

CHAPTER 7 – CUMULATIVE IMPACTS (GREATER SAGE-GROUSE)

7.1 Greater Sage-Grouse Cumulative Effects Analysis: Bighorn Basin

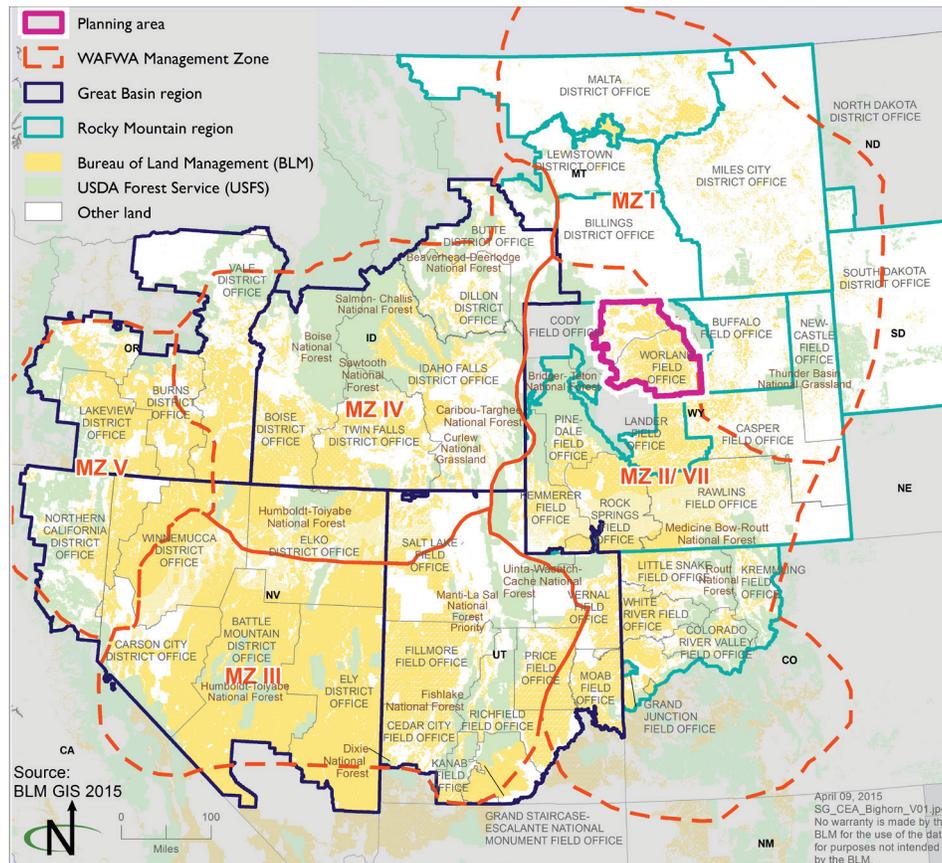
This cumulative effects analysis (CEA) discloses the long-term effects on Greater Sage-Grouse (GRSG) from implementing each RMP/EIS alternative in conjunction with other past, present, and reasonably foreseeable future actions. In accordance with Council on Environmental Quality guidance, cumulative effects need to be analyzed in terms of the specific resource and ecosystem being affected (Council on Environmental Quality 1997). As discussed in Chapter 1, the purpose for the proposed federal action is to identify and incorporate appropriate conservation measures to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. The Western Association of Fish and Wildlife Agencies (WAFWA) delineated seven sage-grouse management zones (MZ) based on populations within floristic provinces as depicted in Figure 7-1 (Stiver et al. 2006). The MZ is the appropriate geographic scope for this analysis because it encompasses areas with similar floristic conditions containing important GRSG habitat. Therefore, the cumulative effects analysis study area for the Greater Sage Grouse extends beyond the Bighorn Basin planning area boundary and incorporates WAFWA Management Zone (MZ) II/VII. MZ II and VII are combined for the purpose of characterizing GRSG habitat conditions and impacts, as was done in the Baseline Environmental Report (Manier et al. 2013). The planning area is almost entirely located within MZ II/VII, with the exception of a small portion on the eastern boundary located in MZ I. This portion of MZ I land contains 76,700 acres of GHMA and 0 acres of PHMA, which represents one tenth of one percent of all GHMA across MZ I; thus the relative influence of cumulative actions in the MZ I portion of the Bighorn Basin RMP planning area would be negligible.

The analysis of BLM actions in MZ II/VII is focused on the GRSG habitat within the MZs and is primarily based on MZ-wide datasets developed by the BLM National Operations Center (NOC). Where quantitative data are not available, analysis is qualitative. This analysis includes past, present and reasonably foreseeable future actions for all land ownerships in the MZ, and evaluates the impacts of the Bighorn Basin RMP, by alternative, when added to those actions. Non-federal actions considered in this analysis include, but are not limited to, the following:

- State plans
- Coordination with states and agencies during consistency reviews
- Additional data from non-BLM-administered lands

The following diagram shows the boundaries of the WAFWA MZs and BLM and Forest Service planning areas. The Bighorn Basin planning area has a relatively small influence in the context of MZ II/VII because it contains relatively few priority habitat management areas (PHMA) or general habitat management areas (GHMA): 1,786,200 acres of PHMA out of 14,105,000 total acres in MZ II/VII; and 3,780,500 acres of GHMA out of 17,771,500 total acres in MZ II/VII). As a result, actions in the Bighorn Basin RMP/EIS may have less cumulative impact on GRSG than those in larger planning areas in MZ II/VII.

Figure 7-1. Western Association of Fish and Wildlife Agencies Greater Sage-Grouse Management Zones



Section 7.1.1 describes the methods used in the analysis. Section 7.1.2 lists assumptions used in the analysis. Section 7.1.3 describes existing conditions in MZ II/VII and in the Bighorn Basin planning area. Section 7.1.4, Regional Efforts to Manage Threats to GRSG, provides a broad-scale description of past, present, and reasonably foreseeable future federal, state, local, and private actions influencing GRSG in MZ II/VII. Section 7.1.5 summarizes the relevant cumulative actions occurring in MZ II/VII. Section 7.1.6 analyzes threats to GRSG in MZ II/VII and discusses the potential cumulative effects resulting from each threat for each alternative. Section 7.1.7, Conclusions, determines the cumulative effects on GRSG as a result of implementing each alternative in the Bighorn Basin RMP, in combination with other private, local, regional, state, and federal past, present, and reasonably foreseeable future actions in MZ II/VII.

7.1.1 Methods

The CEA uses the following methodology:

- Data from the USGS publication “Summary of Science, Activities, Programs, and Policies That Influence the Rangeland Conservation of Greater Sage-Grouse” (Manier et al. 2013) establishes the baseline environmental condition against which the alternatives and other past, present, and reasonably foreseeable future actions are compared. Data from this publication are presented in terms of priority habitat and general habitat.
- The USFWS’s 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (USFWS 2010) and the USFWS publication Conservation Objectives: Final Report (i.e., the COT report; USFWS 2013) were reviewed to identify the primary threats facing GRSG in each WAFWA MZ. Table 2 of the COT report lists threats to GRSG that are present and widespread in each population in the MZ.
- For MZ II/VII the list of threats that are directly or indirectly affected by BLM actions are energy development/mining, infrastructure, grazing/free roaming equids, conversion to agriculture/urbanization, fire, spread of weeds, recreation, and conifers (USFWS 2013). Two other threats listed in the COT report, sagebrush eradication and isolation/small population size, affect GRSG populations in MZ II/VII. While they are not addressed separately in this analysis, they are discussed as elements of other threats.
- Predation was not included as a threat in the final COT report and was not identified by USFWS as a significant threat to GRSG populations (USFWS 2010). Predation is a natural occurrence that may be enhanced by human habitat modifications such as construction of infrastructure that may increase opportunities for nesting and perching or increase exposure of GRSG nests. In such altered habitats, predators may exert an undue influence on GRSG populations. Predation is discussed in this CEA in the context of these other threats.
- Sagebrush eradication is a component of many threats. Isolation/small population size is not analyzed separately, because no management actions directly address this threat. These two threats are discussed as a component of other threats and in the conclusions. Not all the threats discussed in this section represent major threats to GRSG in each planning area in the MZ, but each poses a present and widespread threat to at least one population.
- Each threat is analyzed, and a brief conclusion for each threat is provided.
 - The BLM NOC compiled MZ-wide datasets for quantifiable actions in all proposed LUPs within MZ II/VII. These datasets provide a means by which to quantify cumulative impacts resulting from direct impacts of the threats identified in the COT report on BLM-administered lands.
 - The tables in this cumulative analysis display the number of acres across the entire MZ and the percentage of those acres that are located within the Bighorn Basin planning area. The total number of acres in the MZ includes the number of acres in the other BLM and Forest Service proposed plans plus the number of acres in the applicable Bighorn Basin RMP alternative. For example, the total number of acres for Alternative A includes all of the other proposed plans in MZ II/VII plus Bighorn Basin RMP Alternative A. Likewise, the Alternative B acreage includes all of the other proposed plans in MZ II/VII plus Bighorn Basin RMP Alternative B.
 - Data and information were gathered from other federal, state, and local agencies and tribal governments, where available, and were used to inform the analysis of cumulative impacts on GRSG from each of the threats in MZ II/VII.

- A discussion is provided for each alternative in Section 7.1.7. Each alternative considers the cumulative impacts on GRSG from each of the threats. It also considers whether those threats can be ameliorated via implementation of that particular alternative in conjunction with past, present, and reasonably foreseeable non-BLM/Forest Service and BLM actions in MZ II/VII.
- The list of reasonably foreseeable future actions was derived from each proposed BLM/Forest Service RMP in MZ II/VII to provide an MZ-wide overview of the ongoing and proposed land uses in both MZs.
- Baseline data that are consistent across planning areas and that analyze cumulative effects for each alternative, including the No Action Alternative and Proposed Plan, are used in this analysis.
- PHMA and GHMA were developed to protect the best habitat and highest population density of GRSG. Although PHMA and GHMA are not designated under Alternative A, spatial data was clipped to these boundaries by the BLM's NOC to provide a consistent lens for comparison across all alternatives.
- This analysis uses the most recent information available. For purposes of this analysis, the BLM has determined that the Proposed Plans for the other ongoing GRSG planning efforts in MZ II/VII are reasonable foreseeable future actions.

7.1.2 Assumptions

This cumulative analysis uses the same assumptions and indicators as those established for the analysis of direct and indirect effects on GRSG in Section 4.4.9. In addition, the following assumptions have been made:

- The timeframe for this analysis is 20 years.
- The CEA area extends beyond the planning area and encompasses all of WAFWA MZ II/VII.
- The magnitude of each major threat would vary geographically and may have more or less impact on GRSG in some parts of the MZs, depending on factors such as climate, land use patterns and topography.
- A management action within an alternative would contribute a net conservation gain to GRSG if its effect is to reduce the level of a threat to GRSG from the level detailed in the 2010 USFWS listing decision for GRSG (USFWS 2010). A net conservation gain is equivalent to an actual benefit or gain above baseline conditions. Baseline conditions are defined as the pre-existing conditions of a defined area and/or resource that can be quantified by an appropriate metric(s).
- The CEA quantitatively analyzes GRSG and their habitat in the MZ. Impacts on habitat are likely to correspond to impacts on populations within MZ II/VII, since reductions or alterations in habitat could affect reproductive success through reductions in available forage or nest sites. Human activity could cause disturbance to the birds preventing them from mating or successfully rearing offspring. Human activities could also increase opportunities for predation, disease, or other stressors (Connelly et al. 2004; USFWS 2010; Manier et al 2013).
- In order to have consistency of analysis across the various planning areas within the MZ, the proposed Connectivity Areas have been classified as PHMA for cumulative analysis.

7.1.3 Existing Conditions in WAFWA MZ II/VII, and the Bighorn Basin Planning Area

This section summarizes existing conditions and past and present actions in the Bighorn Basin RMP planning area (provided in more detail in Chapter 3) and MZ II/VII as a whole. Reasonably foreseeable future actions are discussed in Section 7.1.5.

GRSG Habitat and Populations

MZ II/VII consists of nine populations: Eagle-South Routt, Middle Park, Laramie, Jackson Hole, Wyoming Basin, Rich-Morgan, Uintah, North Park, and Northwest Colorado. The bulk of the Bighorn Basin RMP planning area constitutes the Wyoming Basin population, which contains the largest regional extent and highest breeding density of GRSG in the western U.S. Leks in the northern portion of MZ II/VII are the most highly connected in the range (Knick and Hanser 2011), while populations in southern portions of MZ II/VII (i.e., the Colorado Plateau) are less robust, with low lek connectivity and a 96 percent chance of populations declining below 200 males by 2037 (Garton et al. 2011; Knick and Hanser 2011).

In MZ II/VII, state and private lands account for approximately 43 percent of GRSG habitat, with BLM-administered and other federal land accounting for 57 percent (Manier et al. 2013, p. 118). The BLM also has some management authority over split-estate lands, with privately held surface land and federal subsurface mineral rights. The higher percentage of GRSG habitat on BLM-administered and other federal land means BLM management could play a key role in alleviating threats to GRSG across MZ II/VII; however, the Bighorn Basin planning area has a small footprint relative to other planning areas in MZ II/VII.

Table 7-1 provides a breakdown of landownership and acres of GRSG habitat in MZ II/VII. As the table shows, approximately 30 percent of priority habitats, and 30 percent of general habitats are on BLM-administered lands. In the Bighorn Basin planning area, there are approximately 5.6 million acres of GRSG habitat, including approximately 3.1 million acres (56 percent) on BLM-administered lands. The remaining 2.5 million acres (44 percent) of GRSG habitat comprise private, local state, and other federal and tribal lands.

Table 7-1. Management Jurisdiction in MZ II/VII by Acres of Priority and General Habitats

	Total Surface Area (Acres)	Priority (Acres)	General (Acres)	Non-habitat (Acres)
MZ II and VII	92,776,100 (100%)	17,476,000 (19%)	19,200,200 (21%)	56,099,900 (60%)
BLM	30,295,000 (33%)	9,021,200 (30%)	9,012,500 (30%)	12,261,300 (40%)
Forest Service	23,558,800 (25%)	162,000 (<1%)	452,500 (2%)	22,944,300 (97%)
Tribal and Other Federal	7,086,200 (8%)	784,000 (11.1%)	1,354,600 (19%)	4,947,600 (51%)
Private	27,405,400 (30%)	6,233,900 (22%)	7,394,800 (27%)	13,776,700 (50%)
State	4,053,900 (4%)	1,244,800 (31%)	979,800 (24%)	1,829,300 (45%)
Other	376,700 (<1%)	30,100 (8%)	6,000 (2%)	340,600 (90%)

Source: Manier et al. 2013, p. 118

BLM Bureau of Land Management
MZ Management Zone

Planning Area Habitat Conditions

Much of the Bighorn Basin RMP planning area is characterized by sagebrush shrub, foothill mountain sage and shrub, and desert salt shrub and greasewood. Livestock grazing, fire, fire suppression, and surface-disturbing activities have influenced many grassland/shrub vegetation types within the planning area. Leks within the planning area are generally located at mid-elevation sagebrush habitats. Nesting and brood-rearing habitat is sometimes associated with the lek and sometimes found at a distance from the lek in sagebrush habitat. No SFAs are located within the planning area.

Population Trends in Management Zone II/VII

The Wyoming Basin population within MZ II/VII is the largest population in the GRSG range with over 20,000 males attending leks annually. Although recent data suggests a population increase, long-term monitoring is trending downward and population modeling suggests this trend will continue (Garton et al. 2011).

Wyoming data suggest a cyclic pattern, with population lows in 1995, 2002 and 2013, and peaks in 2000 and 2006. Actual trends are difficult to discern due to the lower survey effort prior to 2007, meaning the number and proportion of active to inactive leks is unknown. Since 2007, the number of active leks in Wyoming has remained stable (approximately 1,100 active leks), but the number of males/active lek has declined by more than half (from 42 to 17 males/lek). (Christiansen 2013). Garton et al. (2015, p. 33) found that between 2007 and 2013, the Wyoming Basin population showed a 63 percent decline in the estimated minimum male population attending leks.

The isolation of many other populations on the fringes of MZ II/VII makes them particularly vulnerable to habitat loss and fragmentation. Subpopulation areas at greatest risk include the Laramie and Jackson Hole subpopulation areas, which are close to energy development and recreational areas and face fragmentation risk from infrastructure (USFWS 2013).

7.1.4 Regional Efforts to Manage Threats to GRSG

Across the Greater Sage-Grouse range, other BLM and Forest Service sub-regions are undergoing RMP revision or amendment processes similar to this one for the Bighorn Basin planning area. The Final EIS associated with each of these efforts has identified a Proposed Plan that meets the purpose and need of conserving, enhancing, and/or restoring GRSG habitat by reducing, eliminating, or minimizing threats. The management actions from the various Proposed Plans will cumulatively decrease the threat of GRSG habitat loss and will limit fragmentation throughout the range. Key actions present in many of the Proposed Plans include changes in land use allocations, mitigation framework, an adaptive management strategy, anthropogenic disturbance cap, and protective management actions in priority and general habitat areas.

