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# Chapter 5

## Cumulative Effects



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# CHAPTER 5

## CUMULATIVE EFFECTS

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### 5.1 INTRODUCTION

This chapter presents the likely cumulative impacts on the human and natural environment that could occur from implementing the alternatives presented in **Chapter 2**, Alternatives. This chapter is organized by topic, similar to **Chapter 3**, Affected Environment, and **Chapter 4**, Environmental Consequences.

“Cumulative impact” is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative impacts are effects on the environment that result from the impact of implementing any one of the alternatives (**Chapter 2**) in combination with other actions outside the scope of this plan, either within the planning area or adjacent to it. Cumulative impact analysis is required by CEQ regulations because environmental conditions result from many different factors that act together. The total effect of any single action cannot be determined by considering it in isolation, but must be determined by considering the likely result of that action in conjunction with many other factors. Evaluation of potential impacts considers incremental impacts that could occur from the proposed project, as well as impacts from past, present, and reasonably foreseeable future actions. Management actions could be influenced by activities and conditions on adjacent public and nonpublic lands beyond the planning area boundary; therefore, assessment data and information could span multiple scales, land ownerships, and jurisdictions. These assessments involve determinations that often are complex and, to some degree, subjective.

### 5.2 CUMULATIVE ANALYSIS METHODOLOGY

The cumulative impacts discussion that follows considers the alternatives in the context of the broader human environment – specifically, actions that occur

outside the scope and geographic area covered by the planning area. Cumulative impact analysis is limited to important issues of national, regional, or local significance.

Because of the programmatic nature of the LUPA and cumulative assessment, the analysis tends to be broad and generalized to address potential impacts that could occur from a reasonably foreseeable management scenario combined with other reasonably foreseeable activities or projects. Consequently, this assessment is primarily qualitative for most resources because of lack of detailed information that would result from project-level decisions and other activities or projects. Quantitative information is used whenever available and as appropriate to portray the magnitude of an impact. The analysis assesses the magnitude of cumulative impacts by comparing the environment in its baseline condition with the expected impacts of the alternatives and other actions in the same geographic area. The magnitude of an impact is determined through a comparison of anticipated conditions against the naturally occurring baseline as depicted in the affected environment (see **Chapter 3, Affected Environment**) or the long-term sustainability of a resource or social system.

The total effect of any single action cannot be determined by considering it in isolation, but must be determined by considering the likely result of that action in conjunction with many others. Evaluation of potential impacts considers incremental impacts that could occur from the proposed project, as well as impacts from past, present, and reasonably foreseeable future actions. Management actions could be influenced by activities and conditions on adjacent public and non-public lands beyond the planning area boundary; therefore, assessment data and information could span multiple scales, land ownerships, and jurisdictions.

The following factors were considered in this cumulative impact assessment:

- Federal, nonfederal, and private actions
- Potential for synergistic impacts or synergistic interaction among or between impacts
- Potential for impacts across political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- Comparative scale of cumulative impacts across alternatives

The geographic scope for the cumulative impact analysis varies by resource and is described within each resource section. For Special Status Species – Greater Sage-Grouse, the cumulative impact analysis is at the WAFWA MZ level in addition to the planning area analysis. WAFWA MZs are biologically based delineations that were determined by identifying GRSG populations and sub-populations within seven floristic provinces. Analysis at this level enables the

decision maker to understand the impacts on GRSG at a biologically meaningful scale.

### **5.2.1 Past, Present, and Reasonably Foreseeable Future Actions**

Past, present, and reasonably foreseeable future actions are considered in the analysis to identify whether and to what extent the environment has been degraded or enhanced, whether ongoing activities are causing impacts, and trends for activities in and impacts on the area. Projects and activities are evaluated on the basis of proximity, connection to the same environmental systems, potential for subsequent impacts or activity, similar impacts, the likelihood a project will occur, and whether the project is reasonably foreseeable.

Projects and activities considered in the cumulative analysis were identified through meetings held with cooperators and BLM/Forest Service employees with local knowledge of the area. Each was asked to provide information on the most influential past, present, or reasonably foreseeable future actions. Additional information was obtained through discussions with agency officials and review of publicly available materials and websites.

Impacts of past actions and activities are manifested in the current condition of the resources, as described in the affected environment (see **Chapter 3, Affected Environment**). Reasonably foreseeable future actions are actions that have been committed to or known proposals that would take place within a 10-year planning period.

Reasonably foreseeable future action scenarios are projections made to predict future impacts – they are not actual planning decisions or resource commitments. Projections, which have been developed for analytical purposes only, are based on current conditions and trends and represent a best professional estimate. Unforeseen changes in factors such as economics, demand, and federal, state, and local laws and policies could result in different outcomes than those projected in this analysis.

Other potential future actions have been considered and eliminated from further analysis because there is a small likelihood these actions would be pursued and implemented within the life of the plan or because so little is known about the potential action that formulating an analysis of impacts is premature. In addition, potential future actions protective of the environment (such as new regulations related to fugitive dust emissions) have less likelihood of creating major environmental consequences alone, or in combination with this planning effort. Federal actions such as species listing would require the BLM/Forest Service to reconsider decisions created from this action because the consultations and relative impacts might no longer be appropriate. These potential future actions may have greater capacity to affect resource uses within the planning area; however, until more information is developed, no reasonable estimation of impacts could be developed.

Data on the precise locations and overall extent of resources within the planning area are considerable, although the information varies according to resource type and locale. Furthermore, understanding of the impacts on and the interplay among these resources is evolving. As knowledge improves, management measures (adaptive or otherwise) would be considered to reduce potential cumulative impacts in accordance with law, regulations, and the existing LUPs for the areas included in the analysis.

Projects and activities identified as having the greatest likelihood to generate potential cumulative impacts when added to the alternatives are displayed in **Table 5.1**.

**Table 5.1**  
**Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario**

Other Land Use Plans	BLM Colorado River Valley RMP, In Progress
	BLM Grand Junction RMP, In Progress
	BLM Kremmling RMP, In Progress
	BLM Little Snake RMP (BLM 2011)
	BLM White River RMP (BLM 1997a)
	BLM White River Oil and Gas RMPA, In Progress
	Green River RMP (BLM 1997b)
	Wyoming Greater Sage-Grouse RMP Amendments (BLM 2010)
	Jack Morrow Hills Coordinated Activity Plan and Green River RMP Amendment (BLM 2006b)
	Rawlins RMP (BLM 2008a)
	Vernal RMP (BLM 2008b)
	Moab RMP (BLM 2008c)
	Routt National Forest Land and Resource Management Plan (Forest Service 1997)
	Final EIS for White River National Forest (Forest Service 2002)
	Forest Service Colorado Roadless Rule EIS (Forest Service 2012)
	Eagle County Comprehensive Plan (Eagle County 2005)
	Garfield County, Colorado, Land Use Resolution (Garfield County 2008)
	Grand County, Colorado, Master Plan (Grand County 2011)
	Jackson County, Colorado, Master Plan (Jackson County 1998)
	Larimer County Master, Colorado, Plan (Larimer County 1997)
	Mesa County, Colorado, Master Plan (Mesa County 2000)
	Moffat County, Colorado, Land Use Plan (Moffat County 2001)
	Rio Blanco County, Colorado, Master Plan (Rio Blanco County 2011)
	Routt County, Colorado, Master Plan (Routt County 2003)
	Summit County, Colorado, General Plan (Summit County 2006)
	Sublette County, Wyoming, Comprehensive Plan (Sublette County, amended 2005)
	Fremont County, Wyoming, Land Use Plan (Fremont County 2004)
	Carbon County, Wyoming, Land Use Plan (Carbon County 2012)
	Albany County, Wyoming, Comprehensive Plan (Albany County 2008)

**Table 5.1  
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the  
Cumulative Impact Scenario**

	Laramie County, Wyoming, Land Use Plan (Laramie County 2001)
	Sweetwater County, Wyoming, Land Use Plan (Sweetwater County 2011)
	Daggett County, Utah, General Plan (Daggett County 2008)
	Duchesne County, Utah, General Plan (Duchesne County 2012)
	Grand County, Utah, General Plan (Grand County 2012)
	San Juan County, Utah, Master Plan (San Juan County 2008)
	Uintah County, Utah, General Plan (Uintah County 2005)
Energy and minerals development	Oil and Gas Leasing. The BLM routinely offers land parcels for competitive oil and gas leasing to allow exploration and development of oil and gas resources for public sale. Continued leasing is necessary for oil and gas companies to seek new areas for oil and gas production or to develop previously inaccessible/uneconomical reserves. <b>Table 5.2</b> shows the estimated number of oil and gas wells and pads in ADH by BLM field office and the Routt National Forest based on reasonably foreseeable development scenarios.
	<b>FLUID/LEASABLE MINERALS</b>
	Oil Shale and Tar Sands Programmatic EIS.
	Hiawatha Regional Energy Development EIS (proposed). Decision expected in 2015. The project area is located in LSFO and Rock Springs Field Office, Wyoming.
	Monell Arch Oil and Gas Development Project (authorized). Rock Springs Field Office and Rawlins Field Office.
	Table Rock Oil and Gas Field Development Project (authorized). Rock Springs Field Office.
	Gasco Energy Inc. (authorized). Uinta Basin Natural Gas Development Project, Vernal Field Office. The project area is located in Uintah and Duchesne Counties in Utah, and encompasses approximately 206,826 acres west of the Green River and north of the Duchesne/Uintah and Carbon County line.
	Greater Natural Buttes Development Project (authorized). Vernal Field Office. The project area comprises 162,911 acres in Uintah County, Utah.
	Master Leasing Plan and Plan Amendments to the Moab and Monticello RMPs (proposed). Single EIS to consider leasing for oil and gas and potash on about 783,000 acres of public lands.
	AUM and KMOG Pipelines (proposed). Vernal Field Office. Kerr McGee Oil and Gas Onshore LP (KMOG) and Anadarko Uintah Midstream LLC (AUM) propose to install and bury in one trench the following pipelines: (1) 16-inch natural gas pipeline, (2) 6-inch liquids pipelines.
	Tar Sands Leasing Project (proposed). Vernal Field Office. Project proposal is to lease Tar Sands Lands described in the Asphalt Ridge Tract.
	Newfield's Monument Buttes Oil and Gas Development Project (proposed). Vernal Field Office. Proposed oil and gas development on approximately 119,669 acres.
	Koch's North Alger Oil and Gas development Project (authorized). Vernal Field Office. Proposed oil and gas development on approximately 2,390 acres.
	XTO Energy's Riverbend Directional Infill Project (authorized). Vernal Field Office. Proposed infill project on approximately 17,127 acres.

