comparison of ACEC Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Total acreage within an ACEC boundary	0	0	32,900	0	0
Specific management provisions designed to protect the relevant and important values for which the ACEC was designated	No change	No change	50% reduction in grazing	No change	No change

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 an 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**, Special Status Species—Greater Sage-Grouse, for a discussion of impacts on GRSG habitat.

Implementing management for the following resources would have negligible or no impact on ACECs and are therefore not discussed in detail: travel and transportation management, recreation, lands and realty, range management, fluid minerals, solid minerals, mineral split estate, fire and fuels management, and habitat restoration/vegetation management.

4.14.3 Impacts Common to All Alternatives

Alternative C is the only alternative under which the BLM proposes an ACEC. Therefore, there are no impacts on ACECs that would be common to all alternatives.

Table 4-28, ACECs by Alternative, provides a comparison of ACEC acreages by alternative.

Table 4-28
ACECs by Alternative

ACEC Name	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
GRSG Conservation Area (acres)	0	0	32,900	0	0

4.14.4 Alternative A

Impacts from ACECs

There would be no impact on ACECs under Alternative A. The BLM would continue to manage BLM-administered lands in accordance with existing management policies. Refer to **Section 4.3** for a discussion of impacts on habitat.

4.14.5 Alternative B

Impacts from ACECs

There would be no impact on ACECs under Alternative B. The BLM would implement new management strategies for the protection of PHMA, but without establishing an ACEC. Refer to **Section 4.3** for a discussion of impacts on GRSG habitat.

4.14.6 Alternative C

Impacts from ACECs

The designation and management of a new ACEC under Alternative C (**Table 4-27**) could be used as a way to protect GRSG habitat. Management prescriptions to protect habitat areas would be similar to Alternatives B and D and the Proposed Plan Amendment; however, Alternative C would include the following:

- A 32,900-acre ACEC administrative boundary designation (includes all PHMA)
- A restriction on new road construction within 4 miles of a lek (which covers 32,342 acres, 98 percent of the decision area)
- Closure to fluid mineral leasing
- 50 percent reduction in livestock grazing AUMs on the largest piece of BLM-administered lands in the ACEC (four allotments)

Refer to **Section 4.3** for a discussion of impacts on GRSG habitat. In addition, ACEC designation can 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.

As discussed in that section, by reducing AUMs, Alternative C would reduce the risk of trampling and loss of herbaceous understory cover in GRSG nesting habitat; however, this could contribute to increased fuel loading and risk of wildfire in these areas. Also, as discussed in **Section 4.3**, closing the ACEC to fluid minerals leasing would have a negligible effect; the surface disturbance and well densities do not change significantly among the alternatives. This is because most of the high development potential has already been leased and because of the small amount of BLM minerals in the planning area (refer to **Table 4-6**).

4.14.7 Alternative D

Impacts would be the same as those described for Alternative A.

4.14.8 Proposed Plan Amendment

Impacts would be the same as those described for Alternative A.

4.15 AIR RESOURCES

4.15.1 Methods and Assumptions

Indicators

Table 4-29, Comparison of Air Resource Indicators by Alternative, compares the indicators that were used to analyze the effects on air resources under each alternative.

Table 4-29
Comparison of Air Resource Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres closed to fluid minerals	0	61,197 (7,056 in high potential areas)	66,293 (7,072 in high potential areas)	0	0
Acres closed to new road construction	0	0	32,342	0	0

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 2013). 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 2013).

Actions that increase emissions of air pollutants can result in negative effects on AQRVs, including visibility and atmospheric deposition. An increase in SO_2, NO_x, 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 2012e). Ozone, which is formed by a chemical reaction between volatile organic compounds and NO_x, contributes to smog, which limits visibility (EPA 2012f).

Particulate matter emissions (fugitive dust) are caused by agriculture, earth-moving activities, wind erosion, 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: recreation, lands and realty, range management, solid minerals, mineral split estate, habitat restoration/vegetation management, and ACECs.

4.15.3 Impacts Common to All Alternatives

There are no impacts that are common to all alternatives.

4.15.4 Alternative A

Air resource impacts under Alternative A are 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.

4.15.5 Alternative B

Impacts from Travel and Transportation Management

Under Alternative B, BLM management prescriptions to protect GRSG habitat would result in the potential for more access limitations when compared to Alternative A. The BLM would develop a travel and transportation management plan within five years of the ROD, should the BLM determine there is a need to close certain routes. Also under Alternative B, the BLM would only allow new roads where access to valid existing rights is necessary and does not currently exist, restricting new roads and/or ROWs and access through PHMA.

Construction of new roads 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. Limiting new road construction and closing roads would reduce the potential for short and long-term effects on air resources. Under Alternative B no acres would be closed to new road construction.

Impacts from Fluid Minerals

Under Alternative B, 61,197 acres would be closed to fluid mineral development, including 7,056 acres of high oil and gas potential. Under Alternative B, it is projected that 26 new exploratory and development wells would be drilled on federal oil and gas estate over 20 years. Of these new wells, 21 are expected to be producing oil and gas wells through 2029 (see **Table 4-1**). This represents a 57 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b).

Oil and gas development results in short-term and long-term emissions of criteria and hazardous air pollutants from vehicle use, drill rigs, construction equipment use, flaring or venting of natural gas, and disturbance of soils (EPA 2012g). Closing areas of high potential development would have the potential to result in fewer impacts on air resources, as compared to Alternative A, due to decreased emissions associated with exploration and development of fluid minerals.

Impacts from Fire and Fuels Management

Fires, particularly uncontrolled fires, can significantly affect air quality by introducing large amounts of particulate, carbon monoxide, atmospheric mercury, ozone precursors, and volatile organic compounds into the air, affecting both visibility and human health (BC Air Quality 2013). Under Alternative B, fuels treatment would be focused on protecting existing sagebrush in PHMA, and efforts would be made to ensure sagebrush canopy cover was not reduced to less than 15 percent. This management action restricts the amount of vegetation that can be burned in a prescribed burn, or that can be allowed to burn in an unplanned natural ignition. This would result

in less likelihood of human-caused fires occurring compared with Alternative A. This would result in 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, while prescribed burning would cause increased emissions and temporarily degrade air resources.

4.15.6 Alternative C

Impacts from Travel and Transportation Management

Under Alternative C, the BLM would close 32,342 acres of the planning area to new road construction compared with Alternative A. Prohibiting new road construction would likely result in fewer impacts on air resources, due to decreased emissions associated with road construction and use.

Impacts from Fluid Minerals

Under Alternative C, 66,293 acres would be closed to fluid mineral development, including 7,072 acres of high oil and gas potential. Under Alternative C, it is projected that 25 new exploratory and development wells would be drilled on federal oil and gas estate over 20 years. Of these new wells, 21 are expected to be producing oil and gas wells through 2029 (see **Table 4-1**). This represents a 57 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b).

As described under Alternative B, closing areas of high potential development would likely result in fewer impacts on air resources due to decreased emissions associated with exploration and development of fluid minerals.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be the same as described for Alternative B.

4.15.7 Alternative D

Impacts from Travel and Transportation Management

Under Alternative D, BLM management prescriptions to protect GRSG habitat would result in the potential for more impacts on travel and transportation management compared to Alternative A and would be similar to those described under Alternative B. Prohibiting new road construction would likely result in fewer impacts on air resources, due to decreased emissions associated with road construction and use. Under Alternative D no acres would be closed to new road construction.

Impacts from Fluid Minerals

Similar to Alternative A, under Alternative D, the BLM would not close any acres to fluid mineral leasing. Under Alternative D, it is projected that 51 new

exploratory and development wells would be drilled on federal oil and gas estate in the short term. Of these new wells, 42 are expected to be producing oil and gas wells in the long term (see **Table 4-1**). This represents a 14 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b). Impacts on air resources would be similar to those discussed under Alternative A.

Impacts from Fire and Fuels Management

Under Alternative D, fuels treatment would be focused on protecting existing sagebrush in PHMA, and efforts would be made to ensure sagebrush canopy cover was not reduced to less than 8 percent. Like Alternative B, management actions would decrease the likelihood of human-caused fires. Overall, fires may be less likely to occur compared with Alternative A; this would result in fewer fire-related impacts on air resources.

4.15.8 Proposed Plan Amendment

Impacts from Travel and Transportation Management

Impacts under the Proposed Plan Amendment would be the same as those described under Alternative D.

Impacts from Fluid Minerals

Impacts under the Proposed Plan Amendment would be the same as those described under Alternative D.

Impacts from Fire and Fuels Management

Impacts would be the same as Alternative B.

4.16 CLIMATE

4.16.1 Methods and Assumptions

Indicators

Table 4-30, Comparison of Climate Change Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects related to climate change under each alternative.

Assumptions

The analysis includes the following assumptions:

- There is a correlation between global concentrations of GHGs and climate change.

Table 4-30
Comparison of Climate Change Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres closed to fluid minerals	0	61,197 (7,056 in high potential areas)	66,293 (7,072 in high potential areas)	0	0
Acres closed to new road construction	0	0	32,342	0	0
Contribution to GHG emissions	No change	Less likely to contribute to GHG emissions	Less likely to contribute to GHG emissions	Less likely to contribute to GHG emissions	Less likely to contribute to GHG emissions

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 state, national, or global GHG emissions. 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: recreation, lands and realty, range management, solid minerals, mineral split estate, habitat restoration/vegetation management, and ACECs.

4.16.3 Impacts Common to All Alternatives

There are no impacts that are common to all alternatives.

4.16.4 Alternative A

Climate impacts under Alternative A are identical to impacts resulting from current management as described above in *Nature and Type of Effects*. No changes to GHG emissions would occur.

4.16.5 Alternative B

Impacts from Travel and Transportation Management

Under Alternative B, BLM management prescriptions to protect GRSG habitat would result in the potential for more access limitations when compared to Alternative A. The BLM would develop a travel and transportation management plan within five years of the ROD, should the BLM determine there is a need to close certain routes. Also under Alternative B, the BLM would only allow new roads where access to valid existing rights is necessary and does not currently exist, restricting new roads and/or ROWs and access through PHMA.

No acres under Alternative B would be closed to new road construction. Prohibiting new road construction and closing roads would have the potential to reduce GHG emissions associated with road construction and use. Road construction and use emits GHGs through the combustion of fuel in vehicles and construction equipment.

Impacts from Fluid Minerals

Under Alternative B, 61,197 acres would be closed to fluid mineral development, including 7,056 acres of high oil and gas potential. Under Alternative B, it is projected that 26 new exploratory and development wells would be drilled on federal oil and gas estate over 20 years. Of these new wells, 21 are expected to be producing oil and gas wells through 2029 (see **Table 4-1**). This represents a 57 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b).

Oil and gas development results in short-term and long-term emissions of GHGs during fuel combustion in vehicles, drill rigs, and construction equipment, as well as GHG leaks from equipment (EPA 2012g). Oil and gas activities also remove vegetation and releases sequestered carbon. Closing areas of high potential to development would have the potential to result in fewer releases of GHGs in the planning area as compared to Alternative A.

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 2012h, page 7-21 to 7-22). Fires also remove vegetation that acts as a carbon sink. Under Alternative B, fuels treatment would be focused on protecting existing sagebrush in PHMA, and efforts would be made to ensure sagebrush canopy cover was not reduced to less than 15 percent. This management action restricts the amount of vegetation that can be burned in a prescribed burn or that can be allowed to burn in an unplanned natural ignition. Human-caused fires would be less likely to occur compared with Alternative A, which would result in lower GHG emissions and smaller contributions to climate change than under Alternative A.

4.16.6 Alternative C

Impacts from Travel and Transportation Management

Under Alternative C, the BLM would close 32,342 acres of the planning area to new road construction compared with Alternative A. Prohibiting new road construction would have the potential to reduce GHG emissions associated with road construction and use.