The BLM has incorporated management of Sagebrush Focal Areas (SFAs) into its proposed plan management approach for GRSG. SFAs are a subset of PHMA and represent recognized “strongholds” for the species that have been noted and referenced by the conservation community as having the highest densities of the species and other criteria important for the persistence of the species. Portions of the SFAs that are located on BLM-administered and National Forest System lands would be petitioned for withdrawal from mineral entry, and are prioritized for management and conservation actions, including, but not limited to, review of livestock grazing permits/leases. Management of SFAs would enhance protection of GRSG in these areas, providing a net conservation gain to the species in light of other past, present, and reasonably foreseeable future actions considered in this CEA. Within MZ II/VII

there are two SFAs (Bear River Watershed Area, and Southwestern/South Central Wyoming), totaling approximately 3,895,500 acres.

The WAFWA Sage-Grouse Strategy (Stiver et al. 2006) outlines a plan for monitoring, research, outreach, and funding for conservation projects for GRSG. A basic premise of the WAFWA Sage-Grouse Strategy is that additional conservation capacity must be developed at all local, state, federal, and range-wide levels for both the short term (3 to 5 years) and for the long term (10 years or more) to ensure GRSG conservation.

Wyoming Statewide Efforts

Wyoming has established Core Population Areas to help delineate landscape planning units by distinguishing areas of high biological value. These areas are based on the locations of breeding areas and are intended to help balance GRSG habitat requirements with demand for energy development (Doherty et al. 2011).

In 2000, the Wyoming Sage-Grouse Working Group (WSGWG) was formed to develop a statewide strategy for GRSG conservation. This group prepared the Wyoming GRSG Conservation Plan (WSGWG 2003) to provide coordinated management and direction across the state. In 2004, local GRSG working groups were formed to develop and implement local conservation plans. Eight local working groups around Wyoming have completed conservation plans, many of which prioritize addressing past, present, and reasonably foreseeable threats at state and local levels, and prescribe management actions for private landowners to improve GRSG conservation at the local scale, consistent with the overall Wyoming Core Strategy. The Northeast Wyoming Sage-Grouse Conservation Plan was completed in 2006 and was updated in 2014 (Northeast Wyoming Sage-grouse Working Group 2014). The local and regional working group plans would assist in GRSG conservation through monitoring, public awareness, and voluntary conservation actions on private land.

Wyoming Executive Order

Wyoming Governor Matt Mead issued an executive order on June 2, 2011 that complemented and replaced several executive orders issued by his predecessor. The 2011 Wyoming executive order articulates the State's Core Population Area Strategy (Core Area Strategy) as an approach to balancing GRSG conservation and development. It also provides an approach to mitigating human disturbances to GRSG.

The Wyoming executive order applies to state trust lands starting in 2008. These trust lands cover almost 23 percent of GRSG habitat and benefit approximately 80 percent of the estimated breeding population in the state (USFWS 2010). All proposed activities are evaluated through a density/disturbance calculation tool to determine if the project would exceed recommended density/disturbance thresholds. Additionally, the order has stipulations to be included in such permits, with varying restrictions, depending on whether the proposed development activity occurs within or outside delineated Core Population Areas (Wyoming Executive Order, June 2, 2011).

In Core Areas, there is a 0.6-mile no surface occupancy (NSO) buffer around occupied leks and restrictions on activities in breeding and winter concentration habitat. Wyoming's Industrial Siting Council, which permits large development projects on all lands in the state, is subject to the terms of the executive order. This buffer provides protection for males during lekking season and acts in coordination with the density disturbance cap. The combination of protections could offer GRSG considerable regulatory protection when large wind energy and other development projects are being considered in Wyoming (USFWS 2010; Manier et al. 2013). Statewide modeling of trends under the

Core Area Strategy suggests that with effective enforcement statewide, the strategy could reduce population losses by 9 to 15 percent across Wyoming. Moreover, the number of Core Areas predicted to maintain 75 percent of their current populations could increase from 20 to 25 under long-term scenarios (Copeland et al. 2013). Combining the Core Area Strategy with \$250 million in target conservation easements (provided willing landowners and funding are available) could reduce population declines by another 9 to 11 percent (Copeland et al. 2013).

Core Population Areas in Wyoming also incorporate connectivity corridors (Wyoming Executive Order 2011). These are areas GRSG use to maintain connectivity between habitat areas (Manier et al. 2013). Connectivity reduces isolation, thereby also reducing a population's vulnerability to disease, drought, or other events that may result in extirpation.

Umbrella Candidate Conservation Agreement with Assurances for Wyoming Ranch Management

Candidate Conservation Agreements with Assurances are voluntary conservation agreements between the USFWS and one or more federal or private partners (e.g., the ranchers). In return for managing lands to benefit GRSG, landowners receive assurances against additional regulatory requirements should GRSG be listed under the Endangered Species Act. Within Wyoming, the USFWS and Wyoming Governor's Office in conjunction with the BLM, Natural Resources Conservation Service, Forest Service, and other agencies, have developed an umbrella Candidate Conservation Agreement with Assurances for range management activities. Enrolled landowners are expected to comply with grazing specific conservation measures including but not limited to: avoid (or rotationally utilize) known nesting and brood-rearing habitat as a location for activities that concentrate livestock such as stock tank placement branding and roundup; place salt or mineral supplements in sites minimizing impacts to GRSG habitat; and within 24 months develop and implement a written grazing management plan to maintain or enhance the existing plant community as suitable GRSG habitat (USFWS et al. 2013).

Sweetwater River Conservancy Habitat Conservation Bank

The Sweetwater River Conservancy Habitat Conservation Bank is the first conservation bank established for GRSG. Located in central Wyoming, the bank manages habitat for GRSG allowing energy development and other activities to proceed on other lands within Wyoming. A conservation bank is a site or suite of sites established under an agreement with the USFWS, intended to protect, and improve habitat for species. Credits may be purchased which result in perpetual conservation easements and conservation projects on the land to offset impacts occurring elsewhere. The Sweetwater River Conservancy Habitat Conservation Bank launched with 55,000 deeded acres of GRSG habitat, and could expand up to 700,000 acres on other lands owned by the Sweetwater River Conservancy contingent upon demand (USFWS 2015).

Wyoming Landscape Conservation Initiative

The Wyoming Landscape Conservation Initiative is a long-term science based effort to assess and enhance aquatic and terrestrial habitats at a landscape scale in southwest Wyoming, while facilitating responsible development through local collaboration and partnership. Collaborative efforts address multiple concerns at a scale that considers all activities on the landscape, and can leverage resources that might not be available for single agency projects. GRSG initiatives from the Wyoming Landscape Conservation Initiative have included habitat enhancement efforts (e.g., invasive weed treatment, prescribed grazing strategies), and GRSG research studies (Wyoming Landscape Conservation Initiative 2013).

Montana Statewide Efforts

The Montana Department of Fish, Wildlife and Parks (MFWP) is tasked with implementing the range-wide WAFWA Sage-Grouse Strategy (Stiver et al. 2006) in Montana.

In addition, the MFWP's Montana Management Plan and Conservation Strategy for Sage-Grouse was initiated in 2005 to protect, maintain, and restore GRSG habitat. The plan ranks threats to the species across the state and provides an overall strategy for public and private cooperation in conservation actions. In 2013, the governor established the Greater Sage-Grouse Habitat Conservation Advisory Council to provide recommendations on policies and actions for GRSG conservation and provide regulatory authority for conservation actions. The council provided these recommendations in January 2014. The governor subsequently issued an executive order on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for future GRSG conservation in Montana.

Montana Executive Order

The Montana governor issued an executive order on September 9, 2014 (State of Montana 2014), based on the council recommendations that provided the direction for GRSG conservation in Montana.

Stipulations for development in the executive order and Montana Management Plan and Conservation Strategy for Sage-Grouse include but are not limited to:

- A 0.6-mile NSO buffer around the perimeter of active leks for new activities;
- Locating new overhead power lines and communication towers a minimum of 0.6 mile from the perimeter of active leks;
A minimum 2.0-mile buffer from active lek perimeters for main roads and a minimum 0.6-mile buffer for facility site access roads;
- A 5 percent limit on anthropogenic surface disturbance within the Density and Disturbance Calculation Tool examination area (based upon suitable habitat); and
- As authorized by permitting agency or agencies, activities (production, maintenance and emergency activity exempted), will typically be prohibited from March 15 through July 15 outside of the NSO perimeter of an active lek and within 2 miles of that perimeter in Core Population Areas where breeding, nesting, and early brood-rearing habitat is present.

Specifically, the following measures which would be implemented under the Proposed Plan, or are considered reasonably foreseeable future actions, would help meet the COT report objectives:

- Managing ROW exclusion and avoidance areas would help meet the COT report objective for infrastructure by limiting ROW/SUA development within PHMA. These actions would also help to meet the COT objectives for non-native, invasive plant species by reducing disturbances that promote the spread of weeds.
- Designating major and moderate oil and gas stipulations would limit development in PHMA, except where pre-existing valid rights apply. In these areas Conditions of Approval would limit disturbance.
- Implementation of state conservation plans and/or state executive orders would help meet all COT report objectives, particularly on non-BLM and non-National Forest System lands. Applying a 5 percent disturbance limit (under the Wyoming and Montana GRSG plans/executive orders) would reduce impacts contributing to population declines and range erosion associated with multiple threats including energy, mining, and infrastructure.

- Prioritizing conifer treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase I or 2, would reduce the rate of pinyon-juniper incursion and help to maintain healthy native sagebrush plant communities.
- Continued implementation of the Natural Resource Conservation Service Sage-Grouse Initiative would help meet the COT objective for the threat of agriculture conversion, by securing conservation easements on private lands. Fence marking, implementing prescribed grazing systems, and vegetation seeding would help meet the COT objectives for range management structures, grazing, and non-native, invasive plant species.

The approach of the Montana executive order/Montana Management Plan and Conservation Strategy for GRSG is similar to the Wyoming executive order. Montana's plan will apply a disturbance cap in core habitat and will limit well density and apply timing limitations. The 0.6-mile buffer would protect males in the vicinity of leks during the breeding season; the density limits and disturbance cap would protect GRSG during nesting, brood-rearing, and winter concentration activities. The timing restrictions would reduce the potential for displacement or disruption during the breeding season.

Colorado Statewide Efforts

In 2008, the Colorado Division of Wildlife (now Colorado Parks and Wildlife [CPW]) developed a state conservation plan, which prioritized threats and identified key issues facing conservation. The plan included issues, objectives, and strategies in detail. The strategies for conservation discussed responsible parties, lead agency, timeline, and cost associated with implementation of the strategy.

In 2012, a state conservation plan revision process began, and in consultation with stakeholders, a matrix summarizing implementation and effectiveness of the strategies was developed (Colorado Package), along with a subsequent Synthesis Report. The Colorado Package identified a number of conservation efforts within Colorado which have resulted in positive impacts to GRSG including acquisition of conservation easements and habitat improvement projects (Colorado Department of Natural Resources 2013). The Synthesis Report provided additional information on the effectiveness of conservation efforts such as county zoning ordinances which support protection of GRSG habitat, and measures from the Colorado State Board of Land Commissioners (SLB) which will support adaptive management techniques to improve GRSG habitat (Colorado Department of Natural Resources 2014).

Utah Statewide Efforts

The Conservation Plan for Greater Sage-grouse in Utah (Utah Division of Wildlife Resources 2013) was designed to protect, enhance, and restore GRSG habitat, in an effort to reduce the threats to the species. The plan identifies 11 sage grouse management areas throughout the state (including lands within MZ II/VII), which represent areas of high habitat value. The plan calls for state and local efforts to obtain incentive-based negotiated covenants, easements, leases or other legal tools in order to protect habitat. Additionally, the plan identifies a five percent disturbance limitation of habitat on state or federally managed lands, intended to limit the effects of large scale disturbances.

Idaho Statewide Efforts

In 2006, Idaho developed a statewide plan for the conservation of GRSG (Idaho Sage-grouse Advisory Committee 2006). The plan includes a toolbox of conservation measures to address threats to the species, as well as research, monitoring, and evaluation guidelines and recommendations. The plan was designed to provide guidance, tools, and resources to the local working groups in Idaho, and to facilitate

development of their plans. Rural Fire Protection Districts have been established within the state to help suppress fires in GRSG habitat.

Similar to efforts in nearby states, the governor of Idaho is expected to issue an executive order providing direction for GRSG conservation in Idaho on state lands. This executive order is expected to be largely consistent with BLM and Forest Service direction, though exact details are not known and are speculative as of the time this FEIS is published.

Natural Resource Conservation Service Sage Grouse Initiative

The Natural Resource Conservation Service's (NRCS) Sage Grouse Initiative (SGI) is working with private landowners in 11 western states to improve habitat for GRSG (Manier et al. 2013). With approximately 31 percent of all sagebrush habitats across the range in private ownership (Stiver 2011, p. 39), including 37 percent of priority and general habitat in MZ II/VII (Manier et al. 2013, p. 118), a unique opportunity exists for the NRCS to benefit GRSG and ensure the persistence of large and intact rangelands by implementing long term contracts and conservation easements.

Participation in the SGI program is voluntary, but willing participants enter into binding contracts to ensure that conservation practices that enhance GRSG habitat are implemented. Participating landowners are bound by a contract (usually 3 to 5 years) to implement, in consultation with NRCS staff, conservation practices if they wish to receive the financial incentives offered by the SGI. These financial incentives generally take the form of payments to offset costs of implementing conservation practices and easements or rental payments for long-term conservation.

While potentially effective at conserving GRSG populations and habitat on private lands, incentive-based conservation programs that fund the SGI generally require reauthorization from Congress under subsequent farm bills, meaning future funding is not guaranteed.

As of 2015, SGI has secured conservation easements on 243,400 acres within MZ II/VII (NRCS 2015). On these and additional lands in the MZ, SGI has completed specific GRSG conservation actions, including implementation of grazing systems, conifer removal, vegetation seeding, and fence marking. These conservation actions are targeted at the critical threats in the MZ. Additionally, SGI clusters implementation to achieve landscape benefits (NRCS 2015).

Other Regional Efforts

A programmatic EIS by the Western Area Power Administration (WAPA) and the USFWS for the entire upper Great Plains will focus future wind energy developments in specific corridors outside of GRSG core habitat (WAPA 2013). In accordance with Section 7 of the ESA, preparation of the programmatic EIS has involved consultation between cooperating entities and the USFWS and preparation of a programmatic Biological Assessment to ensure that the action will not jeopardize the continued existence of any federally-listed species, including the federal candidate GRSG. At the time of this RMPA specific conservation measures for protecting GRSG and its habitat under the programmatic EIS are not developed.

Tribes, counties, and local working groups are playing a critical role in promoting GRSG conservation at the local level. Individual conservation plans have been prepared by most local working groups to develop and implement strategies to improve or maintain GRSG habitat and reduce or mitigate threats. The proposed conservation actions and recommendations in these plans are voluntary actions. The conservation plans located in Wyoming are used as instruments to inform the Wyoming executive order.

Local working group projects include monitoring, research, and mapping habitat areas, as well as public outreach efforts, such as landowner education and collaboration with federal, state, and other local entities. These efforts provide a net conservation gain to GRSG through increased monitoring and public awareness.

Local working group GRSG conservation plans in MZ II/VII include the following:

- Northwest Colorado (Northwest Colorado Greater Sage-Grouse Conservation Plan; 2008)
- Piceance/Parachute Roan Creek (Parachute-Piceance-Roan Greater Sage-Grouse Conservation Plan; 2008)
- Northern Eagle/Southern Routt (Northern Eagle County and Southern Routt County Greater Sage-Grouse Conservation Plan; 2004)
- North Park (North Park Greater Sage-Grouse Conservation Plan; 2001)
- Middle Park (Middle Park Sage Grouse Conservation Plan; 2001)
- Rich County (Rich County Sage-grouse Conservation Plan; 2006)
- Morgan-Summit (Morgan-Summit Greater Sage-Grouse Local Conservation Plan; 2006)
- Uintah Basin (Uinta Basin Greater Sage-Grouse Local Conservation Plan; 2007)
- Upper Green River Basin (Upper Green River Basin Sage-Grouse Grouse Conservation Plan; 2007)
- Upper Snake River Basin (Upper Snake River Basin Sage-Grouse Conservation Plan; 2008)
- Wind River/Sweetwater River Basin (Wind River/Sweetwater River Local Sage-Grouse Conservation Plan; 2007)
- Southwest Wyoming (Southwest Wyoming Sage-grouse Conservation Assessment and Plan; 2007)
- South Central Wyoming (South Central Sage-Grouse Conservation Plan; 2007)
- Bates Hole/Shirley Basin (Bates Hole/Shirley Basin Sage-grouse Conservation Plan; 2007)
- Bighorn Basin, Wyoming (Sage grouse Conservation Plan for the Bighorn Basin; Bighorn Basin Sage-grouse Local Working Group; 2007)

7.1.5 Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Bighorn Basin RMP and alternatives in combination with other past, present, and reasonably foreseeable future federal and non-federal action on all lands in MZ II/VII. Where these occur within GRSG habitat, they would cumulatively add to the impacts of BLM- and Forest Service-authorized activities set forth in the Bighorn Basin Proposed Plan. In addition to the conservation efforts described above, relevant reasonably foreseeable future cumulative actions occurring on federal, private, or mixed landownership in MZ II/VII are described in the Proposed RMPAs/LUPAs for Northwest Colorado. The following list includes large-scale past, present, and reasonably foreseeable future actions in MZ II/VII that when added to the Proposed Plan and alternatives for the Bighorn Basin RMP, could cumulatively affect GRSG (see Table 7-12 for more detail):

- Hiawatha Regional Energy Development EIS
- LaBarge Platform Exploration & Development Project
- Continental Divide-Creston Natural Gas Project

- Moneta Divide Natural Gas and Oil Development Project
- Pinedale Anticline Project
- Black Fork Project (Formerly Moxa Arch Area Infill)
- Oil Shale and Tar Sands Programmatic EIS
- Atlantic Rim Natural Gas Field Development Project
- Chokecherry Sierra Madre Wind Farm
- Gateway South Transmission Line Project
- TransWest Express Transmission Line Project
- Gateway West Transmission Line Project
- Riley Ridge o Natrona Pipeline Project
- Invasive Plant Management EIS for the Medicine Bow – Routt National Forests, and Thunder Basin National Grassland
- Normal-Pressured Lance Natural Gas EIS
- Bird Canyon Field Infill EIS

These projects are incorporated into the following analysis as the relevant past, present, and reasonably foreseeable future projects associated with each threat to GRSG in MZ II/VII.