**Table 5.1**  
**Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the**  
**Cumulative Impact Scenario**

ExxonMobil Exploration Company and Natural Soda Inholdings, Inc. Colorado Oil Shale Research, Development and Demonstration Lease Tracts Project (authorized). WRFO. Oil Shale lease tracts on 359 acres.
Anadarko Atlantic Rim Natural Gas Project (authorized). Rawlins Field Office. Natural gas development over 270,420 acres.
Petro-Canada Resources (USA), Inc. Rye Patch Oil and Gas Development (authorized). Vernal Field Office.
BP Continental Divide-Creston Natural Gas Project (proposed). Rawlins Field Office. Proposed natural gas development on 1,028,334 acres.
LaBarge Platform Exploration and Development Project (proposed). Rock Springs Field Office. Proposed development on approximately 218,000 acres.
Normally-Pressured Lance Natural Gas Development Project (proposed). Rock Springs Field Office. Proposed development on approximately 141,080 acres.
Bird Canyon Field Development Project (proposed). Rock Springs Field Office. Proposed development on approximately 18,464 acres.
Horseshoe Basin Unit Project (proposed). Rock Springs Field Office. Proposed development on approximately 24,972 acres.
Riley Ridge to Natrona Pipeline (proposed). Rock Springs Field Office. Proposed 83-mile-long, 24-inch-diameter carbon dioxide pipeline.
Desolation Road Unit Project (proposed). Rock Springs Field Office. Proposed development on approximately 117 acres.
<b>SOLID MINERALS</b>
Arch of Wyoming, LLC Carbon Basin Coal Mine (authorized). Rawlins Field Office. Coal mine on approximately 13,347 acres.
Arch of Wyoming, LLC Medicine Bow Coal Mine (authorized). Rawlins Field Office. Coal mine on approximately 21,777 acres.
Arch of Wyoming, LLC Seminole II Coal Mine (authorized). Rawlins Field Office. Coal mine on approximately 11,355 acres.
Arch of Wyoming, LLC Shoshone Coal Mine (authorized). Rawlins Field Office. Coal mine on approximately 7,688 acres.
Kennecott Uranium Company, Sweetwater Uranium Mine (authorized). Rawlins Field Office. Uranium mine on approximately 11,715 acres.
Lost Creek Uranium Mine (authorized, but currently in litigation). Rawlins Field Office. Authorized uranium mine on approximately 4,250 acres.
Ambre Energy Black Butte Coal Mine (authorized). Rock Springs Field Office. Coal mine on approximately 42,413 acres.
PacifiCorp Jim Bridger Coal Mine (authorized). Rock Springs Field Office. Coal mine on approximately 26,640 acres.
Level III/Anadarko Leucite Hills Coal Mine (authorized). Rock Springs Field Office. Coal mine on approximately 6,721 acres.
PacifiCorp Trapper Coal Mine. LSFO (authorized). Coal mine on approximately 10,569 acres.
TriState/Western Fuels-Colorado, LLC Colowyo Coal Mine, LSFO (authorized). Coal mine on approximately 8,156 acres.

**Table 5.1  
Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the  
Cumulative Impact Scenario**

	Blue Mountain Energy, Inc. Deserado Coal Mine, WRFO (authorized). Coal mine on 8,154 acres.
	Ambre Energy/Anadarko Rosebud Coal Mine (proposed). Rawlins Field Office. Proposed coal mine on approximately 12,644 acres.
	Ambre Energy Black Butte Coal Mine, Rock Springs Field Office (proposed). Proposed coal mine on 45,846 acres.
Vegetation Management	Treatments include prescribed fire, weed control, and mechanical treatments such as thinning, mastication, twist-spiking, and restoration of nonnative fields. Hazardous fuels reduction. Fuels treatments, including prescribed fires, chemical and mechanical treatment, and seeding, will likely continue and increase in the future.
Livestock grazing	Livestock grazing has a long history in the region. Generally, livestock use has decreased over the past 100 years. Grazing in portions of the planning area has either remained stable or declined in the recent past, and demand on BLM-administered and National Forest System lands has remained stable in the last 10 years. Grazing on private lands within the planning area is expected to remain stable or slightly decrease as residential and recreational development increases. Drought and water availability in the planning area, as well as in adjacent areas, has had a significant impact on livestock grazing.
Wild Horse Management	Adobe Town and Salt Wells Creek Wild Horse Gathers (proposed, decision expected in early 2013). Rawlins and Rock Springs Field Offices. Sand Wash Basin Wild Horse Gather (proposed, decision expected in fall of 2013). LSFO. BLM WRFO is planning a horse gather in winter 2013–2014 in the West Douglas Herd Area, which encompasses a small amount of GHMA.
Recreation and visitor use, Travel and Transportation	The primary recreational activities in the planning area are hunting, fishing, hiking, horseback riding, sight-seeing, river-based recreation, and target shooting. Recreation-based visitor use in the planning area is expected to maintain or increase on BLM-administered and non-BLM lands. BLM Bangs Canyon Transportation Management Plan, GJFO (BLM 2007b) BLM Emerald Mountain Transportation Management Plan, LSFO (BLM 2007c) BLM North Fruita Desert Transportation Management Plan, GJFO (BLM 2005a) BLM Wilson Creek Travel Management Plan, WRFO (BLM 2005b) BLM Rock Springs Field Office Comprehensive Travel and Transportation Management Plan, ongoing, decision expected in 2014 BLM Moab RMP (including Travel Management Plan) (BLM 2008c) BLM Vernal RMP (including Travel Management Plan) (BLM 2008b)
Lands and realty	Applications for ROWs may increase to accommodate development, such as residential development and renewable energy. Enterprise Western Expansion II Pipeline. GJFO, Moab Field Office, Vernal Field Office, and WRFO (authorized). Project includes 95-mile 16-inch pipeline to transport natural gas liquids. Quaking Aspen Wind Energy Project, Rock Springs Field Office (proposed). Proposed project encompasses approximately 3,698 acres of public, 3,865 acres of private, and 630 acres of state lands. The project will include up to 100 1.5 megawatt to 3

**Table 5.1**  
**Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the Cumulative Impact Scenario**

megawatt wind turbine generators with a nameplate capacity of 250 megawatts of power, and a 230-kilovolt transmission line.
Sweeney Ranch Wind Park Wind Energy Project, Rock Springs Field Office (proposed). Proposed project comprises approximately 9,700 acres.
Sand Hills Ranch Wind Farm (proposed). Rawlins Field Office. Proposed project would consist of 25 wind turbines.
Teton Wind, LLC White Mountain Wind Farm, Rock Springs Field Office (proposed). Proposed project on approximately 13,165 acres.
Miller Mountain Wind Farm, Rock Springs Field Office (proposed). Proposed project on approximately 5,088 acres.
Hogback Ridge (Whirlwind I) Wind Energy Project (proposed). Rawlins Field Office. Proposed project on approximately 50,000 acres of land.
Chokecherry- Sierra Madre Wind Farm (authorized). Rawlins Field Office. Project consists of over 100,000 wind turbines spaced over approximately 219,707 acres.
Foote Creek Rim Wind Farm (authorized). Rawlins Field Office. The project consists of several thousand wind turbines spaced over approximately 60,619 acres.
PacifiCorp Seven Mile Hill Wind Energy Facility (authorized). Rawlins Field Office. Wind farm on approximately 8,942 acres.
PacifiCorp Dunlap I Wind Farm (authorized). Rawlins Field Office. Wind farm on approximately 16, 279 acres.
Clark Power Services Wind Testing Project (proposed). WRFO.
Proposed Green River Land Sale (ongoing). Proposed land sale of 970 acres in Sweetwater County, Rock Springs Field Office.
Trans West Express 600-kilovolt Transmission Line (proposed, decision expected in 2015). Interstate transmission project with alternatives that cross northwest Colorado.
Energy Gateway South 500-kilovolt Transmission Line (proposed, decision expected in 2015). Interstate transmission project with alternatives in northwest Colorado.
Zephyr 500-kilovolt Transmission Line (proposed). Interstate transmission project with multiple alternatives through northwest Colorado.
Gateway West Transmission Line (proposed; decision expected in 2013). Proposed 230-kilovolt /500-kilovolt transmission project with alternatives that cross southern Wyoming.
Ashley Valley Compressor 25-kilovolt Power line, Vernal Field Office (ongoing). PacifiCorp, doing business as Rocky Mountain Power, proposes to install a 25-kilovolt power line. Length of the line is 10,860 feet, or 2.06 miles.
Blue Valley Land Exchange (ongoing, decision expected in 2015). KFO. Proposed exchange of 1,652 acres of federal lands for 2,005 acres of nonfederal lands in Grand and Summit Counties, Colorado.
Wilderness Ranches Subdivision, Moffatt County (authorized). Subdivision in Moffatt County on approximately 14,318 acres.
Many smaller subdivisions have been authorized on private lands in the cumulative effects analysis area. These range in size from 10 acres to 6,000 acres.

**Table 5.1**  
**Past, Present, and Reasonably Foreseeable Projects, Plans, or Actions that Comprise the**  
**Cumulative Impact Scenario**

Spread of noxious/invasive weeds	<p>Noxious weeds have invaded and will continue to invade many locations in the planning area. Noxious weeds are carried by wind, humans, machinery, and animals. The BLM and Forest Service currently manage weed infestations through integrated weed management, including biological, chemical, mechanical, manual, and educational methods.</p> <p>1991 and 2007 Records of Decision for Vegetation Treatment on BLM Lands in Thirteen Western States (BLM 2007a) and the 2007 Programmatic Environmental Report (BLM 2007d) guide the management of noxious weeds in western states.</p>
Wildland fires	<p>From 2002 to 2012, there have been 11,656 wildfires that have consumed 638,868 acres documented on all lands within the planning area. A total of 2,484 human-caused fires (102,417 acres) and 9,172 naturally occurring wildfires (534,541 acres) were reported during this time.</p> <p>Wildfires have been widely distributed in terms of frequency and severity. Increasing recurrence and severity of drought conditions have been predicted for this area as a result of climate change. This could, in turn, increase the occurrence and severity of wildfires on BLM-administered and National Forest System land.</p> <p>Northwest Colorado Fire Program Area Fire Management Plan (BLM 2012b).</p>
Spread of forest insects and diseases	<p>Several years of drought in western states have resulted in severe stress on forests. This stress has made trees less able to fend off attacks by insects such as mountain pine beetles. In recent years, forest diseases and infestations have been widespread throughout Northwest Colorado.</p>
Drought	<p>For much of the last decade, most of the western US has experienced drought. Crop production, rangeland, riparian, and forest health are all impacted by drought.</p>
Climate change	<p>Increased concern over greenhouse gas emissions and global warming issues may lead to future federal and state regulations limiting the emission of associated pollutants.</p>