Impacts from Fluid Minerals

Under Alternative C, 66,293 acres would be closed to fluid mineral development, including 7,072 acres of high oil and gas potential. Under Alternative C, it is projected that 25 new exploratory and development wells would be drilled on federal oil and gas estate over 20 years. Of these new wells, 21 are expected to be producing oil and gas wells through 2029 (see **Table 4-1**). This represents a 57 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b).

As described under Alternative B, closing areas of high potential to development would have the potential to reduce GHG emissions and lessen climate change impacts.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be the same as described under Alternative B.

4.16.7 Alternative D

Impacts from Travel and Transportation Management

Under Alternative D, BLM management prescriptions to protect GRSG habitat would result in the potential for more impacts on travel and transportation management compared to Alternative A and would be similar to those described under Alternative B. Under Alternative D no acres would be closed to new road construction. Road construction and use emits GHGs through the combustion of fuel in vehicles and construction equipment.

Impacts from Fluid Minerals

Similar to Alternative A, under Alternative D, the BLM would not close any acres to fluid mineral leasing, though a slight decrease in the number of wells is projected. Under Alternative D, it is projected that 51 new exploratory and development wells would be drilled on federal oil and gas estate in the short term. Of these new wells, 42 are expected to be producing oil and gas wells in the long term (see **Table 4-1**). This represents a 14 percent decrease in projected producing wells on federal oil and gas estate compared with Alternative A (BLM 2013b). Climate change impacts would be similar to those discussed under Alternative A.

Impacts from Fire and Fuels Management

Similar to Alternative B, fuels treatment would be focused on protecting existing sagebrush in PHMA, and efforts would be made to ensure sagebrush canopy cover was not reduced to less than eight percent. Fires may be less likely to occur compared with Alternative A, which would result in fewer fire-related GHG emissions and reduce climate change impacts.

4.16.8 Proposed Plan Amendment

Impacts from Travel and Transportation Management

Impacts under the Proposed Plan Amendment would be the same as those described under Alternative D.

Impacts from Fluid Minerals

Impacts under the Proposed Plan Amendment would be the same as those described under Alternative D.

Impacts from Fire and Fuels Management

Impacts under the Proposed Plan Amendment would be the same as those described under Alternative B.

4.17 SOIL RESOURCES

4.17.1 Methods and Assumptions

Indicators

Table 4-31, Comparison of Soils Resources Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on soils resources under each alternative. Conservation measures for GRSG would have only beneficial impacts on soils; therefore, indicators are described in a way that measures to what degree soils would receive protections.

Assumptions

The analysis includes the following assumptions:

- Soils of the BLM-administered lands will be managed to maintain productivity and promote sustained yields while keeping erosion at minimal/acceptable levels and preventing physical or chemical degradation.
- Proposed surface-disturbing projects will be analyzed to determine suitability of soils to support or sustain such projects and designed to minimize soil loss.
- Management actions and objectives will be consistent with soil resource capabilities.

Table 4-31
Comparison of Soils Resources Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Livestock grazing AUMs	5,780	5,780	3,739	5,780	5,780
Acres in ROW exclusion	0	32,900	32,980	32,900[1]	32,900[2]
Acres closed to fluid mineral leasing	0	61,197	66,293	0	0
Acres found available for further consideration of coal leasing with surface restrictions	0	87,443	166,207	87,443	87,433

[1]PHMA would be exclusion areas for new ROW wind energy developments.
[2]PHMA would be exclusion areas for new ROW wind and solar energy developments.

- 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 to soil health.

4.17.2 Nature and Type of Effects

Activities that disturb, compact, contaminate 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 livestock grazing, recreation, mineral resource activities, ROW development (including renewable energy), and road construction.

Soil resources can be protected by management actions that avoid or exclude surface-disturbing activities, such as management actions derived from the GRSG Regional Mitigation Strategy (**Appendix E**). An example is mitigation guidance for GRSG habitat that includes avoidance, minimization, or compensation for actions disturbing GRSG habitat.

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 Plans of Operation that address site-specific environmental concerns and require mitigation to stabilize soil, to prevent unnecessary erosion, and to revegetate disturbed surfaces.

Grazing activities are known to alter vegetative and biological soil crust communities. Livestock grazing can cause adverse impacts on soils, particularly during high-intensity low-duration grazing systems in small pastures. Modified grazing management practices 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.

Direct and indirect impacts from resource programs on soil resources are generally mitigated by avoiding or minimizing the impact using designations such as ROW exclusion and avoidance areas, and stipulations such as NSO and CSU. Impacts that cannot be avoided are generally minimized by the application of COAs, RDFs, BMPs, and standard operating procedures.

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.

Implementing management for the following resources would have negligible or no impact on soil resources and are therefore not discussed in detail: mineral split estate; fire and fuels management; habitat restoration/vegetation management; and ACECs.

4.17.3 Impacts Common to All Alternatives

Table 4-32, Quantitative Impact Summary by Alternative for Soils, provides a comparison of the quantifiable aspects of each alternative with respect to soils.

Impacts from Recreation

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.

Impacts from Mineral Materials and Nonenergy Leasable Minerals

Mineral development generally requires roads and large areas of soil excavation. Local soil health and characteristics within project footprints are typically severely impacted. 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 permanently altered through open pits, mineshafts, and other features. Eliminating or reducing surface-disturbing activities related to these types of mineral development in GRSG habitat would reduce impacts on soil resources.

Table 4-32
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	32,900	32,980	32,900[1]	32,900[2]
ROW avoidance area (acres)	0	80	0	32,900	32,980[3]
Acres closed to fluid mineral leasing	0	61,197	66,293	0	0
Acres available for further consideration of coal leasing with surface restrictions	0	87,443	166,207	87,443	87,443
Livestock grazing AUMs over 32,945 acres	5,780	5,780	3,739	5,780	5,780

[1]PHMA would be exclusion areas for new ROW wind energy developments.
[2]PHMA would be exclusion areas for new ROW wind and solar energy developments.
[3]Wind and solar energy development would be avoidance in GHMA.

4.17.4 Alternative A

Impacts from Travel and Transportation Management

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 fragile soil conditions can minimize the extent of these effects, ideally limiting them to the footprint of the trail.

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 the potential for disturbance and compaction of soils, fragmentation, and other effects as discussed under *Nature and Type of Effects.*

Impacts from Lands and Realty

Lands and realty management decisions affect where ground disturbing activities can and cannot occur. The use of ROW exclusion and ROW avoidance areas protect certain areas from intense compaction and erosion. As shown in **Table 4-32**, Alternative A has no ROW exclusion or avoidance areas.

Adjustments to land tenure and withdrawal of certain lands can determine where ground-disturbing activities could occur. Under Alternative A, lands could be considered for disposal, exchange, or withdrawal.

Impacts from Range Management

Under Alternative A, 5,780 AUMs would be available over 32,945 acres open for grazing (see **Table 4-32**). Compaction and erosion of soils could occur as a result of this grazing; however, implementing and meeting the Standards for Rangeland Health and Guidelines would minimize these impacts.

Impacts from Fluid Minerals

No areas are closed to fluid mineral leasing and development under Alternative A; however, stipulations are in place and these protections would continue (see **Table 4-32**). As described in **Table 4-1**, there would be approximately 816 acres of short-term disturbance and 548 acres of long-term disturbance on BLM-administered lands related to existing and potential development. However, oil and gas development would have limited impacts on soils because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on soils related to surface disturbance and occupancy.

Impacts from Solid Minerals

Alternative A does not allow withdrawing any areas from mineral entry and does not identify any areas as available for further consideration of coal leasing with surface restrictions (see **Table 4-32**). Impact on soils related to surface disturbance and occupancy, as described above in *Nature and Type of Effects*, from these activities could occur.

4.17.5 Alternative B

Impacts from Travel and Transportation Management

Travel and transportation management under Alternative B would likely reduce impacts on soils from roads and motorized vehicles by limiting motorized vehicles to existing roads and trails in PHMA and GHMA, evaluating the need to permanently or seasonally close roads or areas to traffic in PHMA, and restoring roads by re-seeding with appropriate seed mixes and considering the use of transplanted sagebrush. Restoration of sagebrush habitat and minimizing surface disturbances in sagebrush habitat would enhance soil conditions to a greater extent than current policy under Alternative A.

Impacts from Lands and Realty

Under Alternative B, PHMA (32,900 acres) would be managed as ROW exclusion and GHMA (80 acres) as ROW avoidance area. This would be more protective of soil resources than Alternative A, which has no acreage of either designation (see **Table 4-32**).

Under Alternative B, the BLM would seek to acquire lands in PHMA that have intact subsurface mineral estate and whose surface is owned by the State of North Dakota or private entities. The acquisition would be to conserve, enhance or restore GRSG habitat. As such, Alternative B includes measures that would increase the potential to maintain soils in a healthy state, free from human uses that may otherwise cause compaction, erosion, or contamination.

Impacts from Range Management

Management under Alternative B would be the same as Alternative A with respect to the number of AUMs available and the acreage open for grazing (see **Table 4-32**); therefore, impacts would be the same as described under Alternative A.

Impacts from Fluid Minerals

Under Alternative B, the BLM would close PHMA (61,197 acres) to fluid mineral leasing and development, compared with no closures under Alternative A, which would protect these areas from the soil impacts of compaction, erosion and contamination associated with oil, gas exploration, development and production (see **Table 4-32**). As described in **Table 4-1**, there would be approximately 624 acres of short-term disturbance and 476 acres of long-term disturbance on BLM-administered lands related to existing and potential development. Impacts on soils in these areas would be the same as Alternative A, but would occur over a smaller area. Similar to Alternative A, oil and gas development would have limited impacts on soils.

Impacts from Solid Minerals

Under Alternative B, the BLM would manage all PHMA (87,443 federal mineral acres) as available for further consideration of coal leasing with surface restrictions, compared with 0 acres under Alternative A, and would allow for withdrawing areas from mineral entry within PHMA, reducing the potential for soil impacts of compaction, erosion, and contamination in these areas (see **Table 4-32**). Solid minerals management would be more protective of soils resources under Alternative B than under Alternative A. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on soil resources but it would preclude any potential future development.

4.17.6 Alternative C

Impacts from Travel and Transportation Management

Impacts from travel and transportation management would be similar to those under Alternative B, but protections would apply to both PHMA and GHMA and the BLM would apply additional mitigation requirements so impacts on soils (as described under the *Nature and Type of Effects*) would be further reduced. Prohibiting road construction within four miles of a lek would leave only

approximately 600 acres in PHMA for future road construction and would help prevent disturbance and degradation of soils.

Impacts from Lands and Realty

Under Alternative C, the BLM would manage 32,980 acres as ROW exclusion and 0 acres as ROW avoidance area. This would be more protective of soil resources than Alternative A, which has no acreage of either designation (see **Table 4-32**). The ROW exclusion and avoidance areas would protect and partially protect soils, respectively, from the typical impacts associated with developments in ROWs of erosion, compaction, and sometimes contamination.

Alternative C allows for the acquisition of lands with suitable habitat and calls for the withdrawal of lands within PHMA from mineral activity. These acquisitions and withdrawals in GRSG habitat would protect soil resources in these areas from the impacts of erosion, compaction, and sometimes contamination that are typically associated with surface-disturbing activities.

Impacts from Range Management

Under Alternative C, 36 percent fewer AUMs would be available over the same number of acres open for grazing as under Alternative A (see **Table 4-32**). This lower intensity of grazing would likely be more similar to natural grazing scenarios, reducing erosion and compaction in heavy use areas and allowing for the establishment of more diverse vegetative populations. Lower grazing intensity could provide the potential for changes in nutrient cycling and may lead to excess litter buildup which would affect plant growth and succession and could add more organic matter to developing topsoils. Improvements in soil health would be expected in some areas currently not meeting Rangeland Health Standards. Alternative C is expected to result in improved soil health in some areas when compared with Alternative A.