7.1.6 Threats to GRSG in MZ II/VII

The COT Report identifies the present and widespread threats facing GRSG in MZ II/VII as identifies energy development; infrastructure; grazing, including free-roaming equids; conversion to agriculture and urbanization; fire; spread of weeds; and recreation (USFWS 2013). These threats impact GRSG mainly by fragmenting and degrading their habitat. For example, the loss of sagebrush steppe across the West approaches or exceeds 50 percent in some areas. Habitat fragmentation and degradation is a primary factor in long-term declines in GRSG abundance across its historical range (USFWS 2010).

Habitat fragmentation reduces connectivity of populations and increases the likelihood of extirpation from random events such as drought or outbreak of West Nile virus. Furthermore, climate change is likely to affect habitat availability to some degree by decreasing summer flows and limiting growth of grasses and forbs, thereby limiting water and food supply (BLM 2012). Sensitive species such as GRSG, which are already stressed by declining habitat, increased development, and other factors, could experience additional pressures as a result of climate change.

Each COT report threat considered “present and widespread” in at least one population in MZ II/VII is discussed below. For more detail on the nature and type of effects and the direct and indirect impacts on GRSG in the planning area, see Chapter 4 of the Bighorn Basin PRMP/FEIS.

7.1.6.1 Energy Development

The COT report states that energy development should be designed to ensure that it will not impinge on stable or increasing GRSG population trends. For mining, the COT objective is to maintain stable to increasing GRSG populations and no net loss of GRSG habitats in areas affected by mining (USFWS 2013).

There are approximately 1,144,800 acres of GRSG habitat in MZ II/VII where energy development, including oil and gas, coal leasing, mineral materials, and non-energy leasable minerals, is occurring. In

addition, there are over 30,000,000 acres indirectly influenced by energy development (Manier et al. 2013, pp. 55-71).

Oil and Gas

Nature and Type of Effects

As discussed in Chapter 4, oil and gas development impacts GRSG and sagebrush habitats through direct disturbance and habitat loss from well pads, construction activities, seismic surveys, roads, power lines, and pipeline corridors. Indirect disturbances result from noise, gaseous emissions, vehicle traffic, changes in water availability and quality, and human presence. These factors could cumulatively or individually lead to habitat fragmentation in the long term (Connelly et al. 2004; Holloran 2005).

Oil and gas development also directly impacts GRSG through the species' avoidance of infrastructure. This development can also impact GRSG survival or reproductive success. Indirect effects include habitat quality changes, predator communities, and disease dynamics (Naugle et al. 2011).

Several studies completed in the Great Plains and Wyoming Basin have shown that breeding GRSG populations are affected at oil and gas well densities commonly permitted in Montana and Wyoming (Naugle et al. 2011). Doherty et al. (2010) found that although impacts were indiscernible at densities of less than one well per square mile, lek losses were two to five times greater in areas with development above this threshold. They also found that the abundance (number) of males per lek at the remaining leks declined by approximately 30 to 80 percent. These and other studies demonstrate that both direct and indirect impacts result from the impacts of energy development and geophysical exploration in GRSG habitat.

Studies have researched the efficacy of NSO stipulations for leasing and development within certain distances of a lek (Holloran 2005; Walker et al. 2007). Walker et al. (2007) found that in the Powder River Basin, buffer sizes of 0.25, 0.5, 0.6, and 1.0 mile resulted in an estimated lek persistence (the ability of leks to remain on the landscape) of approximately 5, 10, 15, and 30 percent, respectively; conversely, lek persistence in areas without oil and gas development averaged approximately 85 percent. 0.25-mile NSO lease stipulations were found to be insufficient to conserve breeding GRSG populations in Wyoming and Montana, when nearly 100 percent of the area within approximately 2 miles of leks remained open to full-scale development (Walker et al. 2007).

Research has also studied the effects of energy development on GRSG at distances greater than one mile. Naugle et al. (2011) reported that impacts of energy development on leks had been documented at distances greater than 3.5 miles from the lek. Holloran (2005) found impacts on abundance at a distance between 3 and 4 miles in western Wyoming. However, Naugle et al. (2011) also stated that impacts on leks caused by energy development were most severe nearer the lek.

The impacts of well density have also been researched. Naugle et al. (2011) found that impacts from energy development often extirpate leks from gas fields. Doherty (2008) documented that lek losses increased and male abundance decreased as well density increased in the Powder River Basin. Lek extirpation in areas with 8 wells per section (40 to 100 wells total) within 2 miles of the lek was 5 times more likely to occur than in areas with no wells within 2 miles. Male attendance at the remaining leks in these areas declined approximately 20 to 60 percent (Doherty 2008).

The effects of noise on GRSG have been quantified in several studies. Lyon and Anderson (2003) reported that oil and gas development influenced the rate of nest initiation of GRSG in excess of approximately 2 miles of construction activities. GRSG numbers on leks within approximately 1 mile of natural gas compressor stations in Campbell County, Wyoming, were consistently lower than numbers

on leks unaffected by this noise disturbance (Braun et al. 2002). Holloran and Anderson (2005) reported that lek activity decreased downwind of drilling activities, suggesting that noise caused measurable impacts. In addition to activities directly associated with oil and gas development, road traffic also generates noise. Knick et al. (2003) indicated that there were no active GRSG leks within approximately 1 mile of Interstate 80 across southern Wyoming; only 9 leks were known to occur between approximately 1 and 2.5 miles of Interstate 80.

Conditions in MZ II/VII

The Greater Green River Basin, Uintah-Piceance Basin, and North Park Basin are all important oil and gas reserves in MZ II/VII.

Oil and natural gas development-related wells indirectly influence 78 to 84 percent of priority habitats and general habitats respectively across MZ II/VII. BLM-administered lands are host to 54 percent of wells in priority habitats and 50 percent in general habitats within MZ II/VII (Manier et al. 2013). Therefore, BLM actions are likely to have a greater potential to ameliorate the adverse impacts of oil and gas development on GRSG habitat than any other single land management entity.

Oil and gas conservation measures across MZ II/VII are more widespread than in the past. Much oil and gas development on private lands previously occurred with minimal mitigation efforts, but restrictions are now in place to protect GRSG habitat under the Wyoming and Montana executive orders. Additionally, in Colorado, operators may be subject to consultation requirements under the Colorado Oil and Gas Conservation Commission rules, to determine if conditions of approval are necessary to minimize adverse impacts from proposed oil and gas operations in sensitive wildlife habitat (such as GRSG PHMA).

Impact Analysis

Table 7-2, Acres Open and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ II/VII, and Table 7-3, Acres with NSO and CSU/TL Stipulation in GRSG Habitat in MZ II/VII, provide a quantitative summary of present fluid mineral leasing conditions on BLM-administered lands across MZ II/VII. An analysis of this summary along with other past, present, and reasonably foreseeable actions in MZ II/VII (Table 7-12) follows.

As stated under Methods and Assumptions, acreages in these tables are limited to BLM-administered lands and always assume implementation of Proposed Plans in other RMP planning areas across MZ II/VII. Tables displaying fluid mineral acreage include the federal mineral estate.

Table 7-2. Acres Open* and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open* to Fluid Mineral Leasing				
Alternative A	208,000	100%	2,522,000	43%
Alternative B	0	0%	1,875,000	20%
Alternative C	0	0%	3,949,000	62%
Alternative E	0	0%	1,854,000	19%
Alternative F	0	0%	2,370,000	37%
Proposed Plan	0	0%	2,378,000	37%
Closed to Fluid Mineral Leasing				
Alternative A	1,266,000	3%	1,142,000	18%
Alternative B	2,715,000	55%	1,825,000	49%
Alternative C	1,224,000	0%	1,083,000	13%
Alternative E	2,715,000	55%	1,825,000	49%
Alternative F	1,290,000	5%	1,133,000	17%
Proposed Plan	1,290,000	5%	1,165,000	19%

Source: BLM 2015

*Open with standard lease terms and conditions. This table displays the acres of PHMA and GHMA open and closed to fluid mineral leasing in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
 GRSG Greater sage-grouse
 MZ Management Zone
 PHMA Priority Habitat Management Areas

Table 7-3. Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
NSO Stipulations				
Alternative A	4,102,000	14%	1,277,000	25%
Alternative B	3,546,000	0%	1,876,000	49%
Alternative C	3,546,000	0%	1,044,000	8%
Alternative E	3,546,000	0%	1,913,000	50%
Alternative F	4,442,000	20%	1,273,000	25%
Proposed Plan	4,442,000	20%	1,281,000	25%
CSU/TL Stipulations				
Alternative A	5,562,000	12%	6,679,000	14%
Alternative B	4,923,000	0%	6,074,000	5%
Alternative C	4,923,000	0%	7,058,000	19%
Alternative E	4,923,000	0%	6,059,000	5%
Alternative F	5,407,000	9%	6,913,000	17%
Proposed Plan	5,407,000	9%	6,957,000	17%

Source: BLM 2015

This table displays the acres of PHMA and GHMA with NSO Stipulations and CSU/TL Stipulations in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

- CSU Controlled surface use
- GHMA General Habitat Management Areas
- GRSG Greater sage-grouse
- MZ Management Zone
- NSO No surface occupancy
- PHMA Priority Habitat Management Areas
- TL Timing limitations

As shown in Table 7-2 and Table 7-3, fluid mineral closures and stipulations within the Bighorn Basin RMP planning area generally exert limited influence due to their small acreage compared to the broader MZ. However, actions such as closing PHMA and GHMA to leasing, establishing 0.6 mile-lek buffers in accordance with the Wyoming executive order, applying the disturbance cap, and implementing NSO and CSU/TL stipulations within the planning area would help to reduce the threat of oil and gas development within the MZ.

Under Alternative A, 208,000 acres of PHMA in MZ II/VII would be open to fluid mineral leasing under standard lease terms and conditions (all of which would be located in the Bighorn Basin planning area). Additionally, 2,522,000 acres of GHMA would be open to leasing in the MZ. The lack of protective restrictions in these areas would increase the potential for harm or disturbance associated with new leasing projects. GRSG would be most vulnerable to disturbances from oil and gas leasing and development in the Bighorn Basin planning area; implementing other BLM proposed plans throughout the remainder of the MZ would result in greater long-term protections on BLM-administered lands in those areas. Conservation actions at the state and local level (e.g., state GRSG plans, conservation easements, etc.) would complement other BLM proposed plans while oil and gas related past, present,

and reasonably foreseeable future actions that result in surface disturbance would result in a continued threat to GRSG specifically within the planning area.

Acres of PHMA and GHMA closed to fluid mineral leasing in MZ II/VII would be greatest under Alternative B and E. As such, there would not be oil and gas development in these areas, reducing the potential impact to GRSG populations. The risk of habitat fragmentation or disturbance due to new oil and gas development would be reduced. The incremental effect of implementing alternatives B or E in conjunction with BLM proposed plans elsewhere in the MZ and the past, present, and reasonably foreseeable future actions disclosed in Table 7-12 would result in a net conservation gain to GRSG in MZ II/VII because these two alternatives are the most restrictive for oil and gas development.

Alternative C provides the fewest restrictions on energy development in MZ II/VII. For example, approximately 3,949,000 acres of GHMA would be open to fluid mineral leasing under standard conditions. Reasonably foreseeable future leasing projects would be less restricted under this alternative, which could increase the risk of habitat fragmentation or disturbance, particularly within the Bighorn Basin planning area. Implementation of the BLM/Forest Service Proposed Plans in other planning areas would help ameliorate the threat of oil and gas development in those areas, but this alternative would result in a lower net conservation gain than alternatives B, E, or the Proposed Plan.

Under the Proposed Plan, no PHMA in MZ II/VII would be open to fluid mineral leasing with standard terms and conditions; approximately 2,378,000 acres of GHMA would be open with standard terms and conditions. Closing PHMA to fluid mineral leasing or applying major or moderate stipulations would benefit GRSG by limiting new development in PHMAs. While new oil and gas development is likely to occur on lands not administered by the BLM, such projects may be subject to the requirements of the Wyoming executive order and other state plans, which would limit disturbance. The incremental effect of implementing the Proposed Plan in conjunction with other GRSG conservation actions in MZ II/VII would be a net conservation gain for GRSG because of the additional restrictions in PHMAs.

Acres of GRSG habitat open, closed, or subject to NSO and CSU/TL stipulations under Alternative F are similar to those under the Proposed Plan, with slightly more acres of GHMA closed to fluid mineral leasing. Because the past, present, and reasonably foreseeable future actions would remain the same, the cumulative effects on GRSG in MZ II/VII would be similar to those discussed under the Proposed Plan.

All BLM/Forest Service Proposed Plans within MZ II/VII include BMPs and required design features to minimize impacts on GRSG from oil and gas development on federal lands. In areas where mineral estate is currently unleased, these tools can be applied to future leases; in areas which are already leased, BMPs can be applied as conditions of approval for development of existing leases. Examples include: locating new compressor stations outside of PHMA to reduce noise disturbance; clustering operations and facilities as closely as possible; placing infrastructure in already disturbed locations where the habitat has not been fully restored; and restoring disturbed areas at final reclamation to the pre-disturbance landforms and desired plant communities. State plans contain similar measures to reduce impacts. Together, these measures would help protect unfragmented habitats, minimize habitat loss and fragmentation, and maintain conditions that meet GRSG life history needs. Recent research indicates that restored habitats lack many of the features sought by GRSG in their habitat areas, and may not support GRSG for long periods following restoration activities. In order to conserve GRSG populations on the landscape, protection of existing habitat through minimizing development, would provide the best hope for GRSG persistence (Arkle et al. 2014).

The effect of the alternatives and other conservation actions in the MZ (most notably the Montana and Wyoming executive orders) could be synergistic, meaning that the effects of the actions together is

greater than the sum of their individual effects. For example, applying buffers in PHMA and on state and private land would effectively conserve larger blocks of land than if these actions occurred individually. This would provide a landscape-scale net conservation benefit, especially in areas where little development has occurred to date.

Implementation of the Proposed Plan within the Bighorn Basin planning area, in combination with other BLM planning efforts and other GRSG conservation plans within MZ II/VII could affect proposed oil and gas development projects. Large-scale oil and gas projects which could potentially occur on GRSG habitat within MZ II/VII (such as the Hiawatha Regional Energy Development EIS, LaBarge Platform Exploration & Development Project, and Continental Divide-Creston Natural Gas Project as discussed in Table 7-12) would be subject to disturbance cap limitation requirements of the Wyoming executive order and/or BLM/Forest Service Proposed Plans. NSO and CSU/TL stipulations would also apply in GRSG habitat on BLM-administered lands. These restrictions would contribute to the greatest net conservation gain of any alternative because they would limit development in key habitat areas. Because leasing restrictions (e.g., closures in PHMA and NSO stipulations) under the Proposed LUPs in MZ II/VII would not preclude existing leases in PHMA and GHMA from being developed, reasonably foreseeable future projects for oil and gas development are likely to affect GRSG and sagebrush habitats. However, mitigation requirements in BLM/Forest Service LUPAs and state and other GRSG conservation plans would offset disturbances from future projects and result in a net conservation gain for GRSG.

Coal

Nature and Type of Effects

Coal extraction is a major mining activity in GRSG habitat (Braun 1998), and environmental effects include soil erosion, dust, noise, water pollution, acid-mine drainage, and air emissions. These environmental effects can result in GRSG behavioral disruptions and habitat removal or degradation. Although land disturbed by coal mining can be restored to a point that supports a diversity of vegetation, including big sagebrush, reclamation projects require long durations, and GRSG habitat may fail to be restored (Arkle et al. 2014).