**Table 5.2**  
**Estimated Number of Wells and Pads in ADH**

<b>Alternative A Categories</b>	<b>Total Pads</b>	<b>Total Wells</b>	<b>BLM-Managed Pads in ADH</b>	<b>BLM-Managed Wells in ADH</b>
<b>Number of Wells Drilled (Short-Term Disturbance)</b>				
Colorado River Valley Field Office RFD (Includes Roan Plateau)				
Alternative A – Projected Development: Wells and Pads	274	2,311	186	1,569
Alternative A – Existing Wells/Pads	N/A	172	2	0
Alternative A – Total Projected and Existing Wells/Projected Pads	274	2,483	188	1,569
Grand Junction Field Office RFD				
Alternative A – Projected Development: Wells and Pads	630	4,919	175	1,445
Alternative A – Existing Wells/Pads	N/A	342	N/A	4
Alternative A – Total Projected and Existing Wells/Projected Pads	630	5,261	175	1,449
Kremmling Field Office RFD				
Alternative A – Projected Development: Wells and Pads	182	337	182	182
Alternative A – Existing Wells/Pads	N/A	117	N/A	80
Alternative A – Total Projected and Existing Wells/Projected Pads	182	454	182	262
Little Snake Field Office RFD				
Alternative A – Projected Development: Wells and Pads	2,514	2,514	1,521	1,521
Alternative A – Existing Wells/Pads	N/A	456	N/A	336
Alternative A – Total Projected and Existing Wells/Projected Pads	2,514	2,970	1,521	1,857
White River Field Office RFD				
Alternative A – Projected Development: Wells and Pads	207	1,745	138	1,160
Alternative A – Existing Wells/Pads	N/A	405	N/A	261
Alternative A – Total Projected and Existing Wells/Projected Pads	207	2,150	138	1,421
Routt National Forest*				
Alternative A – Projected Development: Wells and Pads				
Alternative A – Existing Wells/Pads	0	0	0	0
Alternative A – Total Projected and Existing Wells/Projected Pads	0	0	0	0
<b>Number of wells completed (Long-Term Disturbance)</b>				
Colorado River Valley Field Office RFD (Includes Roan Plateau)				
Alternative A – Projected Development: Wells and Pads	274	2,195	186	1,491
Alternative A – Existing Wells/Pads	N/A	4	N/A	1
Alternative A – Total Projected and Existing Wells/Projected Pads	274	2,199	186	1,492

**Table 5.2**  
**Estimated Number of Wells and Pads in ADH**

<b>Alternative A Categories</b>	<b>Total Pads</b>	<b>Total Wells</b>	<b>BLM-Managed Pads in ADH</b>	<b>BLM-Managed Wells in ADH</b>
<b>Grand Junction Field Office RFD</b>				
Alternative A – Projected Development: Wells and Pads	630	4,673	175	1,373
Alternative A – Existing Wells/Pads	N/A	22	N/A	1
Alternative A – Total Projected and Existing Wells/Projected Pads	630	4,695	175	1,374
<b>Kremmling Field Office RFD</b>				
Alternative A – Projected Development: Wells and Pads	320	320	173	173
Alternative A – Existing Wells/Pads	N/A	25	N/A	20
Alternative A – Total Projected and Existing Wells/Projected Pads	320	345	173	193
<b>Little Snake Field Office RFD</b>				
Alternative A – Projected Development: Wells and Pads	2,011	2,011	1,217	1,217
Alternative A – Existing Wells/Pads	N/A	79	N/A	27
Alternative A – Total Projected and Existing Wells/Projected Pads	2,011	2,090	1,217	1,244
<b>White River Field Office RFD</b>				
Alternative A – Projected Development: Wells and Pads	207	1,658	138	1,102
Alternative A – Existing Wells/Pads	N/A	46	N/A	25
Alternative A – Total Projected and Existing Wells/Projected Pads	207	1,704	138	1,127
<b>Routt National Forest*</b>				
Alternative A – Projected Development: Wells and Pads				
Alternative A – Existing Wells/Pads	0	0	0	0
Alternative A – Total Projected and Existing Wells/Projected Pads	0	0	0	0

Source: BLM 2006a, 2007e, 2008d, 2009, 2012a, 2012c, 2013

Note: Existing reasonably foreseeable development scenarios for each field office were used to determine the projected development levels. The Colorado Oil and Gas Conservation Commission data was used to gather the numbers of existing producing wells and completed wells. To determine wells that have been completed the following attributes were selected from the Colorado Oil and Gas Conservation Commission Data: SI (Shut in) and TA (Temporarily Abandoned). For wells that are producing PR (Producing) was selected. The Colorado Oil and Gas Conservation Commission wells were intersected with ADH to calculate number of wells.

Note: Existing Pad data is available for only one field office (CRVFO). Data for the other field offices and the Routt National Forest are not available at this time.

\*The Routt National Forest does not have a recent reasonably foreseeable development scenario completed similar to the reasonably foreseeable development scenarios produced for the BLM field offices. Therefore, well and pad projections are not reported for the Routt National Forest.

N/A = Data Not Available

### 5.3 FISH AND WILDLIFE

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect fish and wildlife are mineral exploration and development, residential and industrial development (including power lines and other ROWs), forestry, grazing, recreation, road construction, water diversion and withdrawals, weed invasion and spread, prescribed and wildland fires, land planning efforts, vegetation treatments, habitat improvement projects, insects and disease, and drought.

Many of the activities described above can change habitat conditions, which then cause or favor other habitat changes. For example, wildland fire removes habitat, and affected areas are more susceptible to weed invasion, soil erosion, and sedimentation of waterways, all of which degrade habitats. In general, resource use activities have cumulatively caused habitat removal, fragmentation, noise, increased human presence, and weed spread. Land planning efforts and vegetation, habitat, and weed treatments have offset some of these effects by improving habitat connectivity, productivity, diversity, and health.

Climate change could cause an increase or decrease in temperatures and precipitation, which would affect soil conditions, vegetative health, and water flows and temperature. Such changes would alter habitat conditions, potentially creating conditions that could favor certain species or communities, weeds, or pests.

Under all of the alternatives, impacts on fish and wildlife would be minimized to the extent practicable and feasible through restrictions, stipulations, closures to mineral exploration and development, recreation, and motorized travel, conditions of approval, and by concentrating development in previously disturbed areas.

Since Alternative A would emphasize more resource use and development than any of the action alternatives, impacts on fish and wildlife and habitats would be more likely to occur under this alternative. As a result, Alternative A could significantly contribute to cumulative impacts on fish and wildlife and their habitats. In contrast, under Alternatives B, C, and D and the Proposed LUPA, the BLM/Forest Service would place more restrictions on development than under Alternative A. Under all of the action alternatives, cumulative impacts on fish and wildlife as well as their habitats are expected to be less than significant.

### 5.4 SPECIAL STATUS SPECIES – GREATER SAGE-GROUSE

This cumulative effects analysis 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 of Environmental Quality guidance, cumulative effects need to be analyzed in terms of the specific resource and ecosystem being affected (Council of Environmental Quality 1997). As discussed in **Chapter I**,

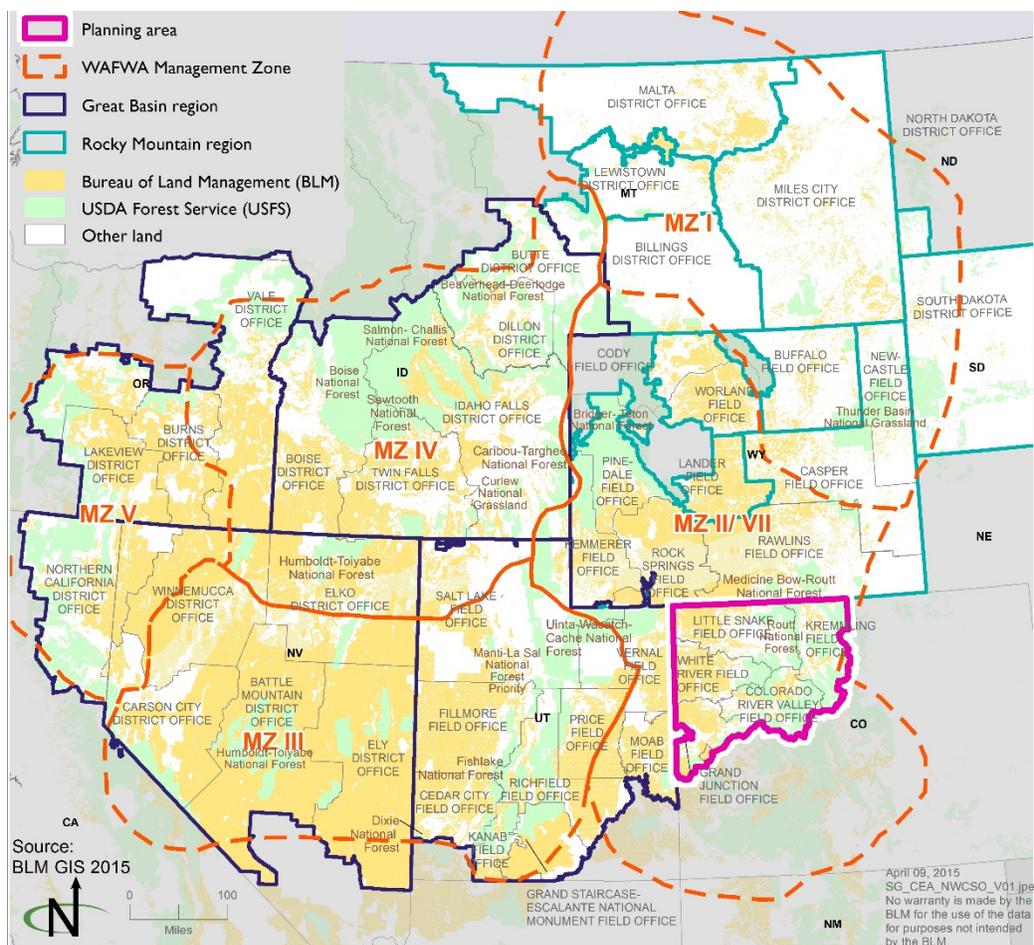
the purpose for the proposed federal action is to identify and incorporate appropriate conservation measures to conserve, enhance, and restore GRSG habitat by reducing, eliminating, or minimizing threats to GRSG habitat. The Western Association of Fish and Wildlife Agencies (WAFWA) delineated seven sage-grouse management zones based on populations within floristic provinces (Stiver et al. 2006). Therefore, the cumulative effects analysis study area for the Greater Sage Grouse extends beyond the Northwest Colorado Sub-region planning area boundary and incorporates WAFWA Management Zones MZ II and VII.

MZs II and VII are combined for the purpose of characterizing GRSG habitat conditions and impacts, as was done in the Summary of Science, Activities, Programs, and Policies That Influence the Range-Wide Conservation of Greater Sage-Grouse (Manier et al. 2013). The analysis of BLM and Forest Service 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). This analysis includes past, present and reasonably foreseeable future actions for all land ownerships in the MZ, and evaluates the impacts of the Northwest Colorado LUPA, by alternative, when added to those actions.

The analysis of nonfederal actions includes a review and analysis of the following:

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

The diagram on the following page shows the boundaries of the WAFWA Management Zones and the BLM and Forest Service planning areas. The Northwest Colorado 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): 2,364,000 acres (17 percent) of PHMA out of 14,105,000 total acres in MZ II/VII, and 1,781,700 acres (10 percent) of GHMA out of 17,771,500 total acres in MZ II/VII. As a result, actions in the Northwest Colorado Sub-region RMP/EIS may have less cumulative impact on addressing the threats to GRSG than those in larger planning areas in MZ II/VII.



**Section 5.4.1** describes the methods used in the analysis, and **Section 5.4.2** lists assumptions used. **Section 5.4.3** describes existing conditions in MZ II/VII and in the Northwest Colorado Sub-region planning area. **Section 5.4.4**, 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 5.4.5** summarizes the relevant cumulative actions occurring in MZ II/VII. **Section 5.4.6** analyzes threats to GRSG in MZ II/VII and discusses the potential cumulative effects resulting from each threat for each alternative. **Section 5.4.7**, Conclusions, determines the cumulative effects on GRSG as a result of implementing each alternative in the Northwest Colorado LUPA, in combination with other past, present, and reasonably foreseeable future actions in MZ II/VII.