Impacts from Fluid Minerals

Under Alternative C, the BLM would close GHMA and PHMA (66,293 acres) to fluid mineral leasing and development that would otherwise not be closed under Alternative A (see **Table 4-32**). This closure would protect these areas from the soil impacts of erosion, compaction and sometimes contamination that are typically associated with oil, gas, and geothermal exploration, development, and production.

As described in **Table 4-1**, there would be approximately 621 acres of short-term disturbance and 475 acres of long-term disturbance on BLM-administered lands related to existing and potential development. Similar to Alternative A, oil and gas development would have limited impacts on soil.

Impacts from Solid Minerals

Under Alternative C, the BLM would manage all PHMA and GHMA (166,207 acres) as available for further consideration of coal leasing with surface restrictions, compared with 0 acres under Alternative A (see **Table 4-32**). The

BLM would also allow for withdrawing areas from mineral entry within PHMA. The closures and the allowance for withdrawals would reduce the potential for soil impacts typically associated with solid mineral extraction of erosion, compaction and sometimes contamination from occurring in these areas. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on soil resources but it would preclude any potential future development.

4.17.7 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 and resulting impacts would be similar to Alternative B, with increased management flexibility incorporated to improve management and target those areas that need most protection. Other measures would be as described under Alternative B, but would apply to both PHMA and GHMA. Overall, management under Alternative D would reduce impacts on soils 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 Lands and Realty

Under Alternative D, PHMA would be managed as a ROW avoidance area and additionally as an exclusion area for new wind and solar energy ROW authorizations. ROWs would be allowed in GHMA (wind and solar energy would be avoidance) with measures to minimize surface disturbance and disruption (see **Table 4-32**). Wind and solar energy would be avoidance in GHMA. The ROW avoidance area, and solar and wind exclusion area, would protect and partially protect soils, respectively, from the typical impacts associated with developments in ROWs of erosion, compaction, and sometimes contamination.

Impacts from Range Management

Impacts from Alternative D would be the same as 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 4-32**).

Impacts from Fluid Minerals

Under Alternative D, as under Alternative A, the BLM would not close any areas to fluid mineral leasing and development, resulting in similar impacts on soil resources (see **Table 4-32**). As described in **Table 4-1**, there would be approximately 767 acres of short-term disturbance and 530 acres of long-term disturbance on BLM-administered lands related to existing and potential development. Similar to Alternative A, oil and gas development would have limited impacts on soils.

Impacts from Solid Minerals

As with Alternative A, under Alternative D, lands would be open to mineral entry. The BLM would manage all PHMA (87,443 acres) as available for further consideration of coal leasing with surface restrictions, which would be more protective of soil resources than management under Alternative A since the impacts typically associated with coal mining of erosion, compaction and sometimes contamination would not be able to occur on these lands (see **Table 4-32**). Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on soil resources but it would preclude any potential future development.

4.17.8 Proposed Plan Amendment

Impacts from Travel and Transportation Management

Impacts from travel and transportation management would be similar to those under Alternative D. However, there would be potential beneficial impacts on soils from applying the lek buffers, and density and disturbance caps. These measures could reduce the likelihood of soil loss or erosion from travel and transportation management, as described under *Nature and Type of Effects*.

Impacts from Lands and Realty

ROW management under the Proposed Plan Amendment would be the same as Alternative D in that 32,900 acres would have some ROW exclusion management and 32,980 acres with some ROW avoidance areas. However, the Proposed Plan Amendment has separated out non-solar and wind ROWs by size. Specifically, PHMA and GHMA would be managed as ROW avoidance areas for high voltage transmission lines and large pipelines, which is more than under Alternative D, which would manage GHMA as open to non-solar and wind ROWs. Minor ROWs would be avoided in PHMA and would be allowed in GHMA with measures to minimize surface disturbance and disruption, as with Alternative D. Finally, wind and solar ROW authorization would be excluded in PHMA and avoided in GHMA, as in Alternative D. Depending on the types or ROWs applied for, the Proposed Plan Amendment would be the same or more protective of soil resources from ROW construction disturbance than Alternative D, due to additional restrictions on large ROWs. Ensuring a net conservation gain for GRSG under the regional mitigation strategy may require project proponents to avoid, minimize or apply compensatory mitigation for their potential impacts on GRSG; this could have beneficial impacts on soils, as described under *Nature and Type of Effects*. There would also be potential beneficial impacts on soils from applying the lek buffers, and density and disturbance caps. These measures could reduce the likelihood of soil loss or erosion from ROW actions.

In addition, the BLM would implement density and disturbance caps for PHMA. If the caps were exceeded, the BLM would allow no further human disturbances until the disturbance has been reduced to less than the cap. As discussed in

Section 2.6.2, the cap applies to BSUs and is subject to applicable laws and regulations and valid existing rights. The density and disturbance caps could apply to impacts from ROW actions and would provide beneficial incidental impacts on vegetation, as described under *Nature and Type 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 4-32**). In addition, under the Proposed Plan Amendment, the BLM would prioritize reviewing and processing grazing permits and leases in PHMA, particularly in areas not meeting Land Health Standards. RDFs and BMPs would be implemented to reduce the impacts of developing or modifying water in GRSG habitat. Together, these measures would improve soil conditions throughout the planning area; therefore, they 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. The Proposed Plan Amendment would prioritize leasing and development outside PHMA and GHMA, providing more opportunities to protect soils from fluid minerals activity impacts and disturbance. Similar to Alternative D, all PHMA would be open to leasing, subject to an NSO stipulation. However, granting no waivers or modifications would provide more certainty of protections to soils from NSOs.

Conservation measures would incorporate surface disturbance reduction and guidance for mitigation, as under Alternative D. Such management would reduce disturbance to soils associated with fluid mineral development, as described under *Nature and Type of Effects*, relative to Alternative A. However, if the resources were drilled from adjacent private lands or minerals, disturbance could still occur.

Ensuring a net conservation gain for GRSG under the regional mitigation strategy may require project proponents to avoid, minimize or apply compensatory mitigation for their potential impacts on GRSG which could provide beneficial impacts on soils.

In addition, the BLM would implement density and disturbance caps for PHMA. If the cap were exceeded, the BLM would allow no further human disturbances until the disturbance has been reduced to less than the cap. As discussed in **Section 2.6.2**, the cap applies to BSUs and is subject to applicable laws and regulations and valid existing rights. The density and disturbance caps could apply to impacts from fluid minerals and would provide beneficial incidental impacts on soils.

Impacts from Solid Minerals

Impacts from solid minerals management under the Proposed Plan Amendment would be similar to those described for Alternative D. The additional potential beneficial impacts on soils from the implementing density and disturbance caps, mitigation strategy, and RDFs would be similar to those described for fluid minerals.

4.18 WATER RESOURCES

4.18.1 Methods and Assumptions

Indicators

Table 4-33, Comparison of Water Resources Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on water resources under each alternative. It is acknowledged that conservation measures for GRSG would have only beneficial impacts on water resources and so indicators are described in a way that measures to what degree water resources would receive protections.

Table 4-33
Comparison of Water Resources Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Livestock grazing AUMs over 32,945 acres	5,780	5,780	3,739	5,780	5,780
Acres in ROW exclusion	0	32,900	32,980	32,900[1]	32,900[2]
Acres closed to fluid mineral leasing	0	61,197	66,293	0	0
Acres found available for further consideration of coal leasing with surface restrictions	0	87,443	166,207	87,443	87433
Opportunity to restore or improve water sources for GRSG and their habitat	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 areas for new ROW wind energy developments.
[2]PHMA would be exclusion areas for new ROW wind and solar energy developments.

Assumptions

The analysis includes the assumption that 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.

4.18.2 Nature and Type of Effects

Management actions could change the quality and accessibility of water features that serve as GRSG drinking sources. Drinking water accessibility and quality in turn affect the health and survival of the GRSG. 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. Aside from the natural factors of weather-related erosion of soils into waterways, surface water quality can be affected by the transport of eroded soils into streams due to improperly managed livestock grazing, introduction of waste matter such as fecal coliforms into streams from domestic livestock, and "low-water" crossing points of roads, routes, and ways used by motorized vehicles.

Surface-disturbing activities can remove or disturb essential soil-stabilizing agents, such as vegetation diversity, soil crusts, litter, and woody debris. These soil features function as living mulch by retaining soil moisture and discouraging annual weed growth (Belnap et al. 2001). Loss of one or more of these agents increases potential erosion and sediment transport to surface water bodies, leading to surface water quality degradation. Surface-disturbing activities under certain circumstances can also lead to soil compaction, which decreases infiltration rates and elevates potential for overland flow. Overland flow can increase erosion and sediment delivery potential to area surface water bodies, leading to surface water quality degradation.

In areas with NSO stipulations and managed as ROW exclusion, water quality would be protected since ground disturbance would be prohibited and soil erosion limited to natural processes. In areas managed as ROW avoidance, water quality would receive some protection since ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on water quality, compared with areas not managed as ROW avoidance.

Surface-disturbing activities within stream channels, floodplains, and riparian habitats are more likely to alter natural morphologic stability and floodplain function. Morphologic destabilization and loss of floodplain function accelerate stream channel and bank erosion, increase sediment supply, dewater near-stream alluvium, cause the loss of riparian and fish habitat, and deteriorate water quality (Rosgen 1996). Altering or removing riparian habitats can reduce the hydraulic roughness of the bank and increase flow velocities near the bank (National Research Council 2002). Increased flow velocities near the bank can accelerate erosion, decreasing water quality.

When surface-disturbing impacts are allowed to alter natural drainage patterns, the runoff critical to recharging and sustaining locally important aquifers, springs/seeps/fens, wetlands, and associated riparian habitats is redirected elsewhere. As a result, these sensitive areas can be dewatered, compromising vegetative health and vigor, while degrading proper function and condition of the watershed.

Subsurface disturbances can alter natural aquifer properties (e.g., enhance hydraulic conductivity of existing fractures, breach confining units, change hydraulic pressure gradients), which can increase potential for contamination of surface and groundwater resources. Furthermore, altering natural aquifer properties can dewater locally important freshwater sources (e.g., groundwater, springs, seeps, fens, streams).

Under dry conditions, surface-disturbing activities release dust into the air. During winter, wind-blown dust can settle on top of snow and affect the rate of snowmelt. Dust-covered snow versus clean snow can have albedo (reflectivity) values as low as 0.35, doubling the amount of absorbed solar radiation. Research and simulations based on observations in the Senator Beck Basin Study Area near Silverton, Colorado, indicate that excess dust on snow (versus pre-1800 conditions) increased the rate of snowmelt and advanced the timing of melting by about three to four weeks (Painter et al. 2007). Furthermore, results of studies conducted by Painter and others (2007) indicate that annual runoff is reduced by five percent under current dust conditions. Primary contributing factors for decreased runoff follow.

Greater absorption of energy during snowmelt causes more of the snow to sublimate directly into the atmosphere.

Earlier melting exposes the ground surface to sunlight and warmth, which both allow more water to evaporate directly from the soil and extend the growing season for plants that then can transpire additional water. It is this combined increase in evapotranspiration that appears to have the most impact on stream flow.

Surface water runoff depends on both natural factors and land management. Natural factors include climate, geology and soils, slope, channel conditions, and vegetation type and density. Land use or management actions that alter these natural factors play a role in altering surface water runoff. Such actions include grading or compacting soils for new roads or well pads and calling for management prescriptions that alter the type or density of vegetation.

Reducing water flow can have adverse impacts on the ecology of a watershed, its recreational potential, the availability of drinking water and water for other uses, and groundwater quality and quantity. Water quality impacts from reduced water supplies include increased water temperatures, pH levels, and alkaline levels. Reductions in water supply could result from consumptive uses of surface

water or tributary groundwater sources that do not return water to the basin. Examples are evaporative loss from new surface water features, evapotranspiration from irrigation of vegetation, injection into deep wells, or use in drilling fluids that are later disposed of outside of the basin.

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 via 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.