Conditions in MZ II/VII

Coal surface leases indirectly influence 8 to 10 percent of priority habitats and general habitats respectively across MZ II/VII. Approximately 50 percent of coal leases in priority habitats (and 57 percent in general habitats) occur on private lands within MZ II/VII (Manier et al. 2013). Therefore, private actions are likely to have a greater potential to ameliorate the effects of coal development on GRSG than any other single land management entity.

Impact Analysis

Coal leasing and development is less extensive in the Bighorn Basin planning area than in other areas of MZ II/VII. As such, management actions in the Bighorn Basin RMP/EIS would have less influence in ameliorating the threat than other regional efforts. Because the Bighorn Basin RMP/EIS would have such a small impact on the broader MZ, there would be little variation in the effects on GRSG within MZ II/VII across the RMP/EIS alternatives.

Under all alternatives and the Proposed Plan, new coal lease applications on federal mineral estate would be subject to suitability determinations governed by 43 CFR, Part 3461.5. Under unsuitability criterion 15, the BLM may determine that portions of the MZ contain essential GRSG habitat and are

unsuitable for all or certain stipulated methods of coal mining. If the BLM made this determination, it would apply stipulations to restrict coal mining and protect GRSG, including possibly prohibiting surface coal mining. As such, the regulations under Criterion 15 of 43 CFR, Part 3461.5(o)(1) would reduce the potential for long-term impacts associated with new coal leasing projects on GRSG habitats and populations.

New coal leasing and development may also occur on non-federal lands in MZ II/VII, subject to state regulations (including reclamation requirements). Additionally, new coal leasing in Wyoming and Montana would be subject to the Surface disturbance limit as required by the Wyoming and Montana executive orders. These measures would help protect GRSG habitat on lands where 43 CFR, Part 3461.5(o)(1) do not apply.

The requirements of 43 CFR, Part 3461.5, Criterion 15, in combination with BLM planning efforts and state plans, would help reduce the threat from coal extraction and would provide a net conservation gain to GRSG in MZ II/VII.

Mineral Materials

Nature and Type of Effects

Development of surface mines (e.g., for sand, gravel and other common mineral materials found in MZ II/VII) may negatively impact GRSG numbers and disrupt the habitat and life-cycle of the species, similar to other types of mining activities (Braun 1998; Manier et al. 2013).

Conditions in MZ II/VII

Mineral material disposal sites indirectly influence 17 percent of priority habitats and 11 percent of general habitats across MZ II/VII. Approximately 65 percent of mineral material disposal sites in priority habitats and 60 percent of sites in general habitats occur on BLM-administered lands within MZ II/VII (Manier et al. 2013). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of mineral material disposal on GRSG than any other single land management entity.

Impact Analysis

As shown in Table 7-4, Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ II/VII, acres of PHMA and GHMA closed to mineral material disposal within the planning area generally have a relatively smaller influence, when compared to the broader MZ.

Table 7-4. Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Mineral Material Disposal				
Alternative A	7,530,000	19%	10,417,000	23%
Alternative B	6,680,000	8%	8,971,000	11%
Alternative C	6,126,000	0%	11,705,000	32%
Alternative E	6,126,000	0%	8,971,000	11%
Alternative F	7,556,000	19%	10,436,000	24%
Proposed Plan	7,181,000	15%	9,762,000	18%
Closed to Mineral Material Disposal				
Alternative A	3,487,000	2%	1,285,000	13%
Alternative B	4,398,000	22%	2,675,000	58%
Alternative C	3,433,000	0%	1,454,000	23%
Alternative E	4,952,000	31%	2,675,000	58%
Alternative F	3,461,000	1%	1,265,000	12%
Proposed Plan	3,495,000	2%	1,390,000	20%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to mineral material disposal in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
 GRSG Greater sage-grouse
 MZ Management Zone
 PHMA Priority Habitat Management Areas

Under Alternative A, 3,487,000 acres of PHMA are closed to mineral material disposal in MZ II/VII and 1,285,000 acres of GHMA are closed. 7,530,000 acres of PHMA would remain open, as would 10,417,000 acres of GHMA. Reasonably foreseeable future mineral material disposals in MZ II/VII could affect GRSG through habitat disturbance, fragmentation, or behavior disruptions, depending on the location and extent of the project; however, implementation of BLM/Forest Service Proposed Plans in other areas of MZ II/VII would restrict development, thereby reducing the risk of removing or fragmenting habitat elsewhere in MZ II/VII, particularly on federal lands. There would be a net conservation gain to GRSG in MZ II/VII, but it would be concentrated in areas outside the Bighorn Basin planning area and would have a less widespread beneficial impact on the Wyoming Basin population in the planning area.

Substantially more acres of PHMA and GHMA are closed under alternatives B and E. These closures would restrict the development of mineral materials on GRSG habitat on federal lands, thereby contributing to the protection of habitat. However, designating GRSG habitat as open or closed to mineral material disposal would not preclude existing facilities from continued operation. In areas where existing mineral material disposal sites affect GRSG (e.g., through noise disturbance or vehicle

collision risk), these impacts would likely continue. Impacts in other areas of MZ II/VII would be the same as under Alternative A.

Under Alternative C, 3,433,000 acres of PHMA would be closed to mineral material disposal in MZ II/VII and 1,454,000 acres of GHMA would be closed. While this Alternative closes the fewest acres of PHMA to mineral material disposal, implementation of state plans and BLM/Forest Service Proposed Plans in other areas of MZ II/VII are considered present and reasonably foreseeable future actions, respectively, which would contribute to the protection of habitat and a net conservation gain.

Under the Proposed Plan, 3,495,000 acres of PHMA would be closed to mineral material disposal in MZ II/VII; 1,390,000 acres would be closed in GHMA. On non-federal lands, the development limitations applied under the Wyoming executive order would reduce impacts to GRSG habitat across the state, and would encourage mineral material disposal in areas away from Core Areas. Together, the incremental effect would be a net conservation gain to GRSG.

Under Alternative F, slightly fewer acres of PHMA and GHMA in MZ II/VII would be closed to mineral material disposal in comparison to the Proposed Plan; the cumulative effects on GRSG are similar to those for the Proposed Plan, but less beneficial on BLM-administered lands within the planning area. This would impact the Wyoming Basin population's integrity more than populations elsewhere in the MZ.

Locatable Minerals

Nature and Type of Effects

Locatable minerals include gold, silver, uranium, and bentonite. Activities associated with locatable mineral development, such as stockpiling topsoil and extracting and transporting material, have direct impacts on GRSG through mortality and nest disruption. These actions also would reduce the functionality of the surrounding habitat via noise and light disturbance, resulting in lost and degraded PHMA and GHMA.

As with fluid mineral development, reclamation practices may help to reduce long-term impacts on GRSG and their habitat. Although disturbed areas have not been restored to near pre-disturbance conditions in the past, recent efforts have been directed toward restoring functional habitat. However, even with effective restoration, restored areas may not support GRSG populations at the same level as prior to disturbance.

Conditions in MZ II/VII

Within MZ II/VII, bentonite, gypsum, gold, and uranium are all commonly mined for commercial use.

Impact Analysis

As shown in Table 7-5, Acres Open and Recommended with Mineral Withdrawal, acres of GRSG habitat recommended for withdrawal generally represents a relatively small influence, when compared to the broader MZ.

Table 7-5. Acres Open and Recommended for Withdrawal from Mineral Entry in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Mineral Entry				
Alternative A	8,154,000	17%	8,910,000	27%
Alternative B	8,213,000	18%	8,830,000	27%
Alternative C	6,770,000	0%	10,413,000	38%
Alternative E	6,770,000	0%	8,825,000	27%
Alternative F	8,169,000	17%	8,993,000	28%
Proposed Plan	8,190,000	17%	8,940,000	28%
Recommended for Withdrawal from Locatable Mineral Entry				
Alternative A	890,000	0%	209,000	8%
Alternative B	941,000	6%	355,000	46%
Alternative C	887,729	0%	202,000	4%
Alternative E	2,383,000	63%	359,000	46%
Alternative F	894,000	1%	217,000	12%
Proposed Plan	893,000	1%	235,000	18%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open to mineral entry and recommended for withdrawal from locatable mineral entry in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
 GRSG Greater sage-grouse
 MZ Management Zone
 PHMA Priority Habitat Management Areas

Under Alternative A, 890,000 acres of PHMA would be recommended for withdrawal from locatable mineral entry in MZ II/VII. Additional acres of PHMA would be recommended for withdrawal under alternatives B, E, F, and the Proposed Plan. Acres of PHMA and GHMA recommended with withdrawal in MZ II/VII would be greatest under Alternative E. Under all alternatives, withdrawing lands from locatable mineral development is unlikely to mitigate existing or approved projects in GRSG habitat. However, withdrawing GRSG habitat from mineral entry would reduce the risk of sagebrush habitat loss or fragmentation caused by new locatable mineral development projects.

Under all alternatives, required design features would help minimize the impacts on GRSG from locatable mineral development on federal land. All BLM/Forest Service Proposed Plans within MZ II/VII include required design features. Examples include: locating facilities outside of PHMA to reduce noise disturbance; clustering operations and facilities as closely as possible; placing infrastructure in already disturbed locations where the habitat has not been fully restored; and restoring disturbed areas at final reclamation to the pre-disturbance landforms and desired plant communities.

Under the Proposed Plan, portions of SFAs would be recommended for withdrawal. As such, if these areas are withdrawn the Proposed Plan would provide a greater net conservation gain to GRSG populations by reducing disturbance to birds from mining activities.

Nonenergy Leasable Minerals

Nature and Type of Effects

Nonenergy leasable minerals include materials such as sulfates, silicates, and trona (sodium carbonate). Impacts on GRSG are similar to those from other types of mining as described above.

Conditions in MZ II/VII

In MZ II/VII, existing federal mineral prospecting permits for nonenergy leasable resources have a direct footprint on 378,400 acres of priority habitats and 557,100 acres of general habitats (Manier et al. 2013, P. 79).

Impact Analysis

Table 7-6, Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ II/VII, shows acres of GRSG habitat open and closed to nonenergy leasing in the MZ.

Table 7-6. Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ II/VII

	PHMA		GHMA	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Nonenergy Leasing				
Alternative A	5,921,000	0%	7,939,000	0%
Alternative B	5,921,000	0%	7,939,000	0%
Alternative C	5,921,000	0%	7,939,000	0%
Alternative E	5,921,000	0%	7,939,000	0%
Alternative F	5,921,000	0%	7,939,000	0%
Proposed Plan	5,921,000	0%	7,939,000	0%
Closed to Nonenergy Leasing				
Alternative A	3,646,000	0%	1,114,000	0%
Alternative B	3,646,000	0%	1,114,000	0%
Alternative C	3,646,000	0%	1,114,000	0%
Alternative E	3,646,000	0%	1,114,000	0%
Alternative F	3,646,000	0%	1,114,000	0%
Proposed Plan	3,646,000	0%	1,114,000	0%

Source: BLM 2015

This table displays the acres of PHMA and GHMA open and closed to nonenergy leasing in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
 GRSG Greater sage-grouse
 MZ Management Zone
 PHMA Priority Habitat Management Areas

No federal lands within the Bighorn Basin planning area were designated as open or closed under the RMP; therefore, cumulative impacts to GRSG within MZ II/VII would vary little across all alternatives because past, present, and reasonably foreseeable future actions would not vary across alternatives. New nonenergy leasable projects occurring in GRSG habitat could impact GRSG and their habitat, depending on the location and extent of the development. Precluding nonenergy leasable development in PHMA and GHMA would reduce habitat disturbance and fragmentation as well as direct disturbance to GRSG, improving the likelihood of successful breeding and reproduction. Implementing a 3 percent disturbance cap under alternatives E, F, and 5 percent disturbance cap under Alternative B and the Proposed Plan would limit nonenergy mineral development over the long term and may reduce development more than alternatives A, or C. As a result, in combination with the disturbance cap applied under state plans, BLM actions in other planning areas in MZ II/VII, and other past, present, and reasonably foreseeable future actions, alternatives B, E, F, and the Proposed Plan would provide a net conservation gain to GRSG. This gain would be greatest under alternatives E and F, as these alternatives implement the most restrictive disturbance caps.

7.1.6.2 Infrastructure

Rights of Way/Special Use Authorizations

Nature and Type of Effects

As discussed in Chapter 4, power lines can directly affect GRSG by posing a collision and electrocution hazard, and can indirectly decrease lek attendance and recruitment by providing perches and nesting habitat for potential avian predators, such as golden eagles and ravens (Connelly et al. 2004). In addition, power lines are linear and often extend for many miles. Thus, ground disturbance associated with construction, as well as vehicle and human presence during maintenance activities, may introduce or spread invasive weeds over large areas, thereby degrading habitat. Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also facilitate predator movements, spread invasive plants, and increase human disturbance from noise and traffic (Forman and Alexander 1998).

Numerous studies have researched the impact of infrastructure on GRSG. For example, GRSG avoided nesting and summering near major roads (for example, paved secondary highways) in south-central Wyoming (LeBeau 2012), and traffic disturbance (1 to 12 vehicles per day) within 1.9 miles of leks during the breeding season reduced nest-initiation rates and increased distances moved from leks during nest site selection of female sage-grouse in southwestern Wyoming (Lyon and Anderson 2003). Nesting propensity (i.e., nest initiation rates) was 24 percent lower for females breeding on road-disturbed leks compared with undisturbed females, 56 percent of females breeding on disturbed leks initiated nests in consecutive years compared to 82 percent of females breeding on undisturbed leks, and females moved twice as far from leks to nest locations if breeding on disturbed leks (Lyon and Anderson 2003). Increased length of road (correlated with use), increased traffic levels on roads, and traffic activity during the early morning on roads within approximately 1.9 miles of leks negatively influence male lek attendance (Manier et al. 2013).

An examination of leks within 62 miles of Interstate 80 in Wyoming and Utah found no leks within 1.25 miles of the interstate, reduced numbers of leks within 4.7 miles of the interstate, and a positive distance-effect with higher rates of decline in lek counts between 1970 and 2003 on leks within 4.5 miles compared to leks 4.7 to 9.3 miles from the interstate (Connelly et al. 2004). Rates of decline in GRSG male lek attendance increased as traffic volumes on roads near leks increased, and vehicle activity on roads during the daily strutting period (i.e., early morning) had a greater influence on male lek attendance compared with roads with no vehicle activity during early morning in southwestern Wyoming (Holloran 2005). In central Wyoming, peak male attendance (i.e., abundance) at leks experimentally treated with noise recorded at roads decreased 73 percent relative to paired controls (Blickley 2012; Manier et al. 2013).

Transmission lines are especially prevalent in MZ II/VII (Manier et al. 2013) and their impact on GRSG in the MZ has been studied. Negative effects of power lines on lek persistence were documented in northeastern Wyoming; the probability of lek persistence decreased with proximity to power lines and with increasing proportion of power lines within a four-mile window around leks (Walker et al. 2007). Braun reported that use of areas near transmission lines by sage-grouse, as measured by pellet counts, increased as distance from transmission line increased up to 600 m (1968 feet) (Braun 1998). Sage-grouse avoided brood-rearing habitats within 2.9 miles of transmission lines in south-central Wyoming (LeBeau 2012; Manier et al. 2013).

Power lines may also cause changes in lek dynamics, with lower growth rates observed on leks within 0.25 miles of new power lines in the Powder River Basin of Wyoming as compared with those further from the lines. This was attributed to increased raptor predation (Braun et al. 2002). Raptors and corvids forage on average 3.1 to 4.3 miles from perching sites, potentially impacting 32 to 40 percent of the sage-grouse conservation area (Connelly et al. 2004). Removing or reducing the number of perching structures and landfills in key nesting, brood rearing, and lekking habitats may reduce predation pressure on sage-grouse (Bui 2009; Leu and Hanser 2011; Manier et al. 2013).

Conditions in MZ II/VII

Infrastructure, such as ROWs and associated facilities and urbanization, is prevalent throughout MZ II/VII.

Although not representative of all infrastructure ROW, transmission lines (greater than 115 kilovolt) indirectly influence 60 to 63 percent of priority habitats and general habitats respectively across MZ II/VII. Approximately 50 percent of transmission lines in priority habitats (and 45 percent in general habitats) are located on BLM-administered lands across GRSG habitats in MZ II/VII (Manier et al. 2013). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of transmission line ROW on GRSG than any other single land management entity.

Impact Analysis

Table 7-7, Acres of Rights-of-Way/Special Use Authorization Management within GRSG Habitat in MZ II/VII, lists the acres of ROW/SUA avoidance and exclusion within GRSG habitat by alternative.