#### 5.4.1 Methods

The cumulative effects analysis uses the following methods:

- Data from the USGS publication Summary of Science, Activities, Programs, and Policies That Influence the Range-Wide Conservation of Greater Sage-Grouse (Manier et al. 2013) establish 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 habitats and general habitats.

- USFWS's 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (USFWS 2010) and 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/Forest Service 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 cumulative effects analysis 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 BLM and Forest Service LUPs/EISs in 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.

- 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.
- 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 Northwest Colorado planning area. To calculate the total number of acres in the MZ, the number of acres in the other BLM and Forest Service Proposed LUPs across MZ II/VII are added to the number of acres in the applicable Northwest Colorado LUPA alternative. For example, the total number of acres for Alternative A includes all of the other Proposed LUPs in MZ II/VII plus Northwest Colorado LUPA Alternative A. Likewise, the Alternative B acreage includes all of the other Proposed LUPs in MZ II/VII plus Northwest Colorado LUPA Alternative B.
- A discussion is provided for each alternative in **Section 5.4.7**. Each alternative considers the cumulative impacts on GRSG from each of the threats. It also considers whether those threats can be ameliorated by implementing that particular alternative in conjunction with past, present, and reasonably foreseeable non-BLM/Forest Service actions in MZ II/VII.
- The list of relevant cumulative actions in **Section 5.4.5** was derived from each proposed BLM/Forest Service LUP in MZ II/VII to provide an overview of the ongoing and proposed land uses there.
- Baseline data that are consistent across planning areas and that analyze cumulative effects for each alternative, including the No Action Alternative and Proposed LUPA, 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 and Forest Service have determined that the Proposed LUPs for the other ongoing GRSG planning efforts in MZ II/VII are reasonable foreseeable future actions.

### 5.4.2 Assumptions

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

- The timeframe for this analysis is 20 years.
- The cumulative effects analysis area extends beyond the planning area and encompasses all of WAFWA MZ II/VII; the quantitative impact analysis focuses on impacts across the MZ. The MZ is the appropriate geographic scope for this analysis because it encompasses areas with similar floristic conditions containing important GRSG habitat.
- The magnitude of each threat would vary geographically and may have more or less impact on GRSG in some parts of the MZ, depending on such factors as climate, land use patterns, and topography.
- All acres in this analysis are presented by PHMA and GHMA, consistent with the analysis of direct and indirect impacts earlier in this EIS. The exception to this is quantitative data for the Summary of Science, Activities, Programs, and Policies That Influence the Range-Wide Conservation of Greater Sage-Grouse (Manier et al. 2013), which used Preliminary Priority Habitat (priority habitat) and Preliminary General Habitat (general habitat) to describe GRSG habitat. Where Manier et al. (2013) data are used in this cumulative effects analysis, “priority habitat” refers to Preliminary Priority Habitat and “general habitat” refers to Preliminary General Habitat.
- In order to have consistency of analysis across the various planning areas within the MZ, the proposed designated Linkage Areas have been classified as GHMA for cumulative analysis.
- A management action or alternative would result in a net conservation gain to GRSG if there is 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). For purposes of a NEPA analysis, the baseline is considered the affected environmental that exists at the time NEPA analysis is initiated, and is used to compare predictions of the effects of the proposed action or a reasonable range of alternative actions.
- The cumulative effects analysis quantitatively analyzes impacts on GRSG and their habitat in the MZ. Impacts on habitat are likely to correspond to impacts on populations within MZ II/VII, because 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 also could increase opportunities for predation, disease, or other stressors (Connelly et al. 2004; USFWS 2010; Manier et al 2013).

### **5.4.3 Existing Conditions in WAFWA MZ II/VII and the Northwest Colorado Sub-region Planning Area**

This section summarizes existing conditions and past and present actions in the Northwest Colorado Sub-region planning area (provided in more detail in **Chapter 3**) and MZ II/VII as a whole. Reasonably foreseeable future actions are discussed in **Section 5.4.5**.

#### ***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 Northwest Colorado planning area contains the Northwest Colorado population. Leks in the Wyoming Basin 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., 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/Forest Service management could play a key role in alleviating threats to GRSG across MZ II/VII; however, the Northwest Colorado planning area has a small footprint relative to other BLM planning areas in MZ II/VII.

**Table 5.3** provides a breakdown of land ownership 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. Less than 1 percent of priority habitats and 2 percent of general habitats are on National Forest System lands. In the Northwest Colorado Sub-region planning area, there are approximately 4.1 million acres of GRSG habitat, including approximately 1.7 million acres (42 percent) on BLM-administered lands and 20,000 acres (less than 1 percent) on National Forest System lands. The remaining 2.4 million acres (58 percent) of GRSG habitat comprise private, local, state, and other federal and tribal lands.

**Table 5.3**  
**Management Jurisdiction in MZ II/VII by Acres of Priority and General Habitats**

	<b>Total Surface Acres</b>	<b>Priority Acres</b>	<b>General Acres</b>	<b>Non Habitat Acres</b>
<b>MZ II and VII</b>	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%)	1,354,600 (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

#### ***Planning Area Habitat Conditions***

A variety of vegetation communities exist within GRSG habitat in the planning area, including sagebrush steppe, agriculture/irrigated meadow, mountain shrub, desert shrub/scrub, grasslands subalpine meadow, pinyon juniper, other forests and woodlands, and riparian/wetlands areas. Sagebrush conditions within the planning area are generally split between upper and lower elevations, with 7,000 feet representing the approximate dividing line. The higher-elevation sagebrush communities are generally productive and show little evidence of decadence. The lower-elevation sagebrush communities consist of older stands that show more signs of decadence and little recruitment.

#### ***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 suggest 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 per active lek has declined by more than half (from 42 to 17 males per active 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. Populations within the planning area, including the Eagle-South Routt, Parachute-Piceance, and Meeker-

White River populations, are considered high risk due to factors such as energy development, small size, and urbanization (USFWS 2013). The North Park population is Colorado's most resilient area of occupied habitat, and the population is considered stable or low risk with no significant historical threats, although oil development may pose a future risk (USFWS 2013).

#### **5.4.4 Regional Efforts to Manage Threats to GRSG**

Regional Efforts include past, present, and reasonably foreseeable actions conducted by or in cooperation with agencies, organizations, landowners, or other groups in MZ II/VII. The boundaries of MZ II/VII encompass portions of Montana, Wyoming, Colorado, Utah, and Idaho. Regional efforts occurring in these states are discussed below.

##### ***Other BLM and Forest Service Planning Efforts***

Across the GRSG range, other BLM and Forest Service sub-regions are undergoing LUP revision or amendment processes similar to this one for the Northwest Colorado 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 LUPs will cumulatively decrease the threat of GRSG habitat loss and will limit fragmentation throughout the range. Key actions present in many of the Proposed LUPs include changes in land use allocations, a mitigation framework, an adaptive management strategy, anthropogenic disturbance cap, and protective management actions in priority and general habitat areas.

The BLM and Forest Service have incorporated management of Sagebrush Focal Areas into its Proposed LUP management approach for GRSG. Sagebrush Focal Areas 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 species' persistence. Portions of the Sagebrush Focal Areas that are located on BLM-administered and National Forest System lands would be petitioned for withdrawal from mineral entry and prioritized for management and conservation actions including, but not limited to, review of livestock grazing permits/leases. Management of Sagebrush Focal Areas 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 cumulative effects analysis. Within MZ II/VII, there are two Sagebrush Focal Areas (Bear River Watershed Area and Southwestern/South Central Wyoming) totaling approximately 3,895,500 acres.

##### ***Colorado Statewide Efforts***

In 2008, the Colorado Division of Wildlife (now Colorado Parks and Wildlife [CPW]) developed a state conservation plan that prioritized threats and identified key issues facing conservation. The plan detailed issues, objectives, and

strategies. The conservation strategies 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 that have resulted in positive impacts on 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 that support protection of GRSG habitat, and measures from the Colorado State Board of Land Commissioners that will support adaptive management techniques to improve GRSG habitat (Colorado Department of Natural Resources 2014).

Colorado Oil and Gas Conservation Commission Rules. Oil and gas development in Colorado is governed primarily by statutory provisions of the Oil and Gas Conservation Act (Colo. Rev. Stat. § 34-60-100, et seq.) and rules developed by the Colorado Oil and Gas Conservation Commission (COGCC) (2 CCR 404-1, et seq.). The rules are intended to prevent waste and to conserve oil and gas in Colorado while protecting public health, safety, and welfare, including the environment and wildlife resources. As the state agency charged with promoting the exploration, development, and conservation of Colorado's oil and gas resources, the COGCC also handles the drilling permit process and ensures industry compliance with state-wide oil and gas statutes and regulations. 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 (e.g., GRSG PHMA).

#### ***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 local 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 in the GRSG LUPs, although exact details are not known and are speculative as of the time of this Final EIS publication.

### **Montana Statewide Efforts**

The Montana Department of Fish, Wildlife, and Parks is tasked with implementing the range-wide WAFWA Sage-Grouse Strategy (Stiver et al. 2006) in Montana. The WAFWA Sage-Grouse Strategy monitors, researches, provides outreach, and funds 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 the long term (10 years or more) to ensure GRSG conservation.

In addition, the Montana Department of Fish, Wildlife, and Parks *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.

Core Areas were delineated by Montana Department of Fish, Wildlife, and Parks in cooperation with federal and non-governmental partners to encompass the areas with the greatest number of displaying males and associated habitat.

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)
- 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

The approach of the Montana executive order/Montana Management Plan and Conservation Strategy for Sage-Grouse is similar to the Wyoming executive order. Montana's plan will apply a disturbance cap in Core Areas 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 5 percent limit on anthropogenic surface disturbance within Core Areas 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.

#### **Utah Statewide Efforts**

The Utah Division of Wildlife Resources developed a *Conservation Plan for Greater Sage-Grouse in Utah* (Utah Division of Wildlife Resources 2013). The conservation plan identifies 11 population areas in Utah that are the focus of GRSG conservation efforts, and helps coordinate the efforts of 10 local working groups in the state. The goal of the *Conservation Plan for Greater Sage-Grouse in Utah* is to protect, maintain, improve, and enhance GRSG populations and habitats on public and private lands within established Sage-grouse Management Areas (population areas). It includes conservation strategies and measurable objectives regarding populations and habitat, including a 5 percent permanent disturbance limit (as of April 2013), and, through Utah Executive Order EO/2015/002 (described below), provides a regulatory mechanism to preserve GRSG through specific restrictions on public or private land use.

On February 25, 2015, Utah Governor Gary Herbert signed Utah Executive Order EO/2015/002. The Executive Order directs state agencies whose actions may affect GRSG to implement Utah's *Conservation Plan for Greater Sage-Grouse in Utah* (Utah Division of Wildlife Resources 2013) in GRSG population areas identified in the 2013 Conservation Plan.