Lands that are open for fluid minerals leasing have the potential for future health and safety risks related to oil and gas exploration, development, operation, and decommissioning. The number of acres open for leasing is proportional to the potential for long-term direct health and safety impacts. Use, storage, and transportation of fluids, such as produced water, hydraulic fracturing fluids, and condensate, have the possibility of spills that could migrate to surface or groundwater, causing human health impacts.

Potential impacts from coal, locatable mineral, mineral material, and nonenergy leasable mineral activities and development include the release of pollutants capable of contaminating surface water during stormwater runoff or contaminating aquifers during groundwater recharge. Mineral activities and developments could also alter drainage patterns, which would affect stream hydrographs and water supplies. Discharge of mine water can alter water chemistry and impair natural stream morphologic conditions.

Activities beneficial to water resources are primarily defined as improving conditions by enhancing or restoring degraded water quality or by reducing ongoing groundwater depletion. Changing grazing patterns in riparian areas further benefits the water quality and geomorphic function of streams. Management actions regarding closure or avoidance of specific areas, or restrictions of disturbance, protect environmental conditions and, thus, are beneficial. Mitigation measures also reduce the impacts on water resources from ongoing or future activities.

Implementing management for the following resources would have negligible or no impact on water resources and are therefore not discussed in detail: travel and transportation management; recreation; mineral split estate; fire and fuels management; habitat restoration/vegetation management; and ACECs.

4.18.3 Impacts Common to All Alternatives

There are no impacts that are common to all alternatives.

Table 4-34, Quantitative Impact Summary by Alternative for Water Resources, provides a comparison of the quantifiable aspects of each alternative with respect to Water Resources.

Table 4-34
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	32,900	32,980	32,900[1]	32,900[2]
ROW avoidance area (acres)	0	80	0	32,900	32,980[3]
Acres closed to fluid mineral leasing	0	61,197	66,293	0	0
Acres available for further consideration of coal leasing with surface restrictions	0	87,443	166,207	87,443	87,443
Livestock grazing AUMs over 32,945 acres	5,780	5,780	3,739	5,780	5,780

[1]PHMA would be exclusion areas for new ROW wind energy developments.
[2]PHMA would be exclusion areas for new ROW wind and solar energy developments.
[3]Wind and solar energy development would be avoidance in GHMA.

4.18.4 Alternative A

Impacts from Lands and Realty

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. Alternative A has no ROW exclusion or avoidance areas (see **Table 4-34**).

Impacts from Range Management

Livestock generally cause decreases in water quality through the heavy trampling of soils and vegetation along and within natural water features that are also used by GRSG as drinking water sources. At the same time, water supply structures throughout the landscape that have been established for the benefit of livestock also often provide drinking water sources for GRSG.

Under Alternative A, BLM would maintain PFC riparian and wetland areas. Water sources would be developed where needed (as indicated by monitoring) to improve GRSG habitat and waters used by GRSG and adversely affected by uncontrolled livestock use would be fenced. These actions would have a beneficial effect on water sources over time.

Under Alternative A, 5,780 AUMs would be available over 32,945 acres open for grazing (see **Table 4-34**). The level of grazing itself does not necessarily have an impact on water sources. More important is the way in which the livestock and the water sources are managed, which is addressed in the previous paragraph.

Impacts from Fluid Minerals

Alternative A does not close any areas to fluid mineral leasing and development (see **Table 4-34**), nor does it not include any fluid minerals management actions that would protect GRSG against West Nile virus. Impacts on soils related to surface disturbance and occupancy from these activities, as described above in *Nature and Type of Effects*, could occur. Disturbance of soils from mineral development would continue to result in the potential for increased erosion and contamination.

As described in **Table 4-1**, there would be approximately 816 acres of short-term disturbance and 548 acres of long-term disturbance on BLM-administered lands related to existing and potential development. However, oil and gas development would have limited impacts on soils because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on soils related to surface disturbance and occupancy.

Impacts from Solid Minerals

Alternative A does not include any solid minerals management actions that would protect GRSG against West Nile virus meaning that water sources could be created that foster mosquito breeding. Management under Alternative A does not allow for withdrawing any areas from mineral entry and does not identify any areas as available for further consideration of coal leasing with surface restrictions (see **Table 4-34**). There would be no impact on water resources over existing conditions. Impact on soils related to surface disturbance and occupancy, as described above in *Nature and Type of Effects*, from these activities could occur.

4.18.5 Alternative B

Impacts from Lands and Realty

Under Alternative B, the BLM would manage PHMA (32,900 acres) as ROW exclusion area and PHMA (80 acres) as ROW avoidance area. The ROW exclusion and avoidance areas would protect and partially protect water resources from erosion and sometimes contamination, which are the typical

impacts associated with developments in ROWs. This would be more protective of water resources than Alternative A, which has no acreage of either designation (see **Table 4-34**), therefore creating fewer impacts of the type and nature described above in *Nature and Type of Effects*.

Impacts from Range Management

Management under Alternative B would be the same as Alternative A with respect to the number of AUMs available and the acreage open for grazing (see **Table 4-34**). However, Alternative B includes measures that would provide greater potential for improvement of water quality sources for GRSG in riparian areas and wet meadows for PFC than Alternative A through striving to attain reference state vegetation relative to the ESD. Alternative B would be of greater benefit to water resources 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. Alternative B includes more management options for structural range improvements that specifically benefit PHMA than Alternative A. The BLM would provide GRSG with greater protection against West Nile virus than under Alternative A through implementing RDFs when developing or modifying water developments in PHMA. Water sources are more likely to be maintained in conditions that would not be conducive to mosquito breeding.

Impacts from Fluid Minerals

Under Alternative B, the BLM would close PHMA (61,197 acres) to fluid mineral leasing and development. This closure would decrease the chance for the contamination of surface water and groundwater and would decrease the likelihood for the creation of new mosquito breeding habitat and the risk of infection of GRSG with West Nile virus (see **Table 4-34**).

As described in **Table 4-1**, there would be approximately 624 acres of short-term disturbance and 476 acres of long-term disturbance on BLM-administered lands related to existing and potential development. Impacts on soils in these areas would be the same as Alternative A, but would occur over a smaller area. Similar to Alternative A, oil and gas development would have limited impacts on water resources.

Impacts from Solid Minerals

Under Alternative B, the BLM would find all PHMA (87,443 acres) as available for further consideration of coal leasing, with surface restrictions. It would allow for withdrawing areas from mineral entry within PHMA (see **Table 4-34**); however, little-to-no coal extraction is expected in the planning area, so protective effects of this closure would be limited. 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. The BLM would also apply West Nile virus prevention RDFs on solid mineral projects. Overall,

management under Alternative B could result in higher quality water sources, and could decrease the occurrence of mosquito breeding habitat and the potential for West Nile virus transmission than Alternative A. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on water resources but it would preclude any potential future development.

4.18.6 Alternative C

Impacts from Lands and Realty

Under Alternative C, the BLM would manage 32,980 acres as ROW exclusion area and zero acres as ROW avoidance area. The ROW exclusion areas would protect water resources from the typical impacts associated with developments in ROWs of erosion and sometimes contamination. This would be more protective of water resources than Alternative A, which has no acreage ROW exclusion (see **Table 4-34**), resulting in fewer impacts on water resources of the type and nature described above in *Nature and Type of Effects*.

Impacts from Range Management

Under Alternative C, 36 percent fewer AUMs would be available over the same acreage of acres open for grazing as under Alternative A (see **Table 4-34**). This lower intensity of grazing would provide the potential for improved soil and vegetative health, would reduce the potential for soil eroding and transporting suspended solids into waterways, would result in thicker vegetative cover and organic litter that would better filter suspended solids out of surface runoff, and would reduce the amount of fecal coliforms being generated on the landscape that could then flow into waterways. Management actions under Alternative C would improve surface water quality over existing conditions. The lower level of grazing could also make some existing water sources more available to GRSG through there being less livestock to temporarily displace the birds during livestock drinking events.

Under Alternative C, the BLM would provide greater protections of water quality than Alternative A for water sources in PHMA through managing riparian areas and wet meadows for PFC. 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. Impacts from Alternative C would be of greater benefit to GRSG 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 GRSG habitats. Management under Alternative C would provide greater potential for new beneficial water sources to be installed in PHMA and GHMA than Alternative A through avoiding all new structural range developments except for those independently shown to benefit GRSG. Management actions under 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

Under Alternative C, the BLM would close GHMA and PHMA (66,293 acres) to fluid mineral leasing and development, which would decrease the chance for the contamination of surface water and groundwater and would decrease the likelihood for the creation of new mosquito breeding habitat and the risk of infection of GRSG with West Nile virus (see **Table 4-34**). This management would make Alternative C more protective of GRSG than Alternative A.

As described in **Table 4-1**, there would be approximately 621 acres of short-term disturbance and 475 acres of long-term disturbance on BLM-administered lands related to existing and potential development. Similar to Alternative A, oil and gas development would have limited impacts on water resources.

Impacts from Solid Minerals

Under Alternative C, the BLM would manage all PHMA (166,207 acres) as available for further consideration of coal leasing with surface restrictions and would allow for withdrawing areas from mineral entry within PHMA (see **Table 4-34**); however, little-to-no coal extraction is expected in the planning area so protective effects of this closure would be limited. 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. The BLM would also apply West Nile virus prevention RDFs on solid mineral projects. Overall, management actions under Alternative C could be more protective of GRSG with respect to West Nile virus transmission than Alternative A. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on water resources but it would preclude any potential future development.

4.18.7 Alternative D

Impacts from Lands and Realty

Under Alternative D, the BLM would manage PHMA (32,900 acres) as ROW avoidance area; however, PHMA would be a ROW exclusion area for wind and solar energy development. This would be more protective of water resources than Alternative A, which has no acreage of either designation (see **Table 4-34**).

Impacts from Range Management

Management under Alternative D would be the same as Alternative A with respect to the number of AUMs available and the acreage open for grazing (see **Table 4-34**).

Under Alternative D, management actions would provide greater potential for improvement of water quality sources for GRSG in riparian areas and wet meadows that meet PFC than Alternative A by striving to move towards GRSG habitat objectives within capabilities of the reference state vegetation relative to the ESD. Unlike Alternative A, management under Alternative D would provide the opportunity for improving PHMA through new water diversions from springs and seeps. Impacts from Alternative D would be similar to Alternative B and would be of greater benefit to GRSG 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. Alternative D provides more options than Alternative A for structural range improvements that specifically benefit PHMA. Management actions under Alternative D would provide more opportunities to improve water resources and greater protection against West Nile virus than Alternative A through implementing RDFs when developing or modifying water developments in PHMA.

Impacts from Fluid Minerals

Under Alternative D, as with Alternative A, the BLM would not close any areas to fluid mineral leasing and development (see **Table 4-34**). Management under Alternative D would 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 imposing NSO within PHMA.

As described in **Table 4-1**, there would be approximately 767 acres of short-term disturbance and 530 acres of long-term disturbance on BLM-administered lands related to existing and potential development (less than Alternative A). Similar to Alternative A, oil and gas development would have limited impacts on water resources.

Impacts from Solid Minerals

Implementation of Alternative D could potentially find all PHMA (87,443 acres) as available for further consideration of coal leasing with surface restrictions (see **Table 4-34**). Under Alternative D, the BLM would apply West Nile virus prevention RDFs on solid mineral projects to prevent unnecessary and undue degradation. Overall, management actions under Alternative D could be more protective of GRSG with respect to West Nile virus transmission than Alternative A. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on water resources but it would preclude any potential future development.

4.18.8 Proposed Plan Amendment

Impacts from Lands and Realty

ROW management under the Proposed Plan Amendment would be the same as Alternative D in that 32,900 acres would have some ROW exclusion management and 32,980 acres with some ROW avoidance areas. However, the Proposed Plan Amendment has separated out non-solar and wind ROWs by size. Specifically, PHMA and GHMA would be managed as ROW avoidance areas for high voltage transmission lines and large pipelines. This is more than Alternative D, which would manage GHMA as open to non-solar or wind ROWs.