Table 7-7. Acres of Rights-of-Way/Special Use Authorization Management within GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Rights-of-Way/Special Use Authorization				
Alternative A	822,000	91%	6,624,000	21%
Alternative B	78,000	0%	5,455,000	4%
Alternative C	77,000	0%	7,166,000	27%
Alternative E	77,000	0%	5,455,000	4%
Alternative F	77,000	0%	5,961,000	13%
Proposed Plan	77,000	0%	5,954,000	12%
Right-of-Way/Special Use Authorization Exclusion				
Alternative A	583,000	4%	678,000	6%
Alternative B	694,000	19%	727,000	12%
Alternative C	562,000	0%	646,000	1%
Alternative E	1,793,000	69%	727,000	12%
Alternative F	562,000	0%	677,000	6%
Proposed Plan	564,000	0%	674,000	5%
Right-of-Way/Special Use Authorization Avoidance				
Alternative A	7,570,000	5%	2,409,000	23%
Alternative B	8,319,000	13%	3,426,000	46%
Alternative C	7,220,000	0%	3,020,000	39%
Alternative E	7,220,000	0%	3,426,000	46%
Alternative F	8,335,000	13%	3,080,000	40%
Proposed Plan	8,336,000	13%	3,134,000	41%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within rights-of-way/special use authorization management areas in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
 GRSG Greater sage-grouse
 MZ Management Zone
 PHMA Priority Habitat Management Areas

Past, present, and reasonably foreseeable projects within MZ II/VII identified in Table 7-12 indicate ROW/SUA applications are anticipated to continue to increase within MZ II/VII/. Major interstate transmission lines are currently proposed in MZ II/VII, and may contribute to the cumulative impacts on GRSG and their habitat. However, by implementing avoidance and exclusion management areas on BLM-administered lands, proposed transmission lines would be restricted in GRSG habitat. Exclusion areas would strictly prohibit ROW/SUA development, while avoidance areas may allow ROW/SUA development subject to restrictions and mitigation.

Exclusion and avoidance area management areas are intended to minimize disturbance to GRSG populations by limiting the siting of roads and other ROWs/SUAs which can increase bird mortality, habitat avoidance, habitat fragmentation. Additionally, the location of tall structures can increase predation (Connelly et al. 2004). These adverse impacts would be most prevalent under Alternative A and C, as these alternatives have the fewest acres of ROW/SUA avoidance and exclusion management areas within MZ II/VII.

Reasonably foreseeable future actions (as discussed in Table 7-12) include multi-state transmission lines which cross multiple land jurisdictions, including private, state, and federally owned lands. ROW exclusion and avoidance management under the Proposed Plan or any of the alternatives would not apply to non-federal lands. Therefore, the disturbance cap limitation under the Wyoming executive order, and other state plan incentives would have a greater impact towards ameliorating the threat.

Alternative A has the most acres of PHMA open to ROW/SUA development in MZ II/VII (822,000 acres), the majority of which are located within the Bighorn Basin planning area. All other action alternatives and the Proposed Plan reduce the number of PHMA acres open to ROW/SUA in MZ II/VII by 91%. Under Alternative A, 6,624,000 acres of GHMA would be open to ROW/SUA development in the MZ; this number is reduced for all other action alternatives and the Proposed Plan, except of Alternative C (7,166,000 acres). This would result in the smallest net conservation gain for GRSG because gains would be concentrated in other portions of MZ II/VII and would also be less pronounced on BLM-administered lands in the Bighorn Basin planning area.

Acres of GRSG habitat managed as ROW/SUA exclusion in MZ II/VII are highest under Alternative B and E and, because relevant cumulative actions do not vary across alternatives, these alternatives would provide the greatest net conservation gain in terms of acres that are closed or restricted for development. The Proposed Plan relies more on ROW avoidance management to protect GRSG habitat rather than ROW exclusion. While ROW avoidance areas do not afford the same level of protection as ROW exclusion areas, ROW developments in avoidance areas would be subject to restrictions and mitigation, which would limit impacts on GRSG habitats and populations. As a result, the incremental effect of implementing the Proposed Plan in conjunction with past, present, and reasonably foreseeable future actions would be a reduction in disturbance of GRSG leks, nests, and brood-rearing and wintering areas compared to other alternatives. The anthropogenic disturbance cap would also have a similar effect.

The cumulative impact of installing multi-state transmission lines and other ROWs/SUA would include adverse effects to some populations of GRSG within MZ II/VII. These effects may include lek abandonment; removal, degradation, and fragmentation of habitat; direct mortality through collisions with vehicles; impeding migration; increased risk of predation; and spread of noxious or invasive weeds. Construction of access roads and ancillary facilities in GRSG habitat would contribute to these negative effects. BMPs, design features, state or BLM field office-specific stipulations, and Forest Standards and Guidelines are incorporated into the NEPA documents for many of these proposed transmission line in MZ II/VII. However, the extent to which these measures are to be implemented during construction is uncertain. GRSG would be particularly vulnerable to the effects of new transmission lines in Colorado, where reasonably foreseeable future transmission line project routes are proposed in both GHMA and PHMA.

The effect of the alternatives and other conservation actions in the MZ (most notably the Montana and Wyoming executive orders) could be synergistic. By implementing restrictions on infrastructure in PHMA and on state and private lands together, the cumulative beneficial effect on GRSG would be greater than the sum of their individual effects because protections would be applied more consistently across the landscape. This is especially important in areas of mixed land ownership patterns where

complementary protections can benefit leks, early brood rearing habitat, or other important areas that do not follow geopolitical boundaries.

Presidential Priority transmission projects which are proposed in MZ II/VII (i.e., TransWest Express and Gateway West), would not be subject to GRSG conservation requirements in BLM/Forest Service GRSG RMP Amendments, but would be subject to requirements in applicable state plans as well as other state and federal laws and regulations. They would also develop their own suite of protective measures analyzed in project-specific NEPA documents. Whether or not these project-specific measures would adequately protect GRSG is unknown at this point in time because the measures have not been finalized. Regardless, impacts would likely be greater in Colorado where the proposed route would impact approximately 26 miles in PACs (key habitats that are essential for GRSG conservation) and 57 miles in PHMA in the Little Snake and White River BLM Field Offices. This impact would be especially harmful to fringe GRSG populations in Colorado, as some are less robust than those in Wyoming and southern Montana. In Wyoming, the routes avoid Core Areas due to that state plan's requirements; this would reduce impacts in Wyoming.

Under all alternatives and the Proposed Plan, the cumulative effect of constructing multiple new transmission lines and other ROWs/SUAs is likely to result in negative effects to GRSG and their habitat. However, implementation of the BLM/Forest Service Proposed Plans in combination with other regional efforts would restrict the extent to which proposed ROWs/SUA could be located in or near GRSG habitat, providing more benefit to the species than current management.

Renewable Energy

Nature and Type of Effects

Impacts on GRSG from renewable energy development, such as that for wind and solar power, are similar to those from nonrenewable energy development. Additional concerns associated with wind energy developments are rotor blade noise, structure avoidance, and mortality caused by collisions with turbines (Connelly et al. 2004).

A study on specific effects of wind development on sage-grouse in south-central Wyoming showed that the relative probability of a GRSG nest failing (eggs not hatching) or brood failing (all chicks lost within 35 days post-hatch) increased with proximity to the nearest wind turbine. This study investigated short-term response of sage-grouse to a wind energy facility; additional impacts may be realized in the longer term following addition of wind turbines, due to the time lags associated with responses of breeding populations to infrastructure (Garton et al. 2011).

Conditions in MZ II/VII

While most federal lands are not currently leased or developed for wind or solar energy resources, areas of potential development coincide closely with GRSG habitats in MZ II (Manier et al. 2013). Within the Bighorn Basin planning area, renewable energy potential is present, but existing facilities are limited. Although not representative of all renewable energy development, wind turbines indirectly influence less than 1 to 2 percent of priority habitats and general habitats respectively across MZ II/VII. Private lands are host to 70 percent of wind turbines affecting GRSG in priority habitats (and 73 percent in general habitats) within MZ II/VII (Manier et al. 2013). If this trend continues into the future, conservation actions on private land are likely to have a greater potential to ameliorate the effects of wind energy development than any other single land management entity.

Impact Analysis

Table 7-8, Acres of Wind Energy Management Areas in GRSG Habitat in MZII/VII, lists acres of wind energy ROW/SUA by alternative.

Table 7-8. Acres of Wind Energy Management Areas in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open to Wind Rights-of-Way/Special Use Authorization				
Alternative A	0	0%	4,159,000	0%
Alternative B	0	0%	4,403,000	6%
Alternative C	0	0%	5,542,000	25%
Alternative E	0	0%	4,403,000	6%
Alternative F	0	0%	4,758,000	13%
Proposed Plan	0	0%	5,461,000	24%
Wind Right-of-Way/Special Use Authorization Exclusion				
Alternative A	3,684,000	0%	700,000	0%
Alternative B	4,214,000	13%	1,407,000	50%
Alternative C	3,684,000	0%	848,000	17%
Alternative E	4,915,000	25%	1,407,000	50%
Alternative F	3,761,000	2%	916,000	23%
Proposed Plan	3,796,000	3%	958,000	27%
Wind Right-of-Way/Special Use Authorization Avoidance				
Alternative A	4,179,000	0%	2,827,000	0%
Alternative B	4,880,000	14%	3,783,000	25%
Alternative C	4,179,000	0%	4,427,000	36%
Alternative E	4,179,000	0%	3,783,000	25%
Alternative F	5,217,000	20%	4,029,000	30%
Proposed Plan	5,184,000	19%	3,323,000	15%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within wind energy management areas in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

- GHMA General Habitat Management Areas
- GRSG Greater sage-grouse
- MZ Management Zone
- PHMA Priority Habitat Management Areas

No PHMA would be managed as open to wind ROWs/SUAs in MZ II/VII under any of the alternatives or the Proposed Plan. All action alternatives and the Proposed Plan would manage GHMA as open to wind ROWs/SUAs in MZ II/VII to varying degrees with Alternative C (5,542,000 acres) and the Proposed Plan (5,461,000 acres) designating the most open acres within the MZ.

Alternative B and E would manage more acres of GRSG habitat in MZ II/VII as wind ROW/SUA exclusion compared to the other alternatives and the Proposed Plan. This would include 4,214,000 acres of PHMA and 1,407,000 acres of GHMA managed as ROW/SUA exclusion under Alternative B; 4,915,000 acres of PHMA and 1,407,000 acres of GHMA under Alternative E.

The Proposed Plan relies more on wind ROW avoidance management to protect GRSG habitat rather than wind ROW exclusion. Similar to other ROWs, this approach preserves management flexibility in situations where landownership is mixed. Without this flexibility, rerouting ROWs/SUAs across nonfederal land may result in a longer route, increasing disturbance of GRSG leks, nests, and brood-rearing and wintering areas more than direct routing across federal land.

Managing wind ROW/SUA avoidance and exclusion areas in GRSG habitat would reduce or minimize impacts from wind utility infrastructure on BLM-administered land by prohibiting or restricting new ROWs/SUAs. In addition, renewals or upgrades of existing facilities could incorporate additional conservation actions. Collocation or clustering of facilities would reduce impacts on GRSG habitat and would reduce disturbance in new areas.

Reasonably foreseeable future projects within MZ II/VII include renewable energy developments, such as the Chokecherry/Sierra Madre Wind Farm in southern Wyoming. Projects which require state agency review or approval would be subject to the Wyoming executive order permitting process for development in Core Areas, which would encourage ROW/SUA development outside of Core Areas and restrict surface occupancy within 0.6 miles of occupied leks.

Impacts would be minimized on BLM-administered land across all alternatives by adhering to the wildlife protection provisions of the Wind Energy Development Programmatic EIS (BLM 2005). Implementation of wind energy ROW/SUA avoidance in PHMA for all BLM/Forest Service Proposed Plans, in combination with the disturbance caps under the state plans, exclusion zones in other BLM planning areas and other past, present, and reasonably foreseeable future actions, would provide the greatest net conservation gain to GRSG in MZ II/VII.

7.1.6.3 Grazing/Free-Roaming Equids

Nature and Type of Effects

In general, livestock can influence habitat by modifying plant biomass, plant height and cover, and plant species composition. As a result, livestock grazing could cause changes in habitat that alter species abundances and composition in GRSG insect prey. Changes in plant composition could occur in varying degrees and could change vegetative structure, affecting cover for nesting birds. Grazing could also alter fire regimes (Davies et al. 2010).

If not managed properly, cattle and sheep grazing could compact soil, enrich soil with nutrients, trample vegetation and nests, directly disturb GRSG, and negatively affect GRSG recruitment. Cattle and sheep also can reduce invertebrate prey for GRSG or increase their exposure to predators (Beck and Mitchell 2000, Pp. 998-1,000; Knick 2011; Coates 2007, Pp. 28-33). Grazing in riparian areas can destabilize streams and riverbanks, cause the loss of riparian shade, and increase sediment and nutrient loads in the aquatic ecosystem (George et al. 2011). Stock watering tanks can contribute to stream and aquifer

dewatering and may concentrate livestock movement and congregation in sensitive areas (Vance and Stagliano 2007).

Grazing can be used to reduce fuel load and reduce the risk of wildfire (Connelly et al. 2004, Pp. 7, 28-30). Under certain conditions, grazing can reduce the spread of invasive grasses, if applied early in the season before the grasses have dried (Strand and Launchbaugh 2013). Light to moderate grazing does not appear to affect perennial grasses, which are important to nest cover (Strand and Launchbaugh 2013). However, excessive grazing can eliminate perennial grasses and lead to expansion of invasive species such as cheatgrass or Japanese brome (Reisner et al. 2013).

A well-developed understory of grass, forbs, and deciduous shrubs is critical for GRSG and other wildlife. Impacts on habitat vary with livestock densities and distribution; the more evenly livestock is distributed, the lower its impact on any given area (Gillen et al. 1984). However, cattle show a strong preference for certain areas, leading to high use in some areas and little to no use in others. Livestock grazing is generally limited by slopes of greater than 60 percent, dense forests and vegetation, poor or little upland forage, and lack of water (Holechek et al. 2010).

Although livestock grazing is the most widespread land use across the sagebrush biome, it exerts a more limited influence on soils and vegetation than land uses that remove or fragment habitat (e.g., mineral extraction or infrastructure development). GRSG are able to co-exist with grazing animals when properly managed. Thus, reducing AUMs or acres open to grazing would not necessarily restore high-quality GRSG habitat.

Reducing grass height caused by livestock grazing in GRSG nesting and brood-rearing areas has been shown to negatively impact nesting success. Livestock grazing could reduce the suitability of breeding and brood-rearing habitat, which would impact GRSG populations (USFWS 2010).

Since the passage of the 1934 Taylor Grazing Act, range conditions on BLM-administered lands have improved due to improved grazing management practices and decreased livestock numbers and annual duration of grazing. In addition, the BLM has applied Standards for Rangeland Health since 1997. The purpose of this practice is to enhance sustainable livestock grazing and wildlife habitat, while protecting watersheds and riparian ecosystems.

For BLM-administered lands, Standards for Rangeland Health require the BLM to ensure rangelands are capable of sustaining viable populations and a diversity of native plant and animal species appropriate to the habitat. Habitats that support or could support threatened species, endangered species, or species of special concern sensitive species will be maintained or enhanced. The BLM Washington Office Instruction Memorandum 2009-018 serves as an aid to BLM field offices in determining priorities for focusing resources when processing permits and leases. The IM is based upon rangeland health, and considers critical habitat conditions, conflicts with GRSG, and whether projects have been proposed for implementing the Healthy Lands initiative. The authorized officer shall take appropriate action upon determining that existing management needs to be modified to ensure that standards are met or are making significant progress towards meeting standards. Modifying management could involve a variety of actions including, but not limited to, changing animal kind, changing season of use, adjusting AUMs, adjusting livestock numbers, implementing a grazing prescription or implementing range improvement projects.

On National Forest Systems lands, livestock grazing is administered in accordance to the Multiple Use and Sustained Yield Act of 1960. As with BLM-administered lands, the Forest Service issues livestock grazing permits for a period of up to 10 years that are generally renewable if it is determined that the terms and conditions of the permit are being met and the ecological condition of the rangelands are meeting the fundamentals of rangeland health.

Range improvements could result in livestock overusing important GRSG areas. For example, developing springs would generally change vegetative composition from a high diversity of grasses and forbs, important to broods, to one dominated by grasses.

Concentrated livestock use can remove standing vegetation and subsequently reduce associated insects and forbs, both of which are important to GRSG broods. Allowing spring developments along ephemeral streams and wetlands and allowing livestock watering tanks would decrease GRSG habitat. Springs, seeps, and wetland areas are vitally important to GRSG broods; therefore, allowing spring developments could reduce resources for GRSG.

Other direct and indirect effects may occur from range improvements. Water developments may also contribute to the increased occurrence of West Nile virus (Walker and Naugle 2011). Barbed wire fences contribute to direct mortality through fence collisions (Stevens et al. 2011).

Conditions in MZ II/VII

In general, the risks to GRSG and their habitat associated with improper grazing practices are less in the northerly, wetter parts of GRSG range (i.e., MZ I and northern portions of MZ II/VII) than across the arid semi-deserts of the rest of MZ II/VII. Nonetheless, livestock grazing is widespread across MZ II/VII, and may, if improperly conducted, pose a substantial threat to GRSG habitat (Stiver et al. 2006).