Earlier efforts in Utah included formation of Utah's Sage-Grouse Plan Committee, comprised of members from public and private entities, which prioritized threats to the species across the state in Utah's Greater Sage-Grouse Management Plan. The plan sought to protect and maintain occupied habitat, while restoring 175,000 acres of habitat by 2014. The plan provided an overall strategy for local working groups to use in implementing conservation actions, while providing annual updates detailing those actions taken for specific strategies identified in each plan. One recent accomplishment report for the Strawberry Valley Adaptive Resource Management Area reported that 10,223 acres had been purchased within the Management Area by the Utah

Reclamation and Mitigation Commission (Strawberry Valley Adaptive Resource Management Local Working Group 2006).

### **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 was formed to develop a statewide strategy for GRSG conservation. This group prepared the Wyoming GRSG Conservation Plan (Wyoming Sage-Grouse Working Group 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 the state and local levels, and prescribe management actions for private landowners to improve GRSG conservation at the local scale, consistent with Wyoming's Core Population Area Strategy.

Wyoming Executive Order. Wyoming Governor Matt Mead issued an executive order on June 2, 2011 (State of Wyoming 2011), that complemented and replaced several executive orders issued by his predecessor. The 2011 Wyoming executive order articulates Wyoming's Core Population 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 permits, with varying restrictions depending on whether the proposed development activity occurs within or outside delineated Core Population Areas (State of Wyoming 2011).

In Core Population Areas, the executive order requires a 0.6-mile no surface occupancy (NSO) buffer around occupied leks, density restrictions of one location per 640 acres, a disturbance cap of 5 percent, and timing restrictions on activities in breeding and winter concentration habitat. This buffer provides protection of 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 oil/gas and other development projects are being considered in Wyoming (USFWS 2010; Manier et al. 2013).

Statewide modeling of trends under Wyoming's Core Population 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 Population 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 Wyoming's Core Population Area Strategy with \$250 million in target conservation easements could reduce population declines by another 9 to 11 percent (Copeland 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).

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., 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).

#### ***Natural Resource Conservation Service Sage-Grouse Initiative***

The US Department of Agriculture, Natural Resources Conservation Service's Sage-Grouse Initiative (SGI) is working with private landowners in 11 western states to improve habitat for GRSG (Manier et al. 2013). With 13.5 million acres of GRSG habitat in private ownership within MZ II/VII (Manier et al. 2013, p. 118), a unique opportunity exists for the Natural Resources Conservation Service to benefit GRSG and to 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, such as fence marking, protecting riparian areas, and maintaining vegetation in nesting areas, are implemented. Participating landowners are bound by a contract (usually 3 to 5 years) to implement, in consultation with Natural Resources Conservation Service 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 251,600 acres within MZ II/VII (Natural Resources Conservation Service 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 (Natural Resources Conservation Service 2015).

#### ***Other Regional Efforts***

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, and 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; Northwest Colorado Greater Sage-Grouse Working Group 2008)
- Piceance/Parachute Roan Creek, Colorado (Parachute-Piceance-Roan Greater Sage-Grouse Conservation Plan; Parachute-Piceance-Roan Greater Sage-Grouse Work Group 2008)
- Northern Eagle/Southern Routt, Colorado (Northern Eagle County and Southern Routt County Greater Sage-Grouse Conservation Plan; Northern Eagle County and Southern Routt County Sage-Grouse Work Group 2004)
- North Park, Colorado (North Park Greater Sage-Grouse Conservation Plan; North Park Sage Grouse Working Group 2001)
- Middle Park, Colorado (Middle Park Sage Grouse Conservation Plan; Middle Park Sage Grouse Working Group 2001)
- Rich County, Utah (Rich County Sage-grouse Conservation Plan; Rich County Coordinated Resource Management Sage-grouse Subcommittee 2006)
- Morgan-Summit, Utah (Morgan-Summit Greater Sage-Grouse Local Conservation Plan; Morgan-Summit Adaptive Resource Management Local Working Group 2006)
- Uintah Basin, Utah (Uinta Basin Greater Sage-Grouse Local Conservation Plan; Uinta Basin Adaptive Resource Management Local Working Group 2006)
- Upper Green River Basin, Wyoming (Upper Green River Basin Sage-Grouse Grouse Conservation Plan; Upper Green River Basin Sage-Grouse Working Group 2007)
- Upper Snake River Basin, Wyoming (Upper Snake River Basin Sage-Grouse Conservation Plan; Upper Snake River Basin Sage-Grouse Working Group 2008)
- Wind River/Sweetwater River Basin, Wyoming (Wind River/Sweetwater River Local Sage-Grouse Conservation Plan; Wind River/Sweetwater River Basin Local Sage-Grouse Working Group 2007)

- Southwest Wyoming (Southwest Wyoming Sage-grouse Conservation Assessment and Plan; Southwest Wyoming Local Sage-grouse Working Group 2007)
- South-Central Wyoming (South Central Sage-Grouse Conservation Plan; South Central Sage-grouse Working Group 2007)
- Bates Hole/Shirley Basin, Wyoming (Bates Hole/Shirley Basin Sage-grouse Conservation Plan; Bates Hole/Shirley Basin Sage-grouse Working Group 2007)
- Bighorn Basin, Wyoming (Sage grouse Conservation Plan for the Bighorn Basin; Bighorn Basin Sage-grouse Local Working Group 2007)

#### 5.4.5 Relevant Cumulative Actions

This cumulative effects analysis considers the incremental impact of the Northwest Colorado Proposed LUPA and alternatives in combination with other past, present, and reasonably foreseeable future federal and nonfederal actions on all lands in MZ II/VII. Where these actions occur within with GRSG habitat, they would cumulatively add to the impacts of BLM- and Forest Service-authorized activities set forth in the Northwest Colorado Proposed LUPA. Relevant cumulative actions occurring in MZ II/VII are described in the Northwest Colorado, 9-Plan, Lander, Bighorn Basin, Billings, Idaho and Southwestern Montana, and Utah RMPs/LUPAs. Actions may occur on federal, state, private, or mixed landownership.

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 Northwest Colorado sub-region, could cumulatively affect GRSG (see **Table 5.14** for more detail):

- Hiawatha Regional Energy Development EIS
- LaBarge Platform Exploration and 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 to 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.

#### **5.4.6 Threats to GRSG in Management Zone II/VII**

In its COT report, USFWS identifies energy development, infrastructure, grazing/free-roaming equids, conversion to agriculture and urbanization, fire, spread of weeds, recreation, and conifers as the “present and widespread” threats facing GRSG in MZ II/VII (USFWS 2013). These threats impact GRSG mainly by fragmenting and degrading their habitat. 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 Northwest Colorado Greater Sage-Grouse Proposed LUPA/Final EIS.

#### ***Energy Development and Mining***

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 is presently occurring, and over 30,000,000 acres are indirectly influenced by energy development, including oil and gas, coal leasing,

mineral materials, and renewables (Manier et al. 2013, pp. 55-71). Indirect influences are primarily due to oil and gas leases. Approximately 50 percent of oil and gas development occurs on BLM-administered land, with most of the remainder on private lands (Manier et al. 2013).

#### *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, 0.50, 0.60, and 1.00 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. In addition, NSO lease stipulations of .25 miles 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 1 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.

Naugle et al. (2011) also found that impacts from energy development often extirpate leks in gas fields. Doherty et al. (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).

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. Energy development is a widespread threat to GRSG in the Northwest Colorado planning area and MZ II/VII. Within MZ II/VII, the Greater Green River Basin, Uintah-Piceance Basin, and North Park Basin are all important oil and gas reserves, and all overlap within the planning area.

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 presently imposed/required across all lands in 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 5.4** and **Table 5.5** 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 (see **Table 5.14**) follows.

As stated under **Section 5.4.1**, Methods, and **Section 5.4.2**, Assumptions, acreages in these tables are limited to BLM-administered and National Forest System lands and always assume implementation of Proposed LUPs in other RMP planning areas across MZ II/VII. Tables displaying fluid mineral acreage include the federal mineral estate.

As shown in **Table 5.4** and **Table 5.5**, fluid mineral closures and stipulations within the Northwest Colorado LUPA planning area exert limited influence due to their small acreage compared to the broader MZ. However, other relevant cumulative reasonably foreseeable future actions within the planning area, 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, would help to reduce the threat of oil and gas development within the MZ.

**Table 5.4**  
**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 (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Open* to Fluid Mineral Leasing				
Alternative A	113,000	100%	2,392,000	6%
Alternative B	0	0%	2,392,000	6%
Alternative C	0	0%	2,259,000	0%
Alternative D	0	0%	2,392,000	6%
Proposed LUPA	0	0%	2,378,000	5%
Closed to Fluid Mineral Leasing				
Alternative A	1,076,000	3%	1,153,000	6%
Alternative B	2,391,000	56%	1,153,000	6%
Alternative C	2,391,000	56%	2,211,000	51%
Alternative D	1,076,000	3%	1,153,000	6%
Proposed LUPA	1,290,000	19%	1,165,000	7%

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.

**Table 5.5**  
**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 (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
NSO Stipulations				
Alternative A	3,509,000	5%	1,253,000	16%
Alternative B	3,340,000	0%	1,253,000	16%
Alternative C	3,340,000	0%	1,058,000	0%
Alternative D	4,655,000	28%	1,253,000	16%
Proposed LUPA	4,442,000	25%	1,281,000	18%
CSU/TL Stipulations				
Alternative A	6,411,000	16%	6,982,000	10%
Alternative B	5,407,000	0%	6,982,000	10%
Alternative C	5,407,000	0%	6,275,000	0%
Alternative D	5,407,000	0%	6,982,000	10%
Proposed LUPA	5,407,000	0%	6,957,000	10%

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.

Under Alternative A, 113,000 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 Northwest Colorado LUPA planning area). Additionally, 2,392,000 acres of GHMA would be open to leasing in the MZ. Under current management, various stipulations apply to leased and unleased fluid minerals within MZ II/VII; however, many are not specific to GRSG. 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 disturbance from oil and gas leasing and development in the Northwest Colorado planning area; implementing other BLM/Forest Service Proposed LUPAs throughout the remainder of the MZ would result in greater long-term protections on BLM and National Forest System lands in those areas. Conservation actions at the state and local level (e.g., state GRSG plans and conservation easements) would complement other BLM/Forest Service Proposed LUPAs while oil and gas-related past, present, and reasonably foreseeable future actions that cause 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 Alternatives B and C. 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 C in conjunction with BLM/Forest Service Proposed LUPs elsewhere in the MZ and the past, present, and reasonably foreseeable future actions disclosed in **Table 5.14** would result in a net conservation gain to GRSG habitats and populations in MZ II/VII on BLM and National Forest System lands because these two alternatives are the most restrictive for oil and gas development. However, the extensive fluid mineral closures under these alternatives could push development onto adjacent nonfederal lands with less restrictive management.

Under Alternative D, acres of PHMA and GHMA closed to fluid mineral leasing in MZ II/VII would be approximately the same as Alternative A. However, under Alternative D, additional acres of PHMA would be managed as NSO, and no PHMA would be open to leasing under standard lease terms and conditions. These actions would benefit GRSG by limiting noise and surface disturbance and preserving undisturbed habitat. Implementation of the BLM/Forest Service Proposed LUPAs in other planning areas within MZ II/VII would help to ameliorate the threat of oil and gas development outside of the Northwest Colorado planning area.