Minor ROWs would be avoided in PHMA and allowed in GHMA with measures to minimize surface disturbance and disruption, as with Alternative D. Finally, wind and solar ROW authorization would be excluded in PHMA and avoided in GHMA, as under Alternative D.

Depending on the types or ROWs applied for, the Proposed Plan Amendment would be the same or more protective of water resources from disturbance activities associated with ROW construction, than Alternative D, due to additional restrictions on large ROWs. Ensuring a net conservation gain to GRSG under the regional mitigation strategy may require project proponents to avoid, minimize or apply compensatory mitigation for their potential impacts on GRSG. This could provide more protection of water resources as described under *Nature and Type of Effects*. There would also be more protection of water quality from applying the lek buffers and density and disturbance caps. These measures could reduce the likelihood of impacts on water quality from ROW actions.

In addition, the BLM would implement density and disturbance caps for PHMA. If the caps were exceeded, the BLM would allow no further human disturbances until the disturbance has been reduced to less than the cap. As discussed in **Section 2.6.2**, the cap applies to BSUs and is subject to applicable laws and regulations and valid existing rights. The density and disturbance caps could apply to impacts from ROW actions and would provide beneficial incidental impacts on water resources.

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 water resources (see **Table 4-34**). In addition, under the Proposed Plan Amendment, the BLM would prioritize the review and processing of grazing permits and leases in PHMA, particularly in areas not meeting Land Health Standards. RDFs and BMPs would be implemented to reduce impacts when developing or modifying water developments in GRSG habitat. Together, these measures would help to protect water resources

throughout the planning area and therefore 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. The Proposed Plan Amendment would prioritize leasing and development outside PHMA and GHMA, providing more opportunities to protect water resources from fluid minerals activities and disturbance. Similar to Alternative D, all PHMA would be open to leasing, subject to an NSO stipulation. However, granting no waivers or modifications would provide more certainty of protections to water resources from NSOs. Conservation measures would incorporate surface disturbance reduction and guidance for mitigation, as under Alternative D. Such management would reduce disturbance to soils associated with fluid mineral development, as described under *Nature and Type of Effects*, relative to Alternative A. However, if the resources were drilled from adjacent private lands or minerals, disturbance could still occur and impact water resources. Ensuring a net conservation gain for GRSG under the regional mitigation strategy may require project proponents to avoid, minimize, or apply compensatory mitigation for their potential impacts on GRSG, which could provide more protection of water resources.

In addition, the BLM would implement density and disturbance caps for PHMA. If the cap were exceeded, the BLM would allow no further human disturbances until the disturbance has been reduced to less than the cap. As discussed in **Section 2.6.2**, the cap applies to BSUs and is subject to applicable laws and regulations and valid existing rights. The density and disturbance caps could apply to impacts from fluid minerals and would provide beneficial incidental impacts on water resources, as described under *Nature and Type of Effects*.

Impacts from Solid Minerals

Impacts from solid mineral management under the Proposed Plan Amendment would be similar to those described for Alternative D. The additional potential beneficial impacts on water resources from implementing the density and disturbance caps and mitigation strategy would be similar to those described for fluid minerals.

4.19 SPECIAL STATUS SPECIES—OTHER SPECIES OF ISSUE

4.19.1 Methods and Assumptions

Although data on known locations within the planning area are available, the data are neither complete nor comprehensive concerning all special status species or potential habitat that might exist. Known Sprague's pipit distribution area was considered for quantitative analysis; however, the potential presence of other species was also considered, and, as a result, some impacts are discussed in more general terms. Additionally, transient gray wolf and migrating whooping crane have the potential to occupy the planning area.

Indicators

Table 4-35, Comparison of Special Status Species-Other Indicators by Alternative, provides a summary of the indicators that were used to analyze the effects on special status species under each alternative.

Table 4-35
Comparison of Special Status Species-Other Indicators by Alternative

Indicator	Alternative				
	A	B	C	D	Proposed Plan Amendment
Acres in ROW exclusion	0	32,900	32,980	32,900[1]	32,900[2]
Livestock grazing AUMs	5,780	5,780	3,739	5,780	5,780
Acres closed to fluid mineral leasing	0	61,197	66,293	0	0
Acres found available for further consideration of coal leasing with surface restrictions	0	87,443	166,207	87,443	87,443

[1]PHMA would be exclusion areas for new ROW wind energy developments.
[2]PHMA would be exclusion areas for new ROW wind and solar energy developments.

Assumptions

The analysis includes the following assumptions:

- In general, special status species would be more sensitive to habitat fragmentation than common species, development, or changes in habitat conditions, as populations are often already highly fragmented, require specific microhabitats, and are especially sensitive to disturbance and human presence.
- The analysis presented is largely qualitative due to the lack of data or uncertainty in existing data on certain special status species' occurrences, for example, many of the BLM sensitive plant species. Furthermore, since many special status species may potentially use habitats that are currently unoccupied and populations fluctuate, any quantitative analysis of occupied habitat would change over time as knowledge of where species exist would increase. Where appropriate, acreages from **Chapter 2** are included to show a comparison between alternatives.
- Impacts on special status species would be more significant than impacts on common species because population viability is already uncertain for special status species and certain species, such as special status plants, tend to be poor competitors.
- Short-term effects are defined as those that 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

Fish and Wildlife

Special status fish and 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).

Changes to special status fish and wildlife habitats would be caused by the following: 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. Examples of impacts on special status fish and wildlife 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 such as raptors that are sensitive to noise or human presence. 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.

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 wildlife species, including increased heart rate, altered metabolism, and a change in hormone balance (Radle 2007, pg. 5). 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, pg. 5). Impacts would be both short 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. 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, ROWs) 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. 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 avoidance and exclusion areas would avoid or reduce habitat impacts and could reduce the total acreage of habitat disturbance and fragmentation.

Bird mortality or injury could occur from collision or electrocution with transmission lines and other ROW structures. 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 applications 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 results in alteration of fire cycles; increase in predators or predation pressure; decreased survival or reproduction of the species; and decreased habitat effectiveness. Areas managed under NSO, CSU, and TL stipulations would limit surface disturbance and associated impacts in certain areas.

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 trend toward achieving Rangeland Health Standard 5: Biodiversity, which would maintain and/or restore habitat values for fish and wildlife. Over the short term, vegetation, fire, and weed treatments would remove habitat, 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.

If livestock grazing is managed improperly, overutilization of forage by livestock could occur, leading to increased competition with wildlife for forage, and potentially reduced cover and nesting habitat for other species. Livestock could also spread weeds, which would degrade habitats. Special status wildlife could be displaced from their habitats, which could increase competition for resources in adjacent habitats. Impacts would vary depending on the extent of vegetation

removal, type of habitat impacted, and length of the grazing period. In general, the more acres that are open to grazing and AUMs available under a given alternative, the greater the risk for impacts. Livestock may degrade riparian areas, which could impact riparian-dependent, aquatic, and fish species.

Natural disturbances such as unplanned fire ignitions could cause short- or long-term damage to habitats depending on the seral type affected, extent, and severity of the fire. In the short term, fire removes nesting and cover habitat and leaves bare areas that provide little habitat value and could erode to cause sedimentation of waterways. 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.

Management actions and special designated areas (e.g., ACECs) that restrict surface-disturbing activities would reduce impacts such as habitat removal, fragmentation, and human disturbance. Such management actions include stipulations 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 closures 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 fish and 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.

4.19.3 Impacts Common to All Alternatives

Determination of Effects

Based on whooping crane, black-footed ferret, gray wolf, and northern long-eared bat descriptions and likelihood of occurrence 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.

4.19.4 Alternative A

Impacts from Travel and Transportation Management

BLM-administered lands would continue to permit limited yearlong use for motorized wheeled vehicles, restricted to existing roads and trails on 33,030 acres. Through site-specific planning, the BLM would inventory, map, and designate roads and trails as open, seasonally open, or closed. Through this

process, important wildlife habitat areas could be protected. Ecological impacts of roads and motorized trails include mortality due to collisions, behavior modifications due to noise, activity and/or habitat loss, alteration of physical environment, leaching of nutrients, erosion, spread of invasive plants, increased use, and alteration by humans due to accessibility would likely continue.

Impacts from Recreation

Under Alternative A, use authorizations would be considered as requested by the public. 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

No ROW avoidance or exclusion areas would be designated under Alternative A and 3,436 acres would be identified for disposal. As a result, human disturbance- and infrastructure-related impacts described above in *Nature and Type of Effects* would continue. However, BLM would collocate facilities where possible, which would reduce impacts on some special status species by reducing the extent of new disturbance.

Land tenure adjustments would be subject to current disposal/exchange/ acquisition criteria, which 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 reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that would remove habitat.

Impacts from Range Management

The most current assessment of acres meeting land health standards in the planning area are described in **Table 3-39**. Nearly 33,000 acres were assessed in PH and 80 acres in GH. These assessments indicate that most of the PH provides diverse and productive plant and animal habitat. Under Alternative A, the BLM would make 5,780 AUMs available, develop water sources, and allow land treatments. Changes to habitat conditions would be as described under *Nature and Type of Effects*. The BLM would incorporate management to reduce impacts during drought, and fences would be erected to protect and benefit wildlife. In addition, riparian and wetland habitats would be improved. Overall, while impacts from grazing would continue to occur, the BLM would take actions to reduce these impacts, which would reduce damage to habitat for some special status species.

Impacts from Fluid Minerals

Impacts could occur on 73,435 acres where BLM-administered surface lands and split estate would be open to fluid mineral leasing. All acres of Sprague's pipit distribution would be open to fluid mineral leasing. Human disturbance and changes to habitat as described under *Nature and Type of Effects* would be reduced on BLM-administered and split estate lands where NSO (9,780 acres), CSU (21,235 acres), or TL (38,504 acres) constraints would be applied for

GRSG. NSO or CSU would be applied on 31,015 acres of Sprague's pipit distribution reducing the nature and types of the described impacts. However, oil and gas development would have limited differences among the alternatives because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on other special status species related to surface disturbance and occupancy.

Impacts from Solid Minerals

In Sprague's pipit distribution, 242,743 federal mineral acres would be available for further consideration of coal leasing and open to solid mineral entry. However, there are no existing coal leases and development of federal coal resources is not anticipated during the life of this plan. Therefore, no impacts are expected from coal.

For locatable minerals, mineral materials, and nonenergy leasable minerals, a total of 56,681 BLM-administered acres would continue to be managed as open to exploration and development. Impacts from surface disturbance and changes in habitat, as described under *Nature and Type of Effects*, would continue.

Impacts from Fire and Fuels Management

Management under Alternative A does not provide much guidance on fire and fuels management, so it is likely that changes in habitat from fire and fuels management, as described under *Nature and Type of Effects*, would continue. In some instances, habitat for some special status species would be lost to fire while other habitats would be protected from fuels management activities. However, the risk of wildfire is very low overall as there have been no fires on BLM-administered lands in the area in the past 10 years.

Impacts from Habitat Restoration and Vegetation Management

Management under Alternative A does not provide much guidance on habitat restoration and vegetation management, so it is likely that impacts from these activities as described above would continue. In some instances, habitat for other special status species would be improved from habitat restoration and vegetation management activities.

Impacts from ACECs

There are no designated ACECs in the planning area under Alternative A, and, as a result, no impacts from ACEC management actions on other special status species.

4.19.5 Alternative B

Impacts from Travel and Transportation Management

Similar to Alternative A, motorized wheeled vehicles would be limited to existing roads and trails on 30,030 acres. Under Alternative B, the BLM would evaluate the need for road closures in PHMA. If closures were applied, the

impacts from roads described in *Nature and Type of Effects* would be reduced in these areas. The BLM would also impose limitations on new route construction and upgrading of existing routes in PHMA, which would reduce impacts from disturbance, changes to habitat, and mortality on other special status species in these areas. The BLM would use appropriate seed mixes when reseeding roads, primitive roads, and trails in PHMA and would transplant sagebrush to facilitate restoration, which would improve habitat connectivity for some special status species over the long term as compared to Alternative A.