A large portion of the central regions of MZ II/VII (approximately 5 million acres) is federally managed wild horse and burro range, suggesting potential effects to GRSG from livestock grazing and the compounding effects of free-roaming equids (Manier et al. 2013). Within MZ II/VII, 19.9 percent of priority habitats are negatively influenced by free-roaming equids (Manier et al. 2013). Two designated herd management areas (HMAs) occur on BLM-administered lands in the planning area, both which contain GHMA and PHMA.

Impact Analysis

Table 7-9, Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ II/VII, lists the acres of PHMA and GHMA available and unavailable for grazing, by alternative.

Table 7-9. Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Available to Livestock Grazing				
Alternative A	8,901,000	13%	9,667,000	21%
Alternative B	7,786,000	0	8,829,000	13%
Alternative C	7,786,000	0%	10,782,000	29%
Alternative E	7,786,000	0	1,194,000	98%
Alternative F	8,901,000	13%	9,667,000	21%
Proposed Plan	8,901,000	13%	9,705,000	21%
Unavailable to Livestock Grazing				
Alternative A	28,000	0%	16,000	31%
Alternative B	1,231,000	100%	7,460,000	98%
Alternative C	28,000	0%	16,000	31%
Alternative E	1,259,000	98%	746,000	98%
Alternative F	28,000	0%	16,000	31%
Proposed Plan	28,000	0%	16,000	31%

Source: BLM 2015

This table displays the acres of PHMA and GHMA available and unavailable to livestock grazing in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
 GRSG Greater sage-grouse
 MZ Management Zone
 PHMA Priority Habitat Management Areas

Under Alternative A, 8,901,000 acres of PHMA would be available to livestock grazing in MZ II/VII; 9,667,000 acres of GHMA acres would be available. Under Alternative F and the Proposed Plan, a similar amount of GRSG habitat acres are available for livestock grazing on federal lands. Alternatives B and E place more restrictions on grazing by designating more acres of PHMA and GHMA within the MZ as unavailable to livestock grazing. These restrictions would help to protect GRSG habitat from the potential effects of improper livestock grazing on BLM-administered lands and National Forest System lands.

As literature suggests that moderate grazing is compatible with GRSG habitat (Strand and Launchbaugh 2013), closing acres to grazing may not itself benefit or harm GRSG. As described above under Nature and Type of Impacts, possibly equally or more beneficial is restricting range improvements in GRSG habitat, limiting fencing, and effectively implementing range health standards on grazing allotments in GRSG habitat.

The COT report objectives for livestock grazing are to manage grazing in a manner consistent with local ecological conditions. This type of management would maintain or restore healthy sagebrush shrub and native perennial grass and forb communities and conserve essential habitat components for GRSG. The

COT report also states that land managers should avoid or reduce the impact of range management structures on GRSG habitat.

Under the Proposed Plan, management actions specifically related to GRSG would help reduce the threat of grazing throughout the MZ to meet the COT report objectives. For example, allotments within PHMAs, (focusing on those containing riparian areas, including wet meadows), will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. Other alternatives do not include a similar action, therefore the Proposed Plan would afford greater protection to GRSG from improper grazing practices on BLM-administered lands by increased monitoring of PHMAs.

In addition, all BLM/Forest Service Proposed LUPs in MZ II/VII would prioritize SFAs for grazing permit renewals, to determine if modification is necessary prior to renewal. This would provide an opportunity to adjust forage levels to meet rangeland health standards, thereby reducing the risk of non-functioning rangelands impacting GRSG habitats. The BLM establishes an appropriate management level for each HMA, which represents the population objective for free-roaming equids. Under all alternatives and the Proposed Action, the BLM has the ability to adjust appropriate management levels of wild horses if resource damage occurs. Additionally, under all action alternatives and the Proposed Plan, HMA plans will be updated to include GRSG objectives. This will result in a net conservation gain for GRSG. Under alternatives B, E, F, and the Proposed Plan, the BLM would apply season restrictions from February 1 to July 31 within the two HMAs in the Bighorn Basin planning area. Therefore, the cumulative net conservation gain in MZ II/VII would be slightly greater compared to alternatives A and C, as seasonal surface disturbance restrictions for wild horse management would also benefit GRSG during nesting and early brood-rearing season.

BLM/Forest Service grazing and free-roaming equid management actions in MZ II/VII would not apply on non-federal lands. Conservation initiatives conducted through the NRCS's SGI would have a greater direct impact towards ameliorating the threat on these lands. Since 2010, SGI has enhanced rangeland health through rotational grazing systems, re-vegetating former rangeland with sagebrush and perennial grasses and control of invasive weeds. On privately-owned lands, SGI has developed a prescribed grazing approach that balances forage availability with livestock demand. This system allows for adjustments to timing, frequency, and duration of grazing, ensuring rangelands are managed sustainably to provide continued ecological function of sagebrush-steppe. A primary focus of the prescribed grazing approach is maintenance of key plant species, such as deep-rooted perennial grasses that have been shown to be essential for ecological resistance to invasive annual grasses (Reisner et al. 2013, pp. 1047-1048). These actions help to alleviate the adverse impacts associated with improper grazing practices outlined above under Nature and Type of Effects. Within MZ II/VII, SGI has implemented 552,600 acres of prescribed grazing systems. This program is likely the largest and most impactful program on private lands within MZ II/VII. Because of its focus on priority areas for conservation, which often overlap PHMA, the SGI's past, present, and reasonably foreseeable work has had and likely will continue to have a cumulative beneficial impact on GRSG when considered alongside protective BLM management actions in PHMA.

Candidate Conservation Agreements with Assurances are another tool being implemented to protect private lands from the threat of improper grazing. Candidate Conservation Agreements with Assurances are voluntary conservation agreements between the USFWS and one or more federal or private partners (e.g., the BLM). In return for managing lands to benefit GRSG, landowners receive assurances against additional regulatory requirements should GRSG be listed under the Endangered Species Act. Within Wyoming, the USFWS and Wyoming Governor's Office in conjunction with the BLM, Natural Resources Conservation Service, Forest Service, and other agencies, have developed an umbrella Candidate

Conservation Agreement with Assurances for range management activities. Enrolled landowners are expected to comply with grazing specific conservation measures including but not limited to: avoid (or rotationally utilize) known nesting and brood-rearing habitat as a location for activities that concentrate livestock such as stock tank placement branding and roundup; place salt or mineral supplements in sites minimizing impacts to GRSG habitat; and within 24 months develop and implement a written grazing management plan to maintain or enhance the existing plant community as suitable GRSG habitat (USFWS et al. 2013). The incremental effects of the Natural Resources Conservation Service actions under the SGI, (including fence marking and conservation easements), Candidate Conservation Agreements with Assurances, and state efforts to maintain ranchland, BLM management actions (related to grazing and free-roaming equids) would provide a net conservation gain to GRSG in MZ II/VII.

7.1.6.4 Spread of Weeds

Nature and Type of Effects

As discussed in Chapter 4, invasive weeds alter plant community structure and composition, productivity, nutrient cycling, and hydrology. Invasive weeds also may cause declines in native plant populations, including sagebrush habitat, through such factors as competitive exclusion and niche displacement. Invasive plants reduce and may eliminate vegetation that GRSG use for food and cover. Invasive weeds fragment existing GRSG habitat and reduce habitat quality by competitively excluding vegetation essential to GRSG. Invasive weeds can also create long-term changes in ecosystem processes, such as fire cycles and other disturbance regimes that persist even after an invasive plant is removed (Connelly et al. 2004).

Roads and recreation can promote the spread of invasive weeds through vehicular traffic. Weed infestations can further exacerbate the fragmentation effects of roadways. Irrigation water has also supported the conversion of native plant communities to hayfields, pasture, and cropland, thus fragmenting sagebrush habitats. Excessive grazing in these habitats can lead to the demise of the most common perennial grasses in this system and an abundance of invasive species such as cheatgrass or Japanese brome (Reisner et al. 2013).

Conditions in MZ II/VII

By means of seeds carried by wind, humans, machinery, and animals, invasive and noxious weeds have invaded and will continue to invade many locations in MZ II/VII, including the planning area. Cheatgrass (one of the primary invasive species threatening GRSG habitat) is found throughout MZ II/VII, and is generally more abundant in comparison to MZ I due to more favorable climate conditions.

The BLM currently manages weed infestations through integrated weed management, including biological, chemical, mechanical, manual, and educational methods. It is guided by the 1991 and 2007 Records of Decisions (RODs) for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 1991) and by the 2007 Programmatic Environmental Report (BLM 2007). Weeds are managed in cooperation with county governments and represent a landscape-level approach across management jurisdictions.

Impact Analysis

Increased surface disturbance, motorized transportation, and animal and human activity would increase the chance for invasive plants to establish and spread.

The BLM and National Forest System manage weed infestations through integrated weed management practices, which include biological, chemical, mechanical, manual, and educational methods. This

general approach for combating infestations will continue under all alternatives and the Proposed Plan. Increased activity (e.g., surface disturbance, motorized transportation, and animal or human activity) would increase the likelihood for the spread and establishment of invasive plants, regardless of surface land ownership. Alternatives A and C would place the fewest constraints on resource uses, and would allow for the most acres of surface disturbing activities within GRSG habitat in MZ II/VII. Therefore, the potential for invasive weed spread and establishment would be greatest under this alternative, and effects to GRSG (e.g., reduction in quality of habitat) would be more pronounced. Reasonably foreseeable future projects which result in surface disturbance within or near GRSG habitat could increase the likelihood of invasive weed spread under these alternatives.

Relevant cumulative actions that result in surface-disturbing activities would increase the potential for the spread of invasive weeds on federal and non-federal lands. Projects subject to the general stipulations outlined in the Wyoming and Montana executive orders are required to control noxious and invasive weed species and to use native seed mixes during reclamation processes. These stipulations would benefit GRSG Core Areas by limiting the spread or establishment of invasive species, particularly on lands that lack BLM protective regulatory mechanisms. Additionally, the Colorado Package has identified GRSG conservation strategies related to invasive weeds, such as interagency cooperation, mapping, monitoring, and integrated weed management treatments. However, complete weed eradication within MZ II/VII is not anticipated under any alternative or the Proposed Plan because of the scale and scope of efforts needed for complete eradication.

Alternatives B and E, would place the most restrictions on resource uses within GRSG habitat on BLM-administered land. Therefore, less disturbance associated with resource uses is likely to occur under these alternatives, which would reduce the potential for invasive weed spread and establishment on BLM-administered lands. Protective stipulations, in combination with state and county noxious weed regulations, continued integrated weed management practices, and other past, present and reasonably foreseeable future actions would provide a net conservation gain to GRSG habitats and populations in MZ II/VII under the Proposed Plan and the other RMP alternatives by restoring degraded sagebrush habitat and increasing native forbs, thus improving nest cover and food supply.

7.1.6.5 Conversion to Agriculture/Urbanization

Nature and Type of Effects

Converting sagebrush habitat to agricultural use, causes direct loss of habitat available for GRSG. Habitat loss also decreases the connectivity between seasonal habitats, increasing population isolation and fragmentation. Fragmentation then increases the probability for decline of the population, reduced genetic diversity, and extirpation from stochastic events (Knick and Hanser 2011).

In addition to reducing the land area available to support GRSG, habitat loss and fragmentation also results in other disturbances, such as human traffic, that increase the potential for wildfire and invasive plant spread.

Converting cropland has eliminated or fragmented sagebrush on private lands in areas with deep fertile soils or irrigation potential. Sagebrush remaining in these areas has been limited to the agricultural edge or to relatively unproductive environments that are ill-suited to sustaining leks, although these area may be beneficial for brood-rearing GRSG depending upon the particular crop.

Biofuel production and small grain prices have increased the conversion to cropland of native grasslands or lands formerly enrolled in the US Department of Agriculture's Conservation Reserve Program. This conversion of private lands further emphasizes the cumulative importance of BLM-administered lands

and associated private grazing lands in maintaining large blocks of native grassland and shrubland habitats suitable for GRSG.

Conditions in MZ II/VII

Less than 1 percent of priority habitats and 2 percent of general habitats in MZ II/VII are directly influenced by agricultural development (Manier et al. 2013). Approximately 4 percent of habitat has been converted for agricultural use in the Wyoming Basin compared to 19 percent in the Great Plains (i.e., MZ I), (Knick et al. 2011).

Urban development also results in permanent loss of GRSG habitat. Human population centers continue to grow and expand across the range. The direct footprint of urban development is higher in priority habitats in MZ II/VII compared to other parts of the GRSG range, though it is still low (approximately 1 percent) compared to other threats (Manier et al. 2013). However, percentages and associated disturbance are higher in some areas. In some Colorado counties, fifty percent of sage-grouse habitat has been subdivided, while an estimated 3 to 5 percent of all historical habitat in Colorado has been converted into urban areas (Braun 1998; USFWS 2010).

Impact Analysis

The BLM does not convert public lands to agriculture. As such, the only direct authority it has over conversion to agriculture is by retaining or disposing of lands in the realty program. Disposing of lands could increase the likelihood they will be converted to agriculture, depending on their location and the policies of the new management authority. Lands retained under BLM management will not be converted to agriculture under any alternative.

As shown below in Table 7-10, Acres Identified for Retention and Disposal in GRSG Habitat in MZ II/VII, these acreages vary relatively little between alternatives.

Table 7-10. Acres Identified for Retention and Disposal in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Acres Identified for Retention				
Alternative A	7,278,000	15%	8,855,000	22%
Alternative B	7,414,000	17%	8,808,000	21%
Alternative C	6,185,000	0%	9,946,000	30%
Alternative E	7,414,000	17%	8,808,000	21%
Alternative F	7,290,000	15%	8,890,000	22%
Proposed Plan	7,301,000	15%	8,928,000	22%
Acres Identified for Disposal				
Alternative A	46,000	48%	189,000	44%
Alternative B	26,000	8%	127,000	17%
Alternative C	24,000	0%	213,000	51%
Alternative E	26,000	8%	127,000	17%
Alternative F	36,000	33%	156,000	32%
Proposed Plan	24,000	0%	156,000	33%

Source: BLM 2015

This table displays the acres of PHMA and GHMA identified for retention and disposal in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
 GRSG Greater sage-grouse
 MZ Management Zone
 PHMA Priority Habitat Management Areas

BLM land tenure adjustments require site-specific NEPA analysis, and land sales must meet specific disposal criteria. Lands identified for disposal in MZ II/VII are typically small isolated parcels that are difficult to manage and do not have high resource value. BLM land tenure adjustments are not anticipated to be a significant contributing element to the threat of agricultural conversion because of the small number of acres involved and the criteria in place that would reduce the likelihood of disposing of parcels containing significant wildlife value, (such as those lands containing leks, early brood rearing habitat, or winter habitat). As a result, cumulative impacts would vary relatively little across alternatives and BLM/Forest Service management would have little impact on alleviating this threat.

Studies of agricultural conversion risk on grasslands have shown a high probability of grassland plots being converted to cropland under current economic and climatic conditions (Rashford et al. 2013). The recent federal Farm Bill tried to discourage converting prairie to cropland by denying crop insurance for such conversions. Nevertheless, if corn and other crop prices remain high, the economic incentive to convert parcels to cropland in GRSG habitat areas will continue and will potentially increase.

The COT Report objectives for converting land to agriculture are to avoid further loss of sagebrush habitat for agricultural activities (both plant and animal production) and to prioritize restoration. In areas where taking agricultural lands out of production has benefited GRSG, the programs supporting

these actions should be targeted and continued (USFWS 2013). In accordance with this objective, the NRCS's SGI program focuses on maintaining ranchland that provides habitat for GRSG.

This voluntary program provides private landowners with monetary incentives to protect GRSG habitat, often through conservation easements. As a result, private land containing GRSG habitat is protected from conversion to agriculture or other development for the life of the conservation agreement. The conservation easements and other conservation incentives, such as restoration of water features and fence marking, can enhance the ability of private ranchlands to support GRSG. As of 2015, SGI has secured conservation easements on 243,400 acres within MZ II/VII, and marked or removed 23 miles of fence (NRCS 2015). This has preserved habitat and reduced the risk of direct mortality on these lands.

These efforts, in conjunction with BLM management, would provide a net conservation gain to GRSG in MZ II/VII, but its impact would be localized and not likely to ameliorate the threat because of limited management authority.

7.1.6.6 Fire

Nature and Type of Effects

Sagebrush killed by wildfire often requires many years to recover, especially after large fires. Contiguous old-growth sagebrush sites are at high fire risk, as are large blocks of contiguous dead sagebrush and sagebrush sites with a substantial cheatgrass understory. Before recovering, these sites are of limited use to GRSG, except along the edges and in unburned islands.

Because of its widespread impact on habitat, fire has been identified as a primary factor associated with GRSG population declines. Depending on the species of sagebrush and the size of a burn, a return to a full pre-burn community cover can take from 25 to 120 years (Baker 2011). In addition, fires can reduce invertebrate food sources and may facilitate the spread of invasive weeds.

While most sagebrush subspecies are killed by fire and slow to reestablish, cheatgrass recovers within one to two years of a fire from seed in the soil. This annual recovery leads to a reoccurring fire cycle that prevents sagebrush reestablishment (USFWS 2010, P. 13932).