Under the Proposed LUPA, no PHMA would be open to fluid mineral leasing with standard terms and conditions in MZ II/VII; 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 in MZ II/VII would benefit GRSG by limiting new development in important habitat areas. While new oil and gas development is likely to occur on lands not administered by the BLM or Forest Service, such projects may be subject to the requirements of the Wyoming executive order and other state conservation plans, which would limit disturbance. For areas already leased for oil and gas but not yet developed, operators may be subject to conditions of approval. Conditions of approval are enforceable conditions or provision under which an Application for Permit to Drill is approved. Specific conditions of approval are included in each individual BLM/Forest Service LUPA within MZ II/VII. The incremental effects of implementing the Proposed LUPA in conjunction with other GRSG conservation plans in MZ II/VII would result in a net conservation gain for GRSG because of the additional restrictions in important habitat areas.

All BLM/Forest Service Proposed LUPAs within MZ II/VII include BMPs and RDFs to minimize impacts on GRSG from oil and gas development on BLM and National Forest System lands. In areas where mineral estate is currently unleased, these tools can be applied to future leases; in areas that are already lease, 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 predisturbance 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 (Arkle et al. 2014) 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).

Implementation of the Proposed LUPA, in combination with other BLM/Forest Service planning efforts within MZ II/VII, could address the threat of proposed oil and gas development projects. Large-scale oil and gas projects that are reasonably foreseeable to occur on GRSG habitat within MZ II/VII (such as the Hiawatha Regional Energy Development EIS, LaBarge Platform Exploration and Development Project, and Continental Divide-Creston Natural Gas Project, as discussed in **Table 5.14**) would be subject to the disturbance cap limitations of the Wyoming executive order and/or other BLM/Forest Service Proposed LUPAs. Additionally, these projects may be subject to NSO and CSU/TL stipulations where proposed development occurs on BLM or National Forest System lands containing GRSG habitat. 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 (see **Table 5.14**) 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.

Implementing any alternative under the Northwest Colorado GRSG LUPA would not apply to pending or future oil and gas development projects outside of the Northwest Colorado planning area. Other BLM/Forest Service LUPs and nonfederal actions that apply outside the planning area would have a greater impact on ameliorating the threat of oil and gas development in these areas. Given the extent of oil and gas resources present in MZ II/VII, development pressure is likely to continue. While applying stipulations and closing areas to leasing would minimize impacts on federal mineral estate, restrictions on oil and gas development on nonfederal lands are less stringent. For example, 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). In Wyoming, the disturbance cap limitations of the executive order would help to limit cumulative impacts associated with oil and gas development on state lands.

The effect of the Northwest Colorado alternatives and other past, present, and reasonably foreseeable future 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.

Overall, under the Proposed LUPA, the combination of past, present, and reasonably foreseeable future actions aimed at protecting GRSG and their habitat would improve baseline conditions and provide a net conservation gain to GRSG populations in MZ II/VII. Reasonably foreseeable oil and gas development is widespread in the MZ. When the impacts of the Northwest Colorado LUPA are added to these actions, the impact would be a net conservation gain due in large part to implementation of NSO stipulations, anthropogenic disturbance caps, and adaptive management that would minimize future disturbance to GRSG populations and habitats.

#### *Coal*

Nature and Type of Effects. Past and current coal extraction has been and continues to be 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. Existing and proposed coal leases occur within 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 development would continue on existing leases under all alternatives; however, under Alternatives B, C, and D and the Proposed LUPA, at the time of leasing, PHMA would be considered unsuitable for surface mining and operations. This would reduce the potential for impacts on GRSG and sagebrush habitats within the planning area, and would contribute to amelioration of the threat within MZ II/VII in conjunction with other regional efforts.

Under all alternatives and the Proposed LUPA, 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 nonfederal lands in MZ II/VII, subject to state regulations (include reclamation requirements). Additionally, new coal leasing in Wyoming and Montana would be subject to the surface disturbance limit as outlined in 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 regulatory 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 their habitat and life cycle, 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. For example, closure of BLM-administered and/or National Forest System lands to mineral material disposal could shift a majority of mineral material disposal in the MZ onto adjacent lands.

Impact Analysis. As shown in **Table 5.6**, 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.

Under Alternative A, 2,265,000 acres of PHMA are closed to mineral material disposal in MZ II/VII, and 1,390,000 acres of GHMA are closed. In PHMA, 8,408,000 acres would remain open, as would 9,762,000 acres of GHMA. Reasonably foreseeable future mineral material disposals in MZ II/VII could affect GRSG through habitat disturbance, fragmentation, or behavior disruptions,

**Table 5.6**  
**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 (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Open to Mineral Material Disposal				
Alternative A	8,408,000	15%	9,762,000	10%
Alternative B	7,518,000	4%	9,762,000	10%
Alternative C	7,518,000	4%	9,762,000	10%
Alternative D	8,408,000	15%	9,762,000	10%
Proposed LUPA	7,181,000	0%	9,762,000	10%
Closed to Mineral Material Disposal				
Alternative A	2,265,000	2%	1,390,000	9%
Alternative B	3,173,000	30%	1,390,000	9%
Alternative C	3,173,000	30%	1,390,000	9%
Alternative D	2,265,000	2%	1,390,000	9%
Proposed LUPA	3,495,000	37%	1,390,000	9%

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.

depending on the location and extent of the project; however, implementation of BLM/Forest Service Proposed LUPs in other areas of MZ II/VII would restrict development, thereby reducing the risk of removing or fragmenting habitat, particularly on federal lands. There would be a net conservation gain to GRSG habitats and populations in MZ II/VII, but it would be concentrated in areas outside the Northwest Colorado planning area.

Under Alternatives B and C and the Proposed LUPA, additional acres of PHMA are designated as closed to mineral material disposal. These closures would restrict new developments on GRSG habitat on BLM and National Forest System lands, thereby contributing to the protection of habitat. 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.

Under the Proposed LUPA, 3,495,000 acres of PHMA would be closed to mineral material disposal in MZ II/VII, and 1,390,000 acres would be closed in GHMA. On nonfederal 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 Population Areas. Reclamation provisions under all action alternatives and the

Proposed LUPA would help restore sagebrush habitat in mineral pits that are no longer in use.

Overall, the BLM and Forest Service management actions for mineral materials development in the Proposed LUPA for Northwest Colorado, combined with past, present, and reasonably foreseeable future actions, would preserve habitat and would provide a net conservation gain to GRSG habitats and populations in MZ II/VII.

#### *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, can have direct impacts on GRSG through mortality and nest disruption. These actions also 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 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 (Arkle et al. 2014).

Conditions in MZ II/VII. Within MZ II/VII, bentonite, gypsum, gold, and uranium are all commonly mined for commercial use. Within the planning area, gold and uranium are the primary locatable minerals mined for commercial use; however, current production is limited to small-scale claims, and the current trend for both resources is downward.

Impact Analysis. As shown in **Table 5.7** acres of GRSG habitat recommended for withdrawal within the planning area generally represents a relatively small proportion, compared to the broader MZ. However, withdrawals in the planning area would still influence the threat on a MZ-wide scale.

Under Alternative A, 893,000 acres of PHMA would be recommended for withdrawal from locatable mineral entry in MZ II/VII; 235,000 acres of GHMA would be recommended for withdrawal. These acres would remain the same under Alternative D and the Proposed LUPA. Substantially more acres of PHMA would be recommended for withdrawal under Alternatives B and C. However, because locatable mineral production within the planning area is less of a threat compared to other areas in MZ II/VII, the overall cumulative impacts to GRSG in the MZ will have relatively little variance between alternatives.

Under all alternatives and the Proposed LUPA, RDFs would help minimize impacts on GRSG from locatable mineral development on BLM and National

**Table 5.7**  
**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 (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Open to Mineral Entry				
Alternative A	8,190,000	15%	8,940,000	11%
Alternative B	6,949,000	0%	8,940,000	11%
Alternative C	6,949,000	0%	8,940,000	11%
Alternative D	8,190,000	15%	8,940,000	11%
Proposed LUPA	8,190,000	15%	8,940,000	11%
Recommended for Withdrawal from Locatable Mineral Entry				
Alternative A	893,000	4%	235,000	32%
Alternative B	2,162,000	60%	235,000	32%
Alternative C	2,162,000	60%	235,000	32%
Alternative D	893,000	4%	235,000	32%
Proposed LUPA	893,000	4%	235,000	32%

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.

Forest System. All BLM/Forest Service Proposed LUPs within MZ II/VII include RDFs, such as 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.

No Sagebrush Focal Areas occur within the Northwest Colorado planning area. However, implementation of all other BLM/Forest Service Proposed LUPs in MZ II/VII would recommend portions of Sagebrush Focal Areas for mineral withdrawal. As such, implementation of any alternative or the Proposed LUPA would result in a net conservation gain to GRSG populations by reducing disturbance to birds from human activity and habitat fragmentation caused by 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 described above.

Conditions in MZ II/VII. Existing leases for nonenergy leasable minerals represent a relatively small threat spatially (Manier et al. 2013). Nonenergy leasable mineral development is an ongoing activity throughout MZ II/VII, and known sodium leasing areas occur within GRSG habitat. 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). Commercially producing sodium operations occur within the planning area; however, none of the existing operations or existing undeveloped leases are present within mapped PHMA or GHMA.

Impact Analysis. Table 5.8 shows acres of GRSG habitat open and closed to nonenergy mineral leasing in the MZ.

**Table 5.8**  
**Acres Open and Closed to Nonenergy Leasable Mineral Leasing in GRSG Habitat in MZ II/VII**

	PHMA		GHMA	
	MZ II/VII (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Open to Nonenergy Leasing				
Alternative A	7,163,000	17%	7,939,000	12%
Alternative B	5,921,000	0%	7,939,000	12%
Alternative C	5,921,000	0%	7,939,000	12%
Alternative D	7,163,000	17%	7,939,000	12%
Proposed LUPA	5,921,000	0%	7,939,000	12%
Closed to Nonenergy Leasing				
Alternative A	2,397,000	2%	1,114,000	7%
Alternative B	3,669,000	36%	1,114,000	7%
Alternative C	3,669,000	36%	1,114,000	7%
Alternative D	2,397,000	2%	1,114,000	7%
Proposed LUPA	3,646,000	35%	1,114,000	7%

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.

Under Alternative A, 2,397,000 acres of PHMA would be closed to nonenergy leasing in MZ II/VII, and 1,114,000 acres of GHMA would be closed. The same number of acres of PHMA and GHMA would be closed to nonenergy leasing under Alternative D. The majority of the habitat closures would be located outside of the Northwest Colorado planning area. Implementation of the other BLM/Forest Service Proposed LUPs in MZ II/VII, in combination with other

regional efforts, would have a greater impact on ameliorating the threat of nonenergy development in the context of the MZ.

Alternatives B and C and the Proposed LUPA would close additional acres of PHMA to nonenergy leasing compared to current management. However, due to the limited nonenergy resources within PHMA or GHMA, these additional acres of closure would have a negligible effect in ameliorating the threat within the MZ.