Impacts from Recreation

The BLM would limit issuance of SRPs in PHMA to those that would have neutral or beneficial effects on GRSG. This action would potentially reduce impacts for those special status species that occur in PHMA as compared to Alternative A.

Impacts from Lands and Realty

The BLM would designate PHMA as ROW exclusion (32,900 acres) and GHMA as ROW avoidance (80 acres) areas, all of which includes Sprague's pipit distribution, thereby reducing impacts on Sprague's pipit. Such designations would also reduce impacts from human disturbance and changes to habitat for those other special status species that occur in these areas. Impacts from co-location of facilities would be similar to those described for Alternative A, though they would occur in GHMA only, which is a reduction of impacts as compared to Alternative A.

Impacts from Range Management

The BLM would make the same number of AUMs available as under Alternative A. However, under Alternative B, the BLM would implement a number of additional management actions to incorporate GRSG habitat objectives and management considerations into livestock grazing management. These include, but are not limited to, consideration of grazing methods and systems to reduce impacts on GRSG habitat, improved management of riparian areas and wet meadows, evaluation of existing introduced perennial grass seedings, water developments, and structural range improvements, RDFs for West Nile virus, and fence marking. Such management actions would largely affect those special status species that use the same habitats as GRSG, and would reduce, but would not eliminate, impacts from grazing on special status species in these areas as compared to Alternative A.

Impacts from Fluid Minerals

Under Alternative B, 61,197 acres of BLM-administered and split estate lands would be closed to fluid mineral leasing and conservation measures would be applied on leased fluid mineral estate and split estate lands. These actions would reduce the likelihood and extent of impacts on the distribution of Sprague's pipit caused by fluid mineral development as compared to Alternative A.

However, oil and gas development would have limited differences among the alternatives because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on other special status species related to surface disturbance and occupancy.

Impacts from Solid Minerals

Under Alternative B, 87,443 acres of PHMA and of Sprague's pipit distribution would be available for further consideration of coal leasing with surface restrictions and minimization measures would be applied in GHMA. However, there are no existing coal leases and development of federal coal resources is not anticipated during the life of this plan. Therefore, no impacts are expected from coal.

Fewer acres (46,397 acres of BLM mineral estate and Sprague's pipit distribution) would be open to solid mineral exploration or development compared to Alternative A, and PHMA (46,397 acres) would be closed to mineral materials disposal and nonenergy solid leasable mineral exploration and development. Together, these actions would reduce impacts on other special status species from solid minerals compared to Alternative A. Because mineral potential is low for mineral materials, these restrictions may have little practical impact on special status species but it would preclude any potential future development.

Impacts from Fire and Fuels Management

Fuels treatments under Alternative B would be designed to protect sagebrush ecosystems and would thereby protect habitat for those other special status species that rely on these habitats. The BLM would maintain sagebrush cover, apply seasonal restrictions, protect winter range, and require use of native seeds. The BLM would prioritize suppression in PHMA and in GHMA where fires would threaten PHMA. 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-scale fire over the long term.

Impacts from Habitat Restoration and Vegetation Management

Habitat restoration and vegetation management actions would aim to improve GRSG habitat and prioritize restoration efforts to benefit GRSG habitats, including reducing invasive plants. This would improve habitat for other special status species that use the same habitat as GRSG.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.19.6 Alternative C

Impacts from Travel and Transportation Management

Similar to Alternative A, motorized wheeled vehicles would be limited to existing roads and trails on 30,030 acres. Disturbance, changes in habitat, and mortality from travel and transportation management would be similar to Alternative B; however, management under Alternative C would not allow roads to be built within four miles of a lek in PHMA or GHMA. This buffer would cover nearly all PHMA. Impacts would be further reduced from the Alternative A baseline, since protections would apply to both PHMA and GHMA, and the BLM would apply additional mitigation requirements. In PHMA and GHMA, no upgrading of existing routes or capacity would be allowed 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.

Impacts from Recreation

Impacts from recreation under Alternative C would be similar to those described for Alternative B. However, impacts would be reduced compared to Alternative A (and reduced below Alternative B levels) since restrictions would apply to both PHMA and GHMA. These measures would further reduce disturbance from recreational activities in potential habitat.

Impacts from Lands and Realty

Under Alternative C, PHMA and GHMA would be designated as a ROW exclusion area and no wind energy development would be allowed. No areas would be identified for disposal. Together, these management actions would reduce impacts from human disturbance and changes to habitat.

Impacts from Range Management

Impacts from range management under Alternative C would be similar to those described for Alternative B, although impacts would be reduced due to increased restrictions that would be applied to both PHMA and GHMA. For example, the BLM would make fewer AUMs available (3,739 AUMs), would not allow new water developments, and would avoid all new structural range improvements and location of supplements in PHMA and GHMA. Together, these management actions would reduce impacts from changes to habitat as a result of grazing as compared to Alternative A.

Impacts from Fluid Minerals

Under Alternative C, 66,293 acres, of which all acres would be Sprague's pipit distribution, would be closed to fluid mineral leasing and conservation measures would be applied on leased fluid mineral estate and split estate lands. Conservation measures would be more restrictive compared to Alternative B. These actions would reduce the likelihood and extent of impacts caused by fluid mineral development.

However, oil and gas development would have limited differences among the alternatives because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on other special status species related to surface disturbance and occupancy.

Impacts from Solid Minerals

Impacts from solid minerals under Alternative C would be similar to those described for Alternative B. No impacts are expected from coal. Impacts would be reduced compared to Alternative B since closures and restrictions would apply to both PHMA and GHMA. Together, these actions would reduce impacts on other special status species from solid minerals compared to Alternative A. Because mineral potential is low for coal and mineral materials, these restrictions may have little practical impact on special status species but it would preclude any potential future development.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management under Alternative C would be similar to those described under Alternative B, although the BLM would not consider the use of livestock to reduce fine fuels. 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

Impacts from habitat restoration and vegetation management would be similar to Alternative B but habitat improvements would be applied to both PHMA and GHMA under Alternative C. As a result, a greater area of habitat would be improved for some special status species.

Impacts from ACECs

Under Alternative C, all PHMA (32,900 acres) would be designated as an ACEC. This would afford protections to other special status species that occur in the GRSG ACEC.

4.19.7 Alternative D

Impacts from Travel and Transportation Management

Similar to Alternative A, motorized wheeled vehicles would be limited to existing roads and trails on 30,030 acres. Under Alternative D, closures would be evaluated when OHV use is found to cause adverse habitat impacts. Management actions that address disturbance, changes in habitat, and mortality from travel and transportation management similar to Alternative B, though many would apply to both PHMA and GHMA and would thus encompass a larger area where impacts would be reduced.

Impacts from Recreation

Impacts from recreation on other special status species under Alternative D would be the same as those described under Alternative B.

Impacts from Lands and Realty

All lands within the decision area would be designated as ROW avoidance areas, although PHMA would be an exclusion area for wind and solar energy. Impacts from collocation of facilities and lands disposal would be the same as those described for Alternative B. Overall, management actions would reduce impacts from disturbance and changes in habitat compared to Alternative A.

Impacts from Range Management

Impacts from range management would be similar to those described for Alternative B, although the BLM would have more tools available to complete their Land Health Assessments and would thus be more likely to complete these assessments in a timely manner. In addition, the BLM would consider other priority species when conducting vegetation treatments, which could benefit some special status species in the long term. Together, these actions would reduce impacts on other special status species from range management compared to Alternative A.

Impacts from Fluid Minerals

Under Alternative D, no lands would be closed to fluid mineral leasing, but 61,197 acres of Sprague's pipit distribution would be open to leasing subject to an NSO stipulation. The BLM would apply CSU stipulations on GHMA. In addition, a number of operational constraints would be applied to existing leases as COAs in PHMA, which would reduce impacts from disturbance and changes to habitat on other special status species in these areas.

However, oil and gas development would have limited differences among the alternatives because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on other special status species related to surface disturbance and occupancy.

Impacts from Solid Minerals

Under Alternative D, restrictions on coal mining would be the same as described for Alternative B. However, there are no existing coal leases and development of federal coal resources is not anticipated during the life of this plan. Therefore, no impacts are expected from coal.

Acres open to solid mineral exploration or development would be the same as under Alternative A, although under Alternative D, the BLM would apply RDFs as needed to reduce impacts. Impacts from mineral materials disposal and nonenergy solid leasable mineral exploration and development would be the same as described for Alternative B. Together, these actions would reduce impacts from disturbance and changes in habitat on other special status species

compared to Alternative A. Because mineral potential is low for mineral materials, these restrictions may have little practical impact on special status species but it would preclude any potential future development.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to those described for Alternative B, although requirements and restrictions under Alternative D would be less stringent and could allow for increased impacts on special status species habitat in comparison.

Impacts from Habitat Restoration and Vegetation Management

Impacts from habitat restoration and vegetation management would be similar to those described for Alternative B, but BLM would consider other priority species habitat when prioritizing restoration projects and creating landscape patterns. This could improve habitat for other special status species over the long term.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.19.8 Proposed Plan Amendment

Impacts from Travel and Transportation Management

Impacts from travel and transportation would be similar to Alternative D. Additionally, temporarily closing areas to vehicles would reduce the potential disturbance of special status species, including Sprague's pipit, in the planning area. Impacts from applying lek buffers, density and disturbance caps, and RDFs would also provide beneficial impacts on special status species. This would be due to reduction of disturbance and habitat loss, as described under *Nature and Type of Effects*. Overall, management under the Proposed Plan Amendment would result in potential beneficial impacts on special status species from activities associated with travel and transportation in the planning area compared, to Alternative A.

Impacts from Recreation

Impacts from recreation on other special status species under the Proposed Plan Amendment would be the same as those described under Alternative B. The Proposed Plan Amendment would provide additional incidental protection to other special status species, including Sprague's pipit, by limiting construction of new recreation facilities in PHMA.

Impacts from Lands and Realty

Impacts from ROW management would be similar to those under Alternative D. PHMA (32,900 acres) would be managed as ROW avoidance for high-voltage transmission lines (100kv and over), large pipelines (24 inches in width and over), and minor ROWs. However, PHMA would be ROW exclusion for wind and solar energy permits. ROW avoidance areas for non-wind and solar

projects would allow for management flexibility, and displacing ROWs onto non-federal land would be avoided. New ROWs would be collocated in 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* and compared to Alternative A. ROWs would be allowed in GHMA (80 acres) with appropriate mitigation measures. There would also be potential beneficial impacts on special status species and habitat from applying mitigation, lek buffers, density and disturbance caps, and RDFs due to a reduction in disturbance and habitat loss.

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. The exceptions would be 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. Since PHMA and GHMA also include Sprague's pipit habitat, these measures would provide increased incidental protection to Sprague's pipit and other special status species 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 reviewing and processing grazing permits and leases in PHMA, particularly in areas not meeting Land Health Standards. RDFs and BMPs would be implemented to reduce impacts when constructing or modifying water developments in GRSG habitat. Together, these measures would help to improve and protect habitat quality throughout the planning area; therefore, they would have a beneficial incidental impact, as described under *Nature and Type of Effects*, on special status species in the planning area, including Sprague's pipit.

Impacts from Fluid Minerals

The Proposed Plan Amendment would prioritize leasing and development outside PHMA and GHMA. This would provide more opportunities to protect special status species from disturbances and loss of habitat related to fluid minerals activities. Similar to Alternative D, all PHMA (61,197 acres) would be open to leasing, subject to an NSO stipulation. However, granting no waivers or modifications would provide more certainty of protections to special status species from NSOs.