BLM management to prevent or control wildfires can also affect GRSG and habitat. Increased human activity and noise associated with fire suppression, fuels treatments, and prescribed fire in areas occupied by GRSG could affect nesting, breeding, and foraging behavior. Important habitats could be altered because of the use of heavy equipment, hand tools, and noise.

In addition, suppression may initially result in higher rates of conifer encroachment in some areas. In the initial stages of encroachment, fuel loadings remain consistent with the sagebrush understory. As conifer encroachment advances, fire return intervals are altered by decreasing understory abundance. The depleted understory causes the stands to become resistant to low intensity wildfires; over years, the accumulating conifer loads contribute to larger-scale wildfires and confound control efforts due to extreme fire behavior.

Conditions in MZ II/VII

Fuels models predict fire risk as generally low across MZ II/VII with 10 percent of priority habitats and general habitats at high risk for fire (Manier et al. 2013). Within the Bighorn Basin planning area, wildfires and prescribed burns are more prevalent at lower elevations, except near river bottoms where vegetation density is higher. Upslope of the basin bottom, wildfires and prescribed burns are more common.

Impact Analysis

BLM/Forest Service management actions in MZ II/VII that emphasize wildfire suppression in GRSG habitat would benefit the species by limiting habitat loss in the event of a wildfire. BLM/Forest Service Proposed Plans would prioritize suppression immediately after life and property to conserve GRSG habitat. In GHMA, suppression would be prioritized where wildfires threaten priority sage-grouse habitat.

The Wyoming and Montana executive orders emphasize fire suppression in Core Population Areas, while recognizing other suppression priorities may take precedent. This would benefit GRSG habitat during wildfire planning and response, particularly on lands not administered by the BLM or Forest Service.

WAFWA's guidance on fire and fuels management for GRSG conservation (WAFWA 2014) promotes coordination among local fire response agencies similar to a "natural disaster" response; it emphasizes the importance of fuel breaks and the need to incorporate GRSG habitat objectives in fire management, as well as the use of grazing as a fuel reduction tool.

On the local level, the Bighorn Basin Sage-grouse Conservation Plan (Bighorn Basin Sage-grouse Local Working Group 2007) includes recommended management practices related to fire and fuels management such as evaluate all wildfires greater than 40 acres in occupied GRSG habitat to determine if rehabilitation of the burned area is needed; and protect and maintain areas of unburned sagebrush within perimeter of treated areas to allow for use in the untreated portion of a pasture or allotment.

Recognition of the importance of sagebrush habitat during interagency wildfire response would benefit the GRSG in the event of an unplanned fire. The Interagency Standards for Fire and Fire Aviation Operations "Red Book" includes a BMP for GRSG habitat conservation for wildlife and fuels management (BLM 2013). This document serves as supplemental policy or guidance for the BLM, Forest Service, and USFWS. This BMP would benefit the GRSG (particularly during interagency wildland fire operations) by utilizing spatial habitat data and using predictive services to prioritize and preposition firefighting resources in critical habitat areas. The coordination of federal, state, and local fire prevention actions, changes in fire management, and other past, present, and reasonably foreseeable future actions would provide a net conservation gain to GRSG in MZ II/VII. The gain would be greatest under the Proposed Plan because of increased fire and fuels management flexibility (e.g., by designing fuels treatments in protect and improve GRSG habitat), interagency coordination, and emphasis on preserving and restoring GRSG habitat.

7.1.6.7 Recreation

Nature and Type of Effects

Recreation such as camping, bicycling, wildlife viewing, horseback riding, fishing, and hunting can be dispersed, concentrated (e.g., OHV use and developed campsites), or permitted (e.g., BLM Special Recreation Permit). The BLM also manages Special Recreation Management Areas (SRMAs), where recreation is a primary resource management consideration.

Recreation on federally administered lands that use the extensive network of double-track and single-track routes have an impact on sagebrush and GRSG. Ecological impacts of roads and motorized trails include mortality due to collisions; behavior modifications due to noise, activity, and habitat loss; alteration of physical environment; nutrient leaching; erosion; invasive plants spread; increased use; and alteration by humans due to accessibility (Knick et al. 2011). Recreation activities can degrade GRSG habitat through direct impacts on vegetation and soils, introduction or spread of invasive species, and

habitat fragmentation. This occurs in areas of concentrated use, trailheads, staging areas, and routes and trails.

Motorized activities, including OHV use, are expected to have a larger footprint on the landscape. They are anticipated to have the greatest level of impact due to noise levels, compared to nonmotorized uses such as hiking or equestrian use. Cross-country motorized travel, which is permitted in designated areas on BLM-administered lands but not on National Forest System lands, would increase the potential for soil compaction, loss of perennial grasses and forbs, and reduced sagebrush canopy cover. Losses in sagebrush canopy could be the result of repeated, high-frequency, cross-country OHV use over long periods. In addition, the chances of wildfire are increased during the summer, when fire dangers are high and recreation is at its highest.

Dispersed uses expand the human footprint. Closing areas to recreation and reclaiming unused, minimally used, or redundant roads in and around sagebrush habitats during seasonal use by GRSG may reduce the footprint and presumably impacts on wildlife. Restricting access to important habitat areas during seasonal use (lekking, nesting, brood-rearing, and wintering) may decrease the impacts associated with humans. However, access restriction will not eliminate other impacts, such as invasive plant spread, predator movements, cover loss, and erosion (Manier et al. 2013).

Conditions in MZ II/VII

BLM, Forest Service, and other agencies provide a variety of dispersed recreation opportunities within MZ II/VII governed by laws, policy, and guidance. Recreation also occurs on private land with fewer restrictions. Within the planning area, year-round dispersed recreational opportunities are available. Increased visitation to small towns and destination resorts contribute to the increased use of public lands within the planning area. The central and eastern portions of the planning area, as well as the western slopes of the Big Horn Mountains provide more accessible public access to BLM-administered lands, and therefore increased levels of recreation compared to the Absaroka Foothills region where public access is more limited.

Impact Analysis

Table 7-11, Acres of Travel Management Designations in GRSG Habitat in MZ II/VII, shows acres of GRSG habitat open, limited, or closed to travel in MZ II/VII.

Table 7-11. Acres of Travel Management Designations in GRSG Habitat in MZ II/VII

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII	Percent Within Planning Area	MZ II/VII	Percent Within Planning Area
Open				
Alternative A	5,000	0%	53,000	5%
Alternative B	5,000	0%	55,000	5%
Alternative C	5,000	0%	67,000	22%
Alternative E	5,000	0%	55,000	5%
Alternative F	5,000	0%	58,000	10%
Proposed Plan	5,000	0%	58,000	10%
Limited				
Alternative A	8,859,000	13%	9,293,000	21%
Alternative B	8,931,000	13%	9,125,000	20%
Alternative C	7,747,000	0%	10,449,000	30%
Alternative E	8,931,000	13%	9,125,000	20%
Alternative F	8,861,000	13%	9,294,000	21%
Proposed Plan	8,861,000	13%	9,331,000	21%
Closed				
Alternative A	113,000	4%	371,000	18%
Alternative B	158,000	31%	429,000	29%
Alternative C	109,000	0%	317,000	3%
Alternative E	158,000	31%	429,000	29%
Alternative F	112,000	3%	366,000	16%
Proposed Plan	112,000	3%	366,000	16%

Source: BLM 2015

This table displays the acres of PHMA and GHMA within travel management designations of open, limited and closed in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

GHMA General Habitat Management Areas
 GRSG Greater sage-grouse
 MZ Management Zone
 PHMA Priority Habitat Management Areas

The COT Report objectives for recreation are to maintain healthy native sagebrush communities, based on local ecological conditions, and to manage direct and indirect human disturbance (including noise) to avoid interruption of normal GRSG behavior (USFWS 2013). Limits on road use under the action alternatives and the Proposed Plan, and limits on OHVs would help meet these objectives.

As shown in Table 7-11, acres of GRSG habitat closed to motorized vehicles would be greatest under Alternative B and E; and less under all other alternatives and the Proposed Plan. However, the vast majority of GRSG habitat on BLM/Forest Service lands in MZ II/VII would be designated as limited to existing routes. As such, OHVs would be prohibited from traveling off existing routes, which would

reduce the risk of direct and indirect effects from recreational motorized vehicles. Approximately 5,000 acres of PHMA in MZ II/VII would be open to OHV use under all alternatives and the Proposed Plan; between 53,000 and 67,000 acres of GHMA would be open under all alternatives and the Proposed Plan. In these areas, habitat degradation, behavior disruptions, and the potential for other direct and indirect effects caused by recreational use would be higher. However, these lands constitute a relatively small percentage of all PHMA and GHMA in MZ II/VII, therefore, the effects would be localized and no notable differences are anticipated in cumulative impacts across the alternatives.

On the local level, the Bighorn Basin Sage-grouse Conservation Plan (Bighorn Basin Sage-grouse Local Working Group 2007) includes recommended management practices related to recreation management such as includes recreation recommended management practices such as restricting organized recreational activities between March 15 and July 15 within two miles of a lek site, and discourage dispersed camping within important riparian habitats occupied by GRSG during late summer. Other local working groups within MZ II/VII include similar recommendations.

Implementation of the action alternatives and Proposed Plan described above, in concert with travel management planning on BLM-administered lands within MZ II/VII, the disturbance caps applied under the state plans, and other past, present, and reasonably foreseeable future actions would help reduce the threat of recreation and travel on GRSG populations and habitats and would provide a net conservation benefit to GRSG in MZ II/VI.

7.1.6.8 Conifers

Nature and Type of Effects

Conifer woodlands, especially juniper (*Juniperus* spp.) and in some regions pinyon pine (*Pinus edulis*), may expand into sagebrush habitat and reduce availability of habitat for GRSG. Conifer expansion may be encouraged by human activities, including fire suppression and grazing (Miller et al. 2011). If woodland development is sufficient to restrict shrub and herbaceous understory growth, habitat quality for GRSG will be reduced (Connelly et al. 2004). Mature trees offer perch sites for raptors; thus, woodland expansion may also increase the threat of predation, as with powerlines (Manier et al. 2013). Locations within approximately 1000 yards of current pinyon-juniper woodlands are at highest risk of expansion (Bradley 2010). The greatest risks from conifer encroachment are thought to be in the Great Basin, with smaller risks (6 to 7 percent of PH and GH) in the Wyoming Basin (Connelly et al. 2004; Manier et al. 2013). Studies have shown that GRSG incur population-level impacts at very low levels of conifer encroachment (Baruch-Mordo et al. 2013).

Conditions in MZ II/VII

Approximately 46 percent of conifer encroachment risk in priority habitats (and 43 percent in general habitats) occur on BLM-administered lands within MZ II/VII (Manier et al. 2013). Therefore, BLM actions are likely to have a greater potential to ameliorate the effects of conifer encroachment on GRSG than any other single land management entity.

Impact Analysis

Specific required design features common to all BLM/Forest Service plans in MZ II/VII include removal of standing and encroaching trees within 100 meters of occupied leks and other habitats (e.g., nesting, wintering, and brood rearing). Additionally, reintroduction of appropriate fire regimes would limit conifer encroachment into the sagebrush plant communities. These actions would benefit GRSG by improving the quality of habitat throughout the MZ.

Additionally, under all action alternatives and the Proposed Plan, conifer removal treatments would be prioritized closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. This action would benefit GRSG by improving the quality of habitat and functionality. Alternative A, does not prioritize conifer removal treatments in areas closest to occupied GRSG habitats, therefore the risk of conifer encroachment would be greater under this alternative.

Recommendations within the Wyoming GRSG Conservation Plan (WSGWG 2003) call for removal of juniper and other conifers where they have invaded sagebrush sites important to GRSG, which could help ameliorate the threat on non-BLM lands. In Colorado, the Colorado Parks and Wildlife has conducted conifer treatments totaling 2,600 acres (Colorado Department of Natural Resources 2013).

SGL has helped reduce the threat of early succession conifer encroachment through mechanical removal on 10,500 acres of private lands within MZ II/VII. The majority of these efforts were located inside PACs (NRCS 2015), helping to preserve historic fire return intervals and important GRSG habitat. While the threat of conifer encroachment is likely to continue under all alternatives and the Proposed Plan, implementing mechanical treatments, reintroduction of appropriate fire regimes, and implementing BLM/Forest Service required design features and BMPs (e.g., removing standing and encroaching trees within 100 meters of occupied leks and other GRSG habitats) under all action alternatives and the Proposed Plan, would result in a net conservation gain for GRSG.

7.1.7 Conclusions

In addition to BLM management in RMP planning areas throughout MZ II/VII, GRSG will also be impacted by management and conservation at state, regional, and local levels. This analysis takes into account each alternative in the Bighorn Basin RMP in conjunction with state and private initiatives, and past, present, and reasonably foreseeable future actions. For purposes of this analysis, the BLM has determined that the Proposed Plans for the other ongoing GRSG and RMP planning efforts in MZ II/VII are reasonable foreseeable future actions.

Some of the most important past, present, and reasonably foreseeable future actions benefitting GRSG populations on private land in MZ II/VII are the conservation easements coordinated by the Natural Resources Conservation Service SGI, State of Wyoming, State of Colorado, BLM, Forest Service, and other agencies and organizations. As of 2015, SGI has secured conservation easements on 243,400 acres within MZ II/VII. Additionally, SGI has worked with landowners to increase fence marking, seeding of native vegetation, remove conifers, and implement prescribed grazing systems to help alleviate the adverse impacts associated with historic improper grazing practices. Future coordination of private landowners within SGI is expected to provide further benefits to GRSG habitat.

This coordination with private landowners enhances conservation in addition to what BLM management can accomplish on federal lands. Ranchers in MZ II/VII are also using Candidate Conservation Agreement with Assurances with the USFWS. Under these instruments, the ranchers voluntarily agree to manage lands to reduce threats to GRSG in exchange for a guarantee that they will not be subject to additional regulations should the species become listed. While ranchers have used these agreements across GRSG range, thus far the agreements have been applied to only a small number of ranches in Wyoming and Montana.

As discussed in Section 7.1.4, Wyoming, Montana, Utah, Colorado, and Idaho have adopted statewide plans to promote GRSG conservation throughout MZ II/VII. Wyoming's plan implements a Core Population Area Strategy with well density limitations, timing restrictions, and a uniform 5 percent disturbance cap across all landownership types. These measures would improve GRSG population levels

if effectively enforced (Copeland et al. 2013). Other state plans include similar, if sometimes less aggressive, measures to reduce impacts on state lands. In Montana, a 5 percent limit on anthropogenic disturbance is applied within the Density and Disturbance Calculation Tool examination area (based upon occupied leks within any given Core population area). Similarly in Utah, the Conservation Plan for Greater Sage-grouse in Utah (Utah Division of Wildlife Resources 2013), includes under certain circumstances, a general limit on new permanent disturbance of 5 percent of habitat on state or federally managed lands within any particular Sage-grouse Management Area.

Alternative A: Current Management

Under Alternative A, current management would continue on BLM-administered lands within the Bighorn Basin planning area. The Bighorn Basin plan would not designate PHMA, GHMA, or SFAs, and would not manage any additional ROW avoidance or exclusion areas. Appropriate and allowable uses and restrictions with regard to such activities as mineral leasing and development, recreation, utility corridors, and livestock grazing would also remain unchanged.

Management prescriptions to protect GRSG currently in place include restricting surface disturbance and occupancy within a 0.25-mile radius of occupied GRSG leks and within 2 miles of occupied leks in GRSG nesting and early brood-rearing habitats. Additionally, the BLM prohibits surface-disturbing activities in GRSG winter concentration areas from November 15 to March 14. These management actions would continue to be implemented under Alternative A.

In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. As a result, the lack of protections under the Alternative A would be offset to an extent by more protective management elsewhere MZ II/VII. However, in the Bighorn Basin planning area, current management would do little to reduce the threats from energy development, mining, and infrastructure on GRSG wintering and breeding grounds. Although current management actions, including the temporary BLM GRSG IMs, provide a limited array of conservation measures that are intended to avoid continued degradation of GRSG habitat in MZ II/VII, they would not be subject to the same development restrictions in GRSG habitat under Alternative A as they would under the action alternatives or the Proposed Plan. Thus, Alternative A would not meet the goals and objectives in this plan to identify and incorporate conservation measures for GRSG and may meet the COT report objectives for present and widespread threats to GRSG, but only in localized areas and not on BLM-administered lands within the Bighorn Basin planning area.

Alternative B

Alternative B emphasizes conservation of biological resources, including habitat for fish and wildlife, maintenance of contiguous blocks of native plant communities, ecosystem management, protection of natural functions in riparian areas, and control of invasive species. Alternative B extends the protective buffers around GRSG habitat, prohibiting surface-disturbing activities within 0.6 mile of occupied GRSG leks and seasonally mitigating surface disturbing activities in GRSG nesting and early brood-rearing habitat. GRSG Key Habitat Areas are closed to mineral leasing and area closed to motorized vehicle use from March 15 to June 30. Alternative B would meet the objectives presented in the COT report for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by implementing management actions which specifically address these threats.