In combination with the disturbance cap applied under state plans, BLM and Forest Service actions in other planning areas in MZ II/VII, and other past, present, and reasonably foreseeable future actions, the Proposed LUPA would provide a net conservation gain to GRSG.

### **Infrastructure**

#### *Rights-of-Way and 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. They also 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 and pipelines often extend for many miles. The ground disturbance associated with construction, as well as vehicle and human presence on maintenance roads, may introduce or spread invasive weeds over large areas, degrading habitat. Impacts from roads may include direct habitat loss from road construction and direct mortality from collisions with vehicles. Roads may also present barriers to migration corridors or seasonal habitats, 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 GRSG 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 et al. 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 4-mile window around leks (Walker et al. 2007). Braun reported that use of areas near transmission lines by GRSG, as measured by pellet counts, increased as distance from transmission line increased up to 600 meters (1968 feet) (Braun 1998). GRSG 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-mile 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 GRSG 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 GRSG (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 ROWs, 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 ROWs on GRSG than any other single land management entity.

Impact Analysis. **Table 5.9** lists the areas of ROW/SUA avoidance and exclusion in GRSG habitat by alternative.

**Table 5.9**  
**Acres of Rights-of-Way/Special Use Authorization Management in GRSG Habitat in MZ II/VII**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Open to Rights-of-Way/Special Use Authorizations				
Alternative A	961,000	92%	6,628,000	11%
Alternative B	77,000	0%	6,628,000	11%
Alternative C	77,000	0%	5,888,000	0%
Alternative D	77,000	0%	6,611,000	11%
Proposed LUPA	77,000	0%	5,954,000	1%
Right-of-Way/Special Use Authorization Exclusion				
Alternative A	564,000	2%	674,000	2%
Alternative B	1,480,000	63%	674,000	2%
Alternative C	1,480,000	63%	1,494,000	56%
Alternative D	564,000	2%	674,000	2%
Proposed LUPA	564,000	2%	674,000	2%
Right-of-Way/Special Use Authorization Avoidance				
Alternative A	7,451,000	0%	2,450,000	2%
Alternative B	7,426,000	0%	2,450,000	2%
Alternative C	7,426,000	0%	2,391,000	0%
Alternative D	8,342,000	11%	2,466,000	3%
Proposed LUPA	8,336,000	11%	3,134,000	24%

Source: BLM 2015

Open with standard terms and conditions. This table displays the acres of PHMA and GHMA within rights-of-way designations in MZ II/VII; it also displays the percentage of those acres that are found within the planning area.

Past, present, and reasonably foreseeable projects within MZ II/VII identified in **Table 5.14** indicate ROW 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 managing BLM and National Forest System lands as ROW/SUA avoidance and exclusion areas, 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.

ROW/SUA exclusion and avoidance 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, and habitat fragmentation. Additionally, the location of tall structures can increase predation (Connelly et al. 2004). These impacts would be most prevalent under Alternative A, as this alternative has the fewest ROW/SUA avoidance and exclusion areas in GRSG habitat within MZ II/VII.

New ROW/SUA developments are expected to continue under all alternatives and the Proposed LUPA. Reasonably foreseeable future actions (as discussed in **Table 5.14**) include multi-state transmission lines that cross multiple land jurisdictions, including private, state, and federally owned lands. ROW/SUA exclusion and avoidance areas under the Proposed LUPA or any of the alternatives would not apply to nonfederal lands. Therefore, the disturbance cap limitation under the Wyoming executive order and other state plan incentives would have a greater impact on ameliorating the threat.

Alternative A has the most acres of PHMA open to ROW/SUA development in MZ II/VII (822,000 acres), of which most are located within the Northwest Colorado planning area. All other action alternatives and the Proposed LUPA reduce the number of PHMA acres open to ROW/SUA in MZ II/VII by 92 percent. Reasonably foreseeable future ROW/SUA proposals would have fewer restrictions under Alternative A, and would therefore be more likely to impact GRSG and their habitat.

Acres of GRSG habitat in ROW/SUA exclusion areas in MZ II/VII are highest under Alternative B and C. ROW/SUA exclusion would help protect GRSG habitat on BLM and National Forest System lands; however, in doing so, nonfederal lands could be at greater risk for development as these areas would have less restrictive management.

The Proposed LUPA relies more on ROW/SUA avoidance areas to protect GRSG habitat rather than ROW/SUA exclusion. This approach preserves management flexibility in situations where land ownership is mixed and may help avoid rerouting ROWs/SUAs across nonfederal land when those routes would disturb more GRSG habitat than if the ROW/SUA was located solely on BLM- or National Forest System lands. As a result, the incremental effect of implementing the Proposed LUPA, including the anthropogenic disturbance cap, 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 cumulative impact of installing multi-state transmission lines and other ROWs/SUAs 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 lines 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 routes are proposed in both GHMA and PHMA.

Presidential Priority transmission projects that are proposed in MZ II/VII (such as the TransWest Express and Gateway West projects), would not be subject to GRSG conservation requirements in BLM/Forest Service LUPAs, but would be subject to those requirements in applicable state plans and 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 because the measures have not been finalized. Regardless, impacts would likely be greater in Colorado where the TransWest Express proposed route would impact approximately 26 miles in PHMA (key habitats that are essential for GRSG conservation) and 57 miles in total habitat in the BLM Little Snake and White River 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.

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.

Under all alternatives and the Proposed LUPA, the cumulative effect of constructing multiple new transmission lines and other ROWs/SUAs is likely to negatively affect GRSG and their habitat. However, implementation of the BLM/Forest Service Proposed LUPs, in combination with other regional efforts, would restrict the extent to which proposed ROWs 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 GRSG 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 GRSG 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 BLM and National Forest System 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). 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 5.10** lists areas of wind energy ROW by alternative.

**Table 5.10**  
**Acres of Wind Energy Management Areas in GRSG Habitat in MZ II/VII**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Open to Wind Rights-of-Way/Special Use Authorization				
Alternative A	884,000	100%	5,857,000	13%
Alternative B	0	0%	5,118,000	0%
Alternative C	0	0%	5,118,000	0%
Alternative D	0	0%	5,118,000	0%
Proposed LUPA	0	0%	5,461,000	0%
Wind Right-of-Way/Special Use Authorization Exclusion				
Alternative A	2,883,000	0%	958,000	1%
Alternative B	3,800,000	24%	958,000	1%
Alternative C	3,800,000	24%	1,777,000	47%
Alternative D	2,883,000	0%	958,000	1%
Proposed LUPA	3,796,000	24%	958,000	1%

**Table 5.10**  
**Acres of Wind Energy Management Areas in GRSG Habitat in MZ II/VII**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
	Wind Right-of-Way/Special Use Authorization Avoidance			
Alternative A	5,207,000	<1%	2,569,000	2%
Alternative B	5,182,000	0%	3,308,000	24%
Alternative C	5,182,000	0%	2,510,000	0%
Alternative D	6,099,000	15%	3,308,000	24%
Proposed LUPA	5,184,000	<1%	3,323,000	25%

Source: BLM 2015

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

Managing wind ROW/SUA avoidance and exclusion areas in GRSG habitat would reduce or minimize impacts from wind utility infrastructure on BLM and National Forest System lands by prohibiting or restricting new ROWs. In addition, renewals or upgrades of existing facilities could incorporate additional conservation actions. Collocation or clustering of facilities would reduce impacts on GRSG habitat. Managing wind ROW/SUA exclusion and avoidance areas would not preclude existing renewable energy projects from operating.

Under Alternative A, 884,000 acres of PHMA in MZ II/VII would be open to wind ROWs/SUAs; 5,857,000 acres of GHMA would be open. Maintaining PHMA as open to wind ROWs/SUAs would increase the risk of development in these areas, as there would be fewer restrictions in place on federal land to protect GRSG.

Under Alternatives B and C, 3,800,000 acres of PHMA would be managed as wind ROW/SUA exclusion in MZ II/VII. This represents a 32 percent increase in the acres of PHMA managed as wind ROW exclusion in MZ II/VII when compared to current management. Slightly fewer acres of PHMA (3,796,000) would be managed as wind ROW/SUA exclusion under the Proposed LUPA. The incremental effect of implementing Alternatives B, C, or the Proposed LUPA in combination with other regional efforts (such as the Wyoming and Montana executive orders) would result in a net conservation gain to GRSG habitats and populations by excluding new wind ROW/SUA projects in PHMA, thereby limiting the risk of impacts associated with these types of activities.

Alternative D would rely more on wind ROW/SUA avoidance areas to protect GRSG habitat. This approach preserves management flexibility in situations where land ownership is mixed, and may help avoid rerouting ROWs/SUAs across nonfederal land when those routes would disturb more GRSG habitat

than if the ROW/SUA was located solely on BLM or National Forest System lands.

Wind ROW/SUA exclusion and avoidance areas in PHMA and GHMA under all alternatives and the Proposed LUPA would help to preserve GRSG habitat throughout the MZ, and reduce impacts associated with new wind developments on federal lands. 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.

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

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

#### ***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, p. 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).

Reducing grass height in GRSG nesting and brood-rearing areas may negatively impact nesting success. However, grazing is only one component of grass height, which is also influenced by soil and weather conditions.

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 a number of laws and regulations, including the Multiple Use and Sustained Yield Act of 1960, Granger-Thye Act of 1950, and Organic Administration Act of 1897. 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. 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 equid grazers (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 HMAs occur on BLM-administered lands in the planning area, both which contain PHMA and GHMA.

Impact Analysis. **Table 5.11** lists the acres of PHMA and GHMA available and unavailable for grazing by alternative.

Under Alternative A, 8,901,000 acres of PHMA would be available to livestock grazing in MZ II/VII; 9,705,000 acres of GHMA would be available. Under Alternatives B and D and the Proposed LUPA, a similar amount of GRSG habitat acres are available for livestock grazing on BLM and National Forest System lands. Alternative C places more restrictions on grazing by designating more

**Table 5.11**  
**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 (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Available to Livestock Grazing				
Alternative A	8,901,000	10%	9,705,000	8%
Alternative B	8,901,000	10%	9,705,000	8%
Alternative C	8,006,000	0%	8,899,000	0%
Alternative D	8,901,000	10%	9,705,000	8%
Proposed LUPA	8,901,000	10%	9,705,000	8%
Unavailable to Livestock Grazing				
Alternative A	28,000	0%	16,000	0%
Alternative B	28,000	0%	16,000	0%
Alternative C	954,000	97%	840,000	98%
Alternative D	28,000	0%	16,000	0%
Proposed LUPA	28,000	0%	16,000	0%

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.

acres of PHMA and GHMA within the MZ as unavailable to livestock grazing. These restrictions would help to protect GRSG habitat from livestock grazing on BLM and National Forest System lands; however, greater restrictions on could increase grazing pressure on adjacent private 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. Restoration to meet these standards and adequate monitoring would be required. The COT report also states that land managers should avoid or reduce the impact of range management structures on GRSG habitat.