As under Alternative D, the BLM would restrict on geophysical exploration and development; however, developers would be allowed to use existing roads and trails, as well as helicopter-portable methods. This could disturb special status species if they were in these areas. Mitigation under the Proposed Plan Amendment would be required to avoid, minimize, and apply compensatory

mitigation for impacts to GRSG, which could result in an indirect compensation of impacts on other special status species if they are located in these areas.

In addition, lek buffers would be applied on a project-specific basis to further reduce impacts and protect PHMA from human disturbances. Such management could reduce disturbance to special status species and habitats associated with fluid mineral development relative to Alternative A. However, if the resources were drilled from adjacent private lands or minerals, disturbance could still occur and the stipulations would not be as effective in providing protections.

In addition, the BLM would implement density and disturbance caps in PHMA. If the cap were exceeded, the BLM would allow no further human disturbances until the disturbance has been reduced to less than the cap. The density and disturbance caps would apply to fluid minerals activities and could prevent further disturbance of habitat and special status species until the overall disturbance has been reduced to less than the cap.

However, oil and gas development would have limited differences among the alternatives because, although there is high potential in GRSG habitat, most of the resources have already been developed; therefore, opening or closing areas to development would have minimal impacts on other special status species related to surface disturbance and occupancy.

Impacts from Solid Minerals

Impacts under the Proposed Plan Amendment would be similar to those described for Alternative D. However, similar to fluid minerals, potential beneficial impacts on special status species and habitat from applying mitigation, lek buffers, and density and disturbance caps would be the same as described above for fluid minerals. Because mineral potential is low for mineral materials, these restrictions may have little practical impact on special status species, but they would preclude any potential future development.

Impacts from Fire and Fuels Management

Impacts from fire and fuels management would be similar to Alternative D. Fuels treatment policies and restrictions would be designed and implemented as described in Alternative D. The exception would be that sagebrush canopy cover would not be reduced to less than 15 percent, providing more opportunities to protect habitat from fuels management. In addition, fuels management projects in PHMA would be designed to incorporate greater flexibility to maximize the acreage protected. Prescribed fires would be used in GRSG habitat only if the four criteria are met in the Burn Plan, thereby minimizing potential disturbance of special status species and its habitat.

Impacts from Habitat Restoration and Vegetation Management

Impacts from habitat restoration and vegetation management under the Proposed Plan Amendment would be similar to Alternative D. However, in all PHMA, the desired condition is to maintain a minimum of 70 percent of lands

capable of producing sagebrush with 10 to 30 percent sagebrush canopy cover (see **Table 2-2**). The Proposed Plan Amendment proposes removing conifers where they are encroaching onto sagebrush habitat. These treatments may beneficially impact special status species depending on habitat requirements.

Impacts from ACECs

Impacts would be the same as under Alternative A.

4.20 RENEWABLE ENERGY

4.20.1 Methods and Assumptions

Indicators

Indicators of impacts on renewable energy are as follows:

- Acres of lands with "Good" or better solar potential within ROW exclusion and avoidance areas within PHMA/GHMA
- Acres of lands with "Good" or better wind potential within ROW exclusion and avoidance areas within PHMA/GHMA

Assumptions

The analysis includes the following assumptions:

- "Good" or better wind potential is classified as wind speeds of 7.0 meters/second at 50 meter 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-hour/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 the objectives of the amended RMP.
- 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 authorized under the timber regulations, unless a new facility is being authorized for biomass production. 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, 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 then alternatives with fewer acres of such restrictions.

4.20.2 Nature and Type of Effects

Impacts on solar and wind developments 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 areas would have long-term direct impacts on the ability for solar and wind projects to be developed.

As discussed in **Section 4.4**, Lands and Realty, 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 BMPs) 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/vegetation management, and ACECs.

4.20.3 Impacts Common to All Alternatives

The acreages of ROW exclusion and avoidance areas vary across alternatives and are provided in **Table 4-36**, BLM-Administered Lands Managed as ROW Exclusion and Avoidance Areas.

There is no "Good" (6.0 kilowatt-hour/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 4-37, "Good" or Better Wind Potential That Would Be Managed as ROW Exclusion and Avoidance Areas, 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.

Table 4-36
BLM-Administered Lands Managed as ROW Exclusion and Avoidance Areas

	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ROW exclusion area (acres)	0	32,900	32,980	32,900[1]	32,900[2]
ROW avoidance area (acres)	0	80	0	32,900	32,980[3]
Open area (acres)	33,030	50	50	130[1]	50

[1]PHMA would be exclusion areas for new ROW wind energy developments.
[2]PHMA would be exclusion areas for new ROW wind and solar energy developments.
[3]Wind and solar energy development would be avoidance in GHMA.

Table 4-37
"Good" or Better Wind Potential That Would Be Managed as ROW Exclusion and Avoidance Areas

	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
ROW exclusion area (acres)	0	3,606	3,686	3,606	3,606
ROW avoidance area (acres)	0	80	0	680	80

4.20.4 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.

4.20.5 Alternative B

Impacts from Lands and Realty

Under Alternative B, PHMA (32,900 acres) would be managed as ROW exclusion areas and would not be open for ROW authorizations. Within this ROW exclusion area there are 3,606 acres considered to have "Good" or better wind potential. This represents 3,606 fewer acres open to wind energy development than under Alternative A. Therefore 97 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.

Under Alternative B, an additional 80 acres would be managed as ROW avoidance areas. Within this ROW avoidance area all 80 acres are considered to have "Good" or better wind potential. This represents 80 fewer acres available for wind development without substantial restrictions. Therefore, under Alternative B, two percent of lands with "Good" or better wind potential available for ROW authorizations would be subject to substantial development and operation restrictions when compare with Alternative A.

In total, 99 percent of the lands with "Good" or better wind potential within the decision area would be affected under Alternative B. Ninety seven percent of these lands would be completely unavailable for wind development while the other remaining would be substantially restricted as compared to Alternative A.

Table 4-38, Wind Potential Affected by Alternatives B and D and Proposed Plan Amendment, provides a detailed overview of how these ROW restrictions relate to individual wind classes.

Table 4-38
Wind Potential Affected by Alternatives B and D and Proposed Plan Amendment

Wind Potential (m/s at 50m)	Total Acres on BLM-Administered Land	Acres of ROW Exclusion (percent of total)	Acres of ROW Avoidance (percent of total)
Class 1 "Poor" 0.0-5.6	0	0	0
Class 2 "Marginal" 5.6-6.4	11,074	11,074	0
Class 3 "Fair" 6.4-7.0"	16,198	16,198	0
Class 4 "Good" 7.0-7.5	3,730	3,606 (97%)	80 (0.3%)
Class 5 "Excellent" 7.5-8.0	0	0	0
Class 6 "Outstanding" 8.0-8.8	0	0	0
Class 7 "Superb" 8.8 and above	0	0	0
Total Classes 1-7	**31,002**	**30,878 (99.6%)**	**80 (0.3%)**

NREL 2012a; BLM 2012a

Collocating new utilities within existing ROWs could reduce land use conflicts by grouping similar facilities and activities in specific areas and away from conflicting developments and activities. However, developing in existing ROWs could limit options for facility design and selection of more-preferable locations.

4.20.6 Alternative C

Impacts from Lands and Realty

Under Alternative C, 32,980 acres would be managed as ROW exclusion areas and would not be open for ROW applications. Within this ROW exclusion area, 3,686 of these acres are considered to have "Good" or better wind

potential. Across the entire decision area, there are 3,730 acres of land considered to have "Good" or better wind potential; therefore, the ROW exclusion areas applied under Alternative C represent 99 percent of those lands. Under Alternative C, 3,686 fewer acres would be open to wind energy development than under Alternative A. In summary, 99 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 C and would not be available for wind development.

Under Alternative C, zero acres would be managed as ROW avoidance areas.

Table 4-39, Wind Potential Affected By Alternative C, provides a detailed overview of how these ROW restrictions relate to individual wind classes.

Table 4-39
Wind Potential Affected By Alternative C

Wind Potential (m/s at 50m)	Total Acres on BLM-Administered Land	Acres of ROW Exclusion (percent of total)	Acres of ROW Avoidance (percent of total)
Class 1 "Poor" 0.0-5.6	0	0	0
Class 2 "Marginal" 5.6-6.4	11,074	11,074	0
Class 3 "Fair" 6.4-7.0"	16,198	16,198	0
Class 4 "Good" 7.0-7.5	3,730	3,686 (99%)	0
Class 5 "Excellent" 7.5-8.0	0	0	0
Class 6 "Outstanding" 8.0-8.8	0	0	0
Class 7 "Superb" 8.8 and above	0	0	0
Total Classes 1-7	**31,002**	**30,958(99.9%)**	**0(0%)**

Source: NREL 2012a; BLM 2012a

4.20.7 Alternative D

Impacts from Lands and Realty

Under Alternative D, PHMA (32,900 acres) would be managed as ROW exclusion areas for wind energy ROW applications Therefore the same acreage would be closed to wind development as Alternative B.

Under Alternative D, an additional 80 acres would be managed as ROW avoidance areas for wind energy. Impacts from avoidance areas would be the same as Alternative B.

Table 4-38 provides a detailed overview of how these ROW restrictions relate to individual wind classes.

4.20.8 Proposed Plan Amendment

Impacts from Lands and Realty

Impacts would be the same as those described above under Alternative B.

4.21 Social and Economic Conditions

4.21.1 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 with 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 Bowman, Golden Valley and Slope counties.

The economic 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 under the alternatives. The economic impact on the local economy are also measured by estimating the employment (full- and part-time jobs) and labor income generated from oil and gas exploration and development 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 economic impacts on the local economy. The multiplier effects tied to grazing and oil and gas 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.

4.21.2 Alternative A

Impacts from Range Management

Livestock grazing would continue to be managed under the existing RMP 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 generates 10 total jobs (direct, indirect, and induced) and $20,000 in labor income (direct, indirect, and induced) on an average annual basis in the impact area economy (**Table 4-40**, Employment Generated from Grazing on Allotments Covered under the RMPA, and **Table 4-41**, Labor Income Generated from Grazing on Allotments Covered under the RMPA). As noted in the discussion of employment specialization in **Section 3.20**, the three-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 seven jobs, which would make up about 5.6 percent of employment in this sector.

Table 4-40
Employment Generated from Grazing on Allotments Covered under the RMPA

	Employment (full and part time jobs)				
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
Direct	7	7	4	7	7
Indirect and Induced	3	3	2	3	3
Total	10	10	6	10	10

Source: IMPLAN 2010

Table 4-41
Labor Income Generated from Grazing on Allotments Covered under the RMPA

	Labor Income (2013 dollars)				
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
Direct	$13,693	$13,693	$8,859	$13,693	$13,693
Indirect and Induced	$6,618	$6,618	$4,281	$6,618	$6,618
Total	$20,311	$20,311	$13,140	$20,311	$20,311

Source: IMPLAN 2010

Forage provided by the BLM is not the entire source of forage used by permittees: it provides an important source of forage that complements additional sources on other public or private land that may be used for unique purposes or during other parts of the year. Estimating the contribution of livestock grazing on the impact area using only BLM AUMs may underestimate the actual importance of BLM-administered lands as a forage resource if BLM AUMs are part of an overall grazing system; where a change in BLM grazing affects the optimal use of the rest of forage resources. For example, reductions

in allocated forage on BLM-administered lands could reduce use on private land given this interdependency in use. Consequently the employment and income estimates from allocated use (10 jobs and $20,000 in labor income) are likely an underestimate of employment and income estimates with additional use of other sources of forage attributable to BLM. Estimates of this additional use are not available for allocated use in the decision area but are acknowledged and discussed qualitatively for each alternative.