Implementing these protective measures on BLM-administered lands within the Bighorn Basin RMP planning area would help preserve GRSG habitat by limiting resource use activities in PHMA and GHMA. In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. The incremental effects of Alternative B combined with implementation of other regional efforts would result in a net conservation gain for GRSG in MZ II/VII.

Alternative C

Alternative C emphasizes resource uses with reduced constraints. Compared to the other alternatives, Alternative C conserves the least land for physical, biological, and heritage resources; and is the least restricted to motorized vehicle use and energy and mineral development. Under this alternative, the BLM would not manage to maintain contiguous blocks of native plant communities or minimize fragmentation.

In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. COT objectives for fire, invasive plants, range management, recreation, infrastructure, energy, and mining would likely be met in these areas. However, within the Bighorn Basin planning area, the limited protective measures would not meet the goals and objectives to identify and incorporate conservation measures for GRSG and would not meet the COT report objectives.

Alternative E

Impacts under Alternative E are the same as Alternative B outside of GRSG Key Habitat Areas. Within GRSG Key Habitat Areas, Alternative E includes additional management actions and an ACEC designation. Alternative E emphasizes conservation of biological resources with more constraints on resource uses than any other alternative. Alternative E would meet the objectives presented in the COT report for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by implementing management actions which specifically address these threats.

Implementing these protective measures on BLM-administered lands within the Bighorn Basin RMP planning area would help preserve GRSG habitat by limiting resource use activities in PHMA and GHMA. In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. The Proposed Plans include better management flexibility to reduce the potential for development spilling over onto adjacent lands in an unrestricted manner; however, this is less of an issue within the Bighorn Basin planning area, due to the fewer non-BLM administered lands. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. The incremental effects of other regional efforts combined with implementation of Alternative E would result in a net conservation gain for GRSG in MZ II/VII, but the strict protective measures on BLM-administered land in the Bighorn Basin planning area may have an unintended effect of reducing gains for GRSG in the planning area via the effects described above.

Alternative F

Impacts under Alternative F are the same as the Proposed Plan outside of GRSG PHMA. Within GRSG PHMA, Alternative F includes additional management actions and an ACEC designation. Alternative F generally emphasizes conservation of biological resources, while placing moderate constraints on resource uses and reclamation and mitigation requirements to reduce impacts to resource values. Alternative F would meet the objectives presented in the COT report for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by implementing management actions which specifically address these threats.

In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. The incremental effects of other regional efforts combined with implementation of the Alternative F would result in a net conservation gain for GRSG in MZ II/VII.

Proposed RMP (Alternative D)

The Proposed Plan generally increases conservation of biological resources compared to current management. The Proposed Plan also emphasizes moderate constraints on resource uses and reclamation and mitigation requirements. This would reduce the potential for development occurring solely on private land where less protections are afforded to GRSG. The Proposed Plan would meet the objectives presented in the COT report for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by targeting these threats in the RMP/EIS and implementing management actions which specifically address these threats.

In the rest of MZ II/VII, other BLM/Forest Service LUP planning efforts would implement their Proposed Plans to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies as discussed in Section 7.1.4, would be implemented on non-federal lands. Reasonably foreseeable future actions in MZ II/VII such as proposed oil and gas developments, interstate transmission lines, and other land disturbance projects would be subject to the requirements set forth in the BLM/Forest Service Proposed Plans which encompass MZ II/VII, where those projects occur on federal decision area lands. For non-federal lands, reasonably foreseeable future projects may be subject to disturbance caps, buffer restrictions, and other requirements of GRSG state plans, as well as site specific mitigation measures.

Regional efforts combined with the incremental effect of implementing the Proposed Plan would result in a net conservation gain for GRSG in MZ II/VII.

Summary

The primary threats affecting GRSG populations throughout MZ II/VII are energy development, infrastructure, grazing/free-roaming equids, spread of weeds, conversion to agriculture, fire, recreation, and spread of conifers (USFWS 2013).

Infrastructure and energy development are of particular concern in MZ II/VII because they affect the greatest amount of land. Numerous multi-state transmission lines are proposed through GRSG habitat, as are large-scale oil and gas field developments in excess of 100,000 acres. Implementation of the BLM/Forest Service Proposed Plans in MZ II/VII is unlikely to preclude such projects from proceeding, especially Presidential Priority transmission line projects that are not subject to GRSG protective measures in the BLM/Forest Service planning efforts; however, GRSG protective measures are being

considered in the project specific analysis. The cumulative effect of the conservation measures in the Proposed Plan will result in protection of GRSG populations. In some localized areas, small populations may be at continued risk due to the cumulative effect of reasonably foreseeable future infrastructure and energy development projects over the next 20 years, when combined with unplanned events such as wildfires, drought, or West Nile virus outbreaks. However, the restrictions on land use, in combination with project-specific BMPs and RDFs and other regional efforts would achieve an overall net conservation gain for the regional population and would help mitigate the effects on small, at risk populations.

Implementation of alternatives B, E, F, and the Proposed Plan are anticipated to result in a net conservation gain for GRSG in MZ II/VII when compared to current management (Alternative A). Alternatives B and E emphasize conservation of biological resources, and contain more restrictions on resource uses than the other alternatives. While not as extensive as alternatives B or E, Alternative F and the Proposed Plan include GRSG conservation measures and resource use allocations which would improve baseline conditions.

Although small fringe populations may be at continued risk of decline in the next 20 years, implementing alternatives B, E, F, or the Proposed Plan in combination with other regional efforts (such as the Proposed Plans for other BLM planning areas; conservation strategies in the Montana, Wyoming, Idaho, Utah, and Colorado state plans; increased land protections via NRCS SGI, and local habitat restoration efforts) would effectively conserve the region-wide population of GRSG in MZ II/VII.

7.1.8 MZ-Wide Reasonably Foreseeable Future Actions Summary Table

Table 7-12 includes a selection of some of the larger projects from the reasonably foreseeable future actions tables in the RMPAs/LUPAs for MZ II/VII. The full tables can be found in each EIS within the MZ.

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
Energy and Mining						
II/VII	Northwest Colorado, 9-Plan	Wyoming Basin, Northwest Colorado	Hiawatha Regional Energy Development EIS	Sweetwater County, Wyoming; Moffat County, Colorado	Proposed development of up to 4,208 new natural gas wells on approximately 157,361 acres of mixed federal, state, and private lands. The project area overlaps with lands identified as GRSG Core Areas. 91% of the project area is managed by the BLM.	Proposed
II/VII	9-Plan	Wyoming Basin	LaBarge Platform Exploration & Development Project	Lincoln and Sublette County, Wyoming	Proposed development of up to 838 new oil and gas wells on 218,000 acres of private, state, and federal lands. Approximately 154,000 acres of surface lands are administered by the BLM.	Proposed

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat (Continued)

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
II/ VII	9-Plan	Wyoming Basin	Continental Divide-Creston Natural Gas Project	Carbon and Sweetwater Counties, Wyoming	Proposed development of up to 8,950 additional natural gas wells on 1.1 million acres of land, including GRSG Core Areas. The proposed facilities would add to the existing network of wells, pipelines, access routes and electrical distribution systems. Approximately 59 percent of the project area is on federally-owned lands.	Proposed
II/ VII	Lander, 9-Plan	Wyoming Basin	Moneta Divide Natural Gas and Oil Development Project	Fremont and Natrona Counties, Wyoming	Proposed development of approximately 4,250 natural gas and oil wells on 265,000 acres of land (including approximately 169,500 acres of land administered by the BLM). The project area includes GRSG Core Areas.	Proposed
II/ VII	9-Plan	Wyoming Basin	Pinedale Anticline Project	Sublette County, Wyoming	Proposed development of natural gas resources within nearly 200,000 acres of land, of which approximately 80 percent is federal surface ownership. The project area occurs within GRSG Core Areas.	Ongoing
II/ VII	9-Plan	Wyoming Basin	Blacks Fork Project (Formerly Moxa Arch Area Infill)	Sweetwater, Uinta, and Lincoln Counties, Wyoming	Proposed infill drilling project, on approximately 7,500 hydrocarbon wells within 633,532 acres of mixed federal, state, and private lands.	Proposed
II/ VII	9-Plan, Northwest Colorado, Utah	Wyoming Basin, Northwest Colorado	Oil Shale and Tar Sands Programmatic EIS	Colorado, Utah, and Wyoming	Amendment of 10 BLM RMPs to designate certain public lands as available for application for leasing and future exploration and development of oil shale and tar sands resources. A ROD was signed in 2013 which made approximately 678,000 acres available for potential development of soil shale, and approximately 132,000 acres available for development of tar sands.	Ongoing
II/ VII	9-Plan	Wyoming Basin	Atlantic Rim Natural Gas Field Development Project	Carbon County, Wyoming	Ongoing development of oil gas resources on 270,080 acres of land, of which 173,672 are federal surface estate. A ROD was signed in 2007. The project area includes GRSG Core Areas.	Ongoing
II/ VII	9-Plan	Wyoming Basin	Chokecherry/Sierra Madre Wind Farm	Carbon County, Wyoming	Proposed development of approximately 1,000 wind turbines and associated ancillary facilities on 220,000 acres of land. The project area includes private, state, and federally managed lands, and overlaps with GRSG Core Areas.	Proposed

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat (Continued)

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
II/ VII	9-Plan	Wyoming Basin	Normally-Pressured Lance Natural Gas EIS	Sublette County, Wyoming	Proposed development of approximately 3,500 natural gas wells within 141,000 acres of state, private, and BLM-administered lands.	Proposed
II/ VII	9-Plan	Wyoming Basin	Bird Canyon Field Infill Project	Sublette and Lincoln Counties, Wyoming	Proposed drilling and production of 348 new natural gas wells within 17,612 acres of BLM-administered land.	Proposed
Rights-of-way						
II/ VII	9-Plan, Northwest Colorado, Utah	Wyoming Basin, Rich-Summit-Morgan, Uintah, North Park, NWCO, Strawberry Valley, Carbon	Gateway South Transmission Line Project	17 Counties in Wyoming, Colorado, and Utah	Proposed 500 kV transmission line which would begin near Medicine Bow, Wyoming, and would extend south and west to a proposed substation near Mona, Utah. The proposed transmission line would span over 400 miles, with a 250-foot right-of-way, and would cross multiple land jurisdictions including lands administered by the BLM.	Proposed
II/ VII	9-Plan, Northwest Colorado, Utah	Wyoming Basin, Northwest Colorado, Sheeprock, Strawberry Valley, Carbon, Bald Hills	TransWest Express Transmission Line Project	Wyoming, Colorado, Utah, and Nevada	Proposed 600 kV transmission line extending from south-central Wyoming to southern Nevada. The transmission line corridor would span over 700 miles and would cross private, state, and federally owned lands. The proposed route and alternative routes under consideration would cross priority and general habitats.	Proposed
II/ VII	9-Plan, Idaho and Southwest Montana	Wyoming Basin, East Central, Northern Great Basin, Box Elder	Gateway West Transmission Line Project	Wyoming and Idaho	Proposed 230 kV and 500 kV transmission line project between Glenrock, Wyoming, and Melba, Idaho. Approximately 1,000 miles of new high-voltage transmission lines would be constructed. The project would cross multiple land jurisdictions, including sage grouse Core Areas in Wyoming.	Proposed
II/ VII	9-Plan	Wyoming Basin	Riley Ridge to Natrona Pipeline Project	Sublette, Sweetwater, Fremont, and Natrona Counties, Wyoming	Proposed 243-mile pipeline from Riley Ridge to Big Piney, Wyoming. The pipeline would consist of a 50-foot right-of-way, and would cross GRSG Core Areas.	Proposed
II/ VII	9-Plan	Wyoming Basin	Zephyr Power Line Transmission Project	Wyoming, Colorado, Utah, and Nevada	Proposed 500 kV transmission line spanning between Chugwater, Wyoming to just south of Las Vegas, Nevada.	Proposed

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat (Continued)

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
Weeds						
II/ VII	9-Plan, Northwest Colorado	Wyoming Basin, Northwest Colorado, Powder River Basin, North Park	Invasive Plant Management EIS for the Medicine Bow - Routt National Forests, and Thunder Basin National Grassland	Wyoming and Colorado	Proposed treatment of invasive plant species using adaptive and integrated invasive plant treatment methods. These include manual, mechanical, biological, aerial, and ground herbicide applications. Potential treatment areas include GRSG Core Areas.	Proposed

Notes:

1. Hiawatha Regional Energy Development Project Update: <http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/rsfodocs/hiawatha/newsitrs.Par.79506.File.dat/Hiawatha03-2013.pdf>
2. LaBarge Platform Exploration & Development Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/labarge_platform.html
3. Continental Divide-Creston Natural Gas Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/cd_creston.html
4. Moneta Divide Natural Gas and Oil Development Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/lfo/moneta-divide.html>
5. Pinedale Anticline Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/anticline/seis.html>
6. Black Forks Project (Formally Moxa Arch Area Infill Project): http://www.blm.gov/wy/st/en/info/NEPA/documents/kfo/moxa_arch.html
7. Oil Shale and Tar Sands Programmatic EIS: <http://ostseis.anl.gov/>
8. Atlantic Rim Natural Gas Field Development Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/atlantic_rim.html
9. Chokecherry/Sierra Madre Wind Farm: <http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/Chokecherry.html>
10. Gateway South Transmission Line Project: http://www.blm.gov/wy/st/en/info/NEPA/documents/hdd/gateway_south.html
11. TransWest Express Transmission Line Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/hdd/transwest.html>
12. Gateway West Transmission Line Project: <http://www.gatewaywestproject.com/>
13. Riley Ridge to Natrona Pipeline Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/rsfo/RRNP.html>
14. Normally Pressured Lance Natural Gas Development Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/npl.html>
15. Bird Canyon Natural Gas Infill Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/rsfo/birdcanyon.html>
16. Invasive Plant Management EIS for the Medicine Bow – Routt National Forests and Thunder Basin National Grasslands: http://www.fs.usda.gov/wps/portal/fsinternet!/ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gDfxMDT8MwRydLA1cj72BTMwMTAwjQL8h2VAQArb-RA!!/?ss=110206&navtype=BROWSEBYSUBJECT&navid=130110000000000&pnavid=130000000000000&accessDB=true&position=Project*&groupid=19692&ttype=projectdetail&pname=Medicine%20Bow-Routt%20National%20Forests%20&%20Thunder%20Basin%20National%20Grassland-%20Projects

- BLM Bureau of Land Management
- EIS Environmental Impact Statement
- GRSG Greater sage-grouse
- kV Kilovolt
- MZ Management Zone
- RMP Resource Management Plan
- ROD Record of Decision

7.1.9 References

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TABLE OF CONTENTS

CHAPTER 7 – CUMULATIVE IMPACTS (GREATER SAGE-GROUSE)7-1

7.1 Greater Sage-Grouse Cumulative Effects Analysis: Bighorn Basin7-1

7.1.1 Methods7-3

7.1.2 Assumptions.....7-4

7.1.3 Existing Conditions in WAFWA MZ II/VII, and the Bighorn Basin Planning Area7-5

7.1.4 Regional Efforts to Manage Threats to GRSG7-6

7.1.5 Relevant Cumulative Actions7-12

7.1.6 Threats to GRSG in MZ II/VII7-13

7.1.6.1 Energy Development7-13

7.1.6.2 Infrastructure7-26

7.1.6.3 Grazing/Free-Roaming Equids7-32

7.1.6.4 Spread of Weeds7-37

7.1.6.5 Conversion to Agriculture/Urbanization7-38

7.1.6.6 Fire.....7-41

7.1.6.7 Recreation7-42

7.1.6.8 Conifers.....7-45

7.1.7 Conclusions7-46

7.1.8 MZ-Wide Reasonably Foreseeable Future Actions Summary Table7-50

7.1.9 References.....7-54

LIST OF TABLES

Table 7-1. Management Jurisdiction in MZ II/VII by Acres of Priority and General Habitats.....7-5

Table 7-2. Acres Open* and Closed to Fluid Mineral Leasing in GRSG Habitat in MZ II/VII7-16

Table 7-3. Acres with NSO and CSU/TL Stipulations in GRSG Habitat in MZ II/VII7-17

Table 7-4. Acres Open and Closed to Mineral Material Disposal in GRSG Habitat in MZ II/VII.....7-21

Table 7-5. Acres Open and Recommended for Withdrawal from Mineral Entry in GRSG Habitat in MZ II/VII7-23

Table 7-6. Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ II/VII7-25

Table 7-7. Acres of Rights-of-Way/Special Use Authorization Management within GRSG Habitat in MZ II/VII7-28

Table 7-8. Acres of Wind Energy Management Areas in GRSG Habitat in MZ II/VII7-31

Table 7-9. Acres Available and Unavailable to Livestock Grazing in GRSG Habitat in MZ II/VII7-35

Table 7-10. Acres Identified for Retention and Disposal in GRSG Habitat in MZ II/VII7-40

Table 7-11. Acres of Travel Management Designations in GRSG Habitat in MZ II/VII7-44

Table 7-12. Reasonably Foreseeable Future Actions in Management Zone II/VII Likely to Impact GRSG Habitat7-50

LIST OF FIGURES

Figure 7-1. Western Association of Fish and Wildlife Agencies Greater Sage-Grouse Management Zones 7-2