Under the Proposed LUPA, management actions specifically related to GRSG would help reduce the threat of grazing throughout the MZ to meet the COT

report objectives. For example, the Proposed LUPA would prioritize review of grazing permits/leases in PHMA to determine if modification is necessary prior to renewal. Implementation of other Proposed LUPs in MZ II/VII would prioritize Sagebrush Focal Areas for grazing permit renewals. These actions would provide an opportunity to adjust forage levels to meet rangeland health standards, thereby reducing the risk of nonfunctioning rangelands impacting GRSG habitats. Additional actions specific to the Northwest Colorado planning area Proposed LUPA include prioritizing field checks in allotments within PHMAs, focusing on those containing riparian areas (including wet meadows) to help ensure compliance with the terms and conditions of the grazing permits, working cooperatively on integrated ranch planning within GRSG habitat, and developing management strategies that are seamless with respect to actions on BLM-administered and National Forest System lands and private lands within BLM and/or Forest Service grazing allotments. No similar actions (prioritized in PHMA) occur under Alternative A.

The BLM establishes an appropriate management level (AML) 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 AMLs of wild horses if resource damage occurs. Additionally, under all action alternatives and the Proposed LUPA, HMA plans would be updated to include GRSG objectives. This would result in a net conservation gain for GRSG in MZ II/VII.

BLM/Forest Service grazing and free-roaming equid management actions in MZ II/VII would not apply on nonfederal lands. Conservation initiatives conducted through Natural Resources Conservation Service'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, revegetating 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 and Forest Service 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 2013).

In combination with Natural Resources Conservation Service actions under the SGI, including fence marking and conservation easements, and state efforts to maintain ranchland, BLM and Forest Service management actions (related to grazing and free-roaming equids) would provide a net conservation gain to GRSG habitats and populations in MZ II/VII. This benefit would be most pronounced under the Proposed LUPA because PHMA would be prioritized for grazing permit renewals, and maintaining lands available to grazing would reduce pressure on adjacent nonfederal lands.

### ***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 weeds 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. Via 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. Within the planning area, acres of GRSG habitat with cheatgrass potential are greatest on private lands (1,783,800 acres), followed by BLM-administered lands (1,488,200 acres) (Manier et al. 2013).

The BLM and Forest Service currently manage weed infestations through integrated weed management, including biological, chemical, mechanical, manual, and educational methods. Weed management on BLM-administered lands is guided by the 1991 and 2007 Records of Decisions 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 activity, such as surface disturbance, motorized transportation, and animal and human activity, would increase the chance for the establishment and spread of invasive plants.

The BLM and Forest Service manage weed infestations through integrated weed management practices, which include biological, chemical, mechanical, manual, and educational methods. This approach for combating infestations would continue under all alternatives and the Proposed LUPA. 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. Management under Alternative A would allow for the most acres of surface disturbance within GRSG habitat in MZ II/VII; therefore, the potential for invasive weed spread and establishment would be greatest under Alternative A, and effects to GRSG (e.g., reduction in habitat quality) would be more pronounced. Alternatives B, C, and D and the Proposed LUPA would place more restrictions on resource uses within GRSG habitat on BLM and National Forest System lands when compared to Alternative A. Therefore, fewer disturbances associated with resource uses is likely to occur under these alternatives, which would reduce the potential for invasive weed spread and establishment. In addition, the BLM and Forest Service Proposed Plans across MZ II/VII would focus on increasing restoration efforts, which would reduce the potential for invasive weed spread and establishment.

Relevant cumulative actions that result in surface-disturbing activities would increase the potential for the spread of invasive weeds on federal and nonfederal 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 habitat by limiting the spread or establishment of invasive species, particularly on lands that lack BLM or Forest Service protective regulatory mechanisms. Additionally, the Colorado Package identifies GRSG conservation strategies related to invasive weeds, such as interagency cooperation, mapping, monitoring, and integrated weed management treatments. These strategies, 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 LUPA and other action alternatives by restoring degraded sagebrush habitat and increasing native forbs, thus improving nest cover and food supply. This is in accordance with the COT report objective for invasive species, which is to maintain and restore health native sagebrush plant communities (USFWS 2013). However, complete weed eradication within MZ II/VII is not anticipated under any alternative or the Proposed LUPA because of the scale and scope of efforts needed for complete eradication.

#### ***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 of population decline, 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 increases 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.

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 (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, 50 percent of GRSG 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 and Forest Service do not convert public lands to agriculture. As such, the only direct authority both agencies have over conversion to agriculture is by retaining or disposing lands in the realty program.

Disposing lands could increase the likelihood they would be converted to agriculture, depending on their location and the policies of the new management authority. Lands retained under BLM and Forest Service management would not be converted to agriculture under any alternative.

As shown in **Table 5.12** these acreages have relatively little variance between alternatives.

**Table 5.12**  
**Acres Identified for Retention and Disposal in GRSG Habitat in MZ II/VII**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Acres Identified for Retention				
Alternative A	6,375,000	0%	8,104,000	0%
Alternative B	7,298,000	13%	8,104,000	0%
Alternative C	7,298,000	13%	8,104,000	0%
Alternative D	7,298,000	14%	8,104,000	0%
Proposed LUPA	7,301,000	13%	8,928,000	9%
Acres Identified for Disposal				
Alternative A	24,000	0%	156,000	0%
Alternative B	24,000	0%	156,000	0%
Alternative C	24,000	0%	156,000	0%
Alternative D	24,000	0%	156,000	0%
Proposed LUPA	24,000	0%	156,000	0%

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.

BLM and Forest Service 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 and Forest Service 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 discouraged 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 would continue and 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 Natural Resources Conservation Service's SGI program focuses on maintaining rangeland 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 water feature restoration 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 (Natural Resources Conservation Service 2015). This has preserved habitat and reduced the risk of direct mortality on these lands.

These efforts, in conjunction with BLM and Forest Service 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.

#### **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 invasive weed spread.

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 and Forest Service 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 and hand tools, as well as 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 and general habitats at high risk for fire (Manier et al. 2013).

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. Alternatives B, C, and D and the Proposed LUPA would give priority consideration to PHMA during fire operations, after life and property, and would therefore afford greater protection to GRSG compared to Alternative A, which would not prioritize fire operations beyond what has already been determined in the fire management plans for the area.

The Wyoming and Montana executive orders emphasize fire suppression in Core Population Areas, while recognizing other suppression priorities may take precedence. This would benefit GRSG habitat during wildfire planning and

response, particularly on non-BLM-administered and non-National Forest System lands.

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 Northwest Colorado Greater Sage-Grouse Conservation Plan (Northwest Colorado Greater Sage-Grouse Working Group 2008) describes strategies to use fire to restore native plant compositions and enhance ecosystem vitality in sagebrush habitats used by GRSG. Such strategies include coordinating and planning fires with federal and county agencies, which incorporate life requirements for GRSG; reclaiming and/or reseeding after disturbance, and mapping habitats and burns to assess conditions. Other local working groups in MZ II/VII incorporate similar strategies in their plans.

Recognition of the importance of sagebrush habitat during interagency wildfire response would benefit 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 wildland fire 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 habitat and populations in MZ II/VII. This is in accordance with the COT report objective to retain and restore healthy native sagebrush plant communities within the range of GRSG (USFWS 2013). The gain would be greatest under the Proposed LUPA because of increased fire and fuels management flexibility, interagency coordination, and emphasis on preserving and restoring GRSG habitat.

### **Recreation**

Nature and Type of Effects. Recreation, such as camping, bicycling, wildlife viewing, horseback riding, fishing, and hunting, can be dispersed; concentrated, such as OHV use and developed campsites; and permitted, such as via BLM Special Recreation Permits. The BLM also manages Special Recreation Management Areas where recreation is a primary resource management consideration.

Recreation on BLM-administered and National Forest System lands that use the extensive network of single- and double-track routes impact sagebrush and GRSG. Ecological impacts of roads and motorized trails are 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 and perennial grasses and forbs loss, and would reduce 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 would not eliminate other impacts, such as invasive plant spread, predator movements, cover loss, and erosion (Manier et al. 2013).

Conditions in MZ II/VII. The 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 BLM and National Forest System lands. On state lands within Colorado, recreation is only available through written authorization by the Colorado State Board of Land Commissioners, generally in the form of a lease or permit. Examples of recreational use leases issued by the Colorado State Board of Land Commissioners include guided and private big game hunting and fishing, horseback riding, and guest ranch operations. Additionally, some land is open for wildlife and related recreation through the Public Access Program, a lease agreement between the Colorado State Board of Land Commissioners and CPW.

Impact Analysis. **Table 5.13** shows acres of GRSG habitat open, limited, or closed to travel in MZ II/VII.

**Table 5.13**  
**Acres of Travel Management Designations in GRSG Habitat in MZ II/VII**

	Priority Habitat Management Areas		General Habitat Management Areas	
	MZ II/VII (acres)	Percent Within Planning Area	MZ II/VII (acres)	Percent Within Planning Area
Open				
Alternative A	165,000	97%	58,000	72%
Alternative B	5,000	0%	58,000	72%
Alternative C	5,000	0%	58,000	72%
Alternative D	5,000	0%	58,000	72%
Proposed LUPA	5,000	0%	58,000	73%
Limited				
Alternative A	8,699,000	8%	9,331,000	8%
Alternative B	8,861,000	10%	9,331,000	8%
Alternative C	8,861,000	10%	9,331,000	8%
Alternative D	8,861,000	10%	9,331,000	8%
Proposed LUPA	8,861,000	10%	9,331,000	8%
Closed				
Alternative A	112,000	24%	366,000	7%
Alternative B	112,000	24%	366,000	7%
Alternative C	112,000	24%	366,000	7%
Alternative D	112,000	24%	366,000	7%
Proposed LUPA	112,000	24%	366,000	7%

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.

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 Proposed LUPA, as well as restrictions for OHVs, would help meet these objectives.

Under Alternative A, 165,000 acres of PHMA would be open to cross-country travel in MZ II/VII. While this comprises a relatively small percentage of all PHMA in MZ II/VII (1 percent), impacts associated with recreation (e.g., soil compaction, loss of sagebrush habitat, behavior modifications, and collisions) would be more likely to occur under Alternative A. The incremental effects of OHV disturbance in PHMA, combined with reasonably foreseeable future

transmission line and energy development projects, could adversely affect populations in this area under Alternative A.

Under Alternatives B, C, and D and the Proposed LUPA, the acres of PHMA in MZ II/VII open to cross-country travel would be reduced by 162,000 acres. The action alternatives and the Proposed LUPA would instead designate these areas 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. Additionally, the anthropogenic disturbance cap restrictions under Alternatives B, C, D, and the Proposed Plan would limit new road construction in GRSG habitat.

On the local level, the Northwest Colorado GRSG Conservation Plan identifies strategies for reducing the physical disturbance in GRSG habitat associated with recreation. These strategies include, but are not limited to, working with OHV, recreational hunting groups, and private landowners to develop guidelines/restrictions that will minimize vehicle damage to important GRSG habitat and reduce fragmentation of existing habitat; minimizing the amount of unnecessary or duplicate roads in GRSG habitat; and identifying areas during transportation planning for seasonal or permanent closures of roads that fragment GRSG habitat (Northwest Colorado Greater Sage-Grouse Working Group 2008). Other local