Impacts from Energy Development

Under Alternative A, existing contributions from oil and gas development on federal mineral estate in the decision area would continue. Approximately 9,860 acres of PH is found on unleased federal mineral estate and has high potential. Existing oil and gas leases would continue to be developed according to existing lease terms. Consequently future potential development of high potential federal mineral estate could occur in the decision area. Estimates of potential exploration and development under this alternative indicate that approximately four wells could be drilled on an average annual basis between 2013 and 2029 (DOI 2011). If this exploration and development occurred, levels of employment and income could be slightly greater than currently supported in the three county area. The direct, indirect, and induced employment and effects from levels of production and anticipated levels of exploration and development under this alternative are depicted in **Table 4-42**, Employment Generated from Oil and Gas Exploration and Development on BLM in the Decision Area, and **Table 4-43**, Labor Income Generated from Oil and Gas Exploration and Development on BLM in the Decision Area. Actual future production and market price cannot be projected; therefore, estimates of effects under this alternative may not be an accurate portrayal of actual impacts under future market conditions.

Table 4-42
Employment Generated from Oil and Gas Exploration and Development on BLM in the Decision Area

	Employment (full and part time jobs)				
	Alternative A	**Alternative B**	**Alternative C**	**Alternative D**	**Proposed Plan Amendment**
Direct	16.0	15.8	15.8	15.9	15.9
Indirect and Induced	5.4	5.1	5.1	5.3	5.3
Total	21.4	20.9	20.9	21.3	21.3

Source: IMPLAN 2010

Table 4-43
Labor Income Generated from Oil and Gas Exploration and Development on BLM in the Decision Area

	Labor Income (2013 dollars)				
	Alternative A	Alternative B	Alternative C	Alternative D	Proposed Plan Amendment
Direct	$639,234	$632,858	$628,128	$628,116	$628,116
Indirect and Induced	$138,479	$131,334	$136,062	$136,187	$136,187
Total	$777,713	$764,191	$764,189	$764,303	$764,303

Source: IMPLAN 2010

Under Alternative A, annual payments to local governments in the analysis area associated with oil and gas royalties from existing and anticipated production under this alternative would be approximately $6.5 million. These oil and gas related payments, including royalties, would support about 116 jobs and $4 million in labor income (direct, indirect and induced effects) on an average annual basis. Payments to counties and their impacts under this alternative are slightly higher than the other alternatives since anticipated well drilling is higher. As discussed above, this estimate is based on current prices and potential production. Actual production and market price cannot be projected; therefore, these estimates may not be an accurate portrayal of actual impacts. Regardless contributions from these payments would remain an important portion of general government revenue (approximately 30 percent of allocated revenue from all sources).

Impacts from Habitat Restoration and Vegetation Management and ACECs

Management under this alternative would not specifically protect GRSG habitat. In addition, 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 not be protected.

4.21.3 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 management 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 10 total jobs (direct, indirect and induced) and $20,000 in labor income (direct, indirect and induced) on an average annual

basis within the impact area economy (**Table 4-40** and **Table 4-41**). As noted in the discussion of employment specialization above, the three-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 seven jobs which would comprise about 5.6 percent of employment in this sector. Use on BLM-administered lands that complements additional sources of forage on other public or private land would continue under this alternative.

Impacts from Energy Development

Under Alternative B, prior existing rights on developed oil and gas leases would enable current contributions to continue from oil and gas development on federal mineral estate in the decision area. However, future development within PHMA found on unleased federal mineral estate with high potential would not occur since all federal mineral estate within PHMA would be closed to fluid mineral leasing. Regardless, some anticipated development is expected on other lands in the decision area; estimates of potential exploration and development under this alternative indicate that approximately two wells could be drilled on an average annual basis between 2013 and 2029 (DOI 2011). If this exploration and development occurred, levels of employment and income could be slightly greater than currently supported, but less than estimated under Alternative A. The direct, indirect, and induced employment and income effects from levels of production and anticipated levels of exploration and development under this alternative are depicted in **Table 4-42** and **Table 4-43**. Actual future production and market price cannot be projected; therefore, estimates of effects under this alternative may not be an accurate portrayal of actual impacts under future market conditions.

Under Alternative B, annual payments to local governments in the analysis area associated with oil and gas royalties from existing production and anticipated production under this alternative, would be approximately $6.4 million. These payments would support about 114 jobs and $4 million in labor income (direct, indirect and induced effects) on an average annual basis. Payments to counties and their impacts under this alternative are slightly lower than the other alternatives since anticipated well drilling is lower. Regardless, current contributions from oil and gas production in the decision area (as presented **Section 3.22**, Social and Economic Conditions) could be accommodated under this alternative. As discussed above, this estimate is based on current prices and potential production. Actual production and market price cannot be projected; therefore, these estimates may not be an accurate portrayal of actual impacts. Contributions from these payments would remain an important portion of general government revenue (approximately 30 percent of allocated revenue from all sources).

Impacts from Habitat Restoration and Vegetation Management and ACECs

Under this alternative restoration projects would be prioritized based on benefit to GRSG; however, no ACECs to protect GRSG habitat would be included in this alternative. As a result well-being non-market values associated with GRSG habitat would be protected to a greater degree than Alternative A and D but less than Alternative C.

4.21.4 Alternative C

Impacts from Range Management

Under Alternative C, grazing would be reduced by 50 percent on all allotments within the Big Gumbo area. 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 in the Big Gumbo area employment would decrease from 10 to 6total jobs (direct, indirect and induced), and labor income would decrease from $20,000 to $13,000 (direct, indirect, and induced) on an average annual basis within the impact area economy (**Table 4-40** and **Table 4-41**). As noted in the discussion of employment specialization, the three-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 seven jobs to four jobs which would correspond to a decrease from 5.6 percent to 3.4 percent of employment in this sector. Use on BLM-administered lands that complements additional sources of forage on other public or private land would decrease under this alternative.

Impacts from Energy Development

Under Alternative C, prior existing rights on developed oil and gas leases would enable current contributions to continue from oil and gas development on federal mineral estate in the decision area. However, future development within PHMA and GHMA found on unleased federal mineral estate with high potential would not occur since all federal mineral estate within PHMA and GHMA would be closed to fluid mineral leasing. Regardless some anticipated development is expected on other lands in the decision area; estimates of potential exploration and development indicate that approximately two wells could be drilled on an average annual basis between 2013 and 2029 (DOI 2011). If this exploration and development occurred, levels of employment and income could be slightly greater than currently supported, but less than estimated under Alternative A. The direct, indirect, and induced employment and income effects from levels of production and anticipated levels of exploration and development under this alternative are depicted in **Table 4-42** and **Table 4-43**. Actual future production and market price cannot be projected; therefore, estimates of effects under this alternative may not be an accurate portrayal of actual impacts under future market conditions.

Under Alternative C, annual payments to local governments in the analysis area associated with oil and gas royalties from existing production and anticipated production under this alternative, would be approximately $6.4 million. These oil and gas related payments would support about 114 jobs and $4 million in labor income (direct, indirect and induced effects) on an average annual basis. Payments to counties and their impacts under this alternative are slightly lower than the other alternatives since anticipated well drilling is lower. Regardless, current contributions from oil and gas production in the decision area (as presented **Section 3.22**) could be accommodated under this alternative. As discussed above, this estimate is based on current prices and potential production. Actual production and market price cannot be projected; therefore, these estimates may not be an accurate portrayal of actual impacts. Contributions from these payments would remain an important portion of general government revenue (approximately 30 percent of allocated revenue from all sources).

Impacts from Habitat Restoration and Vegetation Management and ACECs

Under this alternative, additional actions would promote expansion of GRSG habitat at levels greater than the other alternatives. In addition, an ACEC to protect GRSG habitat would be designated under in this alternative. As a result well-being and non-market values associated with GRSG habitat would be protected to a greater degree than the other alternatives.

4.21.5 Alternative D and the 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 10 total jobs (direct, indirect and induced) and $20,000 in labor income (direct, indirect and induced) on an average annual basis within the impact area economy (**Table 4-40** and **Table 4-41**). As noted in the discussion of employment specialization above, the three-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 seven jobs, which would comprise about 5.6 percent of employment in this sector. Use on BLM-administered lands that complements additional sources of forage on other public or private land would continue under this alternative.

Impacts from Energy Development

Under Alternative D and the Proposed Plan Amendment, prior existing rights on developed oil and gas leases would enable current contributions to continue

from oil and gas development on federal mineral estate in the decision area. However, future development within PHMA found on unleased federal mineral estate with high potential could occur since PHMA would be subject to NSO stipulations. In addition, anticipated development is expected on other lands with lower potential in the decision area; estimates of potential exploration and development under this alternative indicate that approximately three wells could be drilled on an average annual basis between 2013 and 2029 (DOI 2011). If this exploration and development occurred, levels of employment and income could be slightly greater than Alternatives B and C but less than estimated under Alternative A. The direct, indirect, and induced employment and income effects from levels of production and anticipated levels of exploration and development under Alternative D and the Proposed Plan Amendment are depicted in **Table 4-42** and **Table 4-43**. Actual future production and market price cannot be projected; therefore, estimates of effects under this alternative may not be an accurate portrayal of actual impacts under future market conditions.

Under Alternative D and the Proposed Plan Amendment, annual payments to local governments in the analysis area associated with oil and gas royalties from existing production and anticipated production under this alternative, would be approximately $6.5 million. These payments would support about 115 jobs and $4 million in labor income (direct, indirect and induced effects) on an average annual basis. Payments to counties and their impacts under this alternative are slightly higher than Alternatives B and C since anticipated well drilling is higher. Regardless, current contributions from oil and gas production in the decision area (as presented **Section 3.22**) could be accommodated under this alternative. As discussed above, this estimate is based on current prices and potential production. Actual production and market price cannot be projected; therefore, these estimates may not be an accurate portrayal of actual impacts. Contributions from these payments would remain an important portion of general government revenue (approximately 30 percent of allocated revenue from all sources).

Impacts from Habitat Restoration and Vegetation Management and ACECs

Under Alternative D and the Proposed Plan Amendment, consideration for other threatened, endangered, or sensitive species would be evaluated in addition to GRSG, when prioritizing restoration projects. In addition, 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 protected to a greater degree than Alternative A, but less than the other alternatives.

4.22 ENVIRONMENTAL JUSTICE

While minority and low-income populations exist in the area, none of the minority or low-income populations meet the criteria discussed in **Section 3.23** to be considered environmental justice populations. None of 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.

4.23 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 North Dakota 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 by alternatives 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 specific wildlife stipulations, oil and gas development would result in unavoidable long-term wildlife habitat loss where developed. However, oil and gas development would have limited impacts on disturbance because, although there is high potential in GRSG habitat, most of the high potential resources have already been developed; therefore, opening or closing areas to development would have minimal changes among the alternatives from converting areas to oil and gas development.

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 species, 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.

4.24 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 North Dakota 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, road ROWs, and wind energy 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, RDFs, and BMPs 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 actions 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, RDFs, and stipulations to protect planning area resources.

Across all alternatives and the Proposed Plan Amendment, an irreversible commitment of nonrenewable fossil fuels (e.g., oil, gas, and coal), solid minerals, and mineral materials would occur from development over the life of the North Dakota RMP.

4.25 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 North Dakota RMP.

Short-term use of air resources would not affect long-term productivity, except that air quality emissions in high enough concentrations could reduce vegetation and plant vigor. Across all alternatives, 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, RDFs, and BMPs 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.

Short-term use of an area to foster energy and minerals, and development in ROWs would result in long-term loss of soil productivity and vegetation diversity. Impacts would persist as long as surface disturbance and vegetation loss continue. In general, the loss of soil productivity would be directly at the point of disturbance, although long-term vegetation diversity and habitat value could be reduced due to fragmentation and the increased potential for invasive species to spread from the developments or disturbances. Alternative A would have the greatest potential for short-term loss of productivity and diversity due to less stringent mitigation and reclamation standards than contained under Alternatives B, C, D, and the Proposed Plan Amendment. Management actions under Alternative C would provide the greatest long-term productivity by deferring development in many areas through closures or application of major restrictions on development activities.

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. Sprague's pipit, as well as other terrestrial special status species, could be affected by habitat fragmentation associated with short-term resource uses, and road construction and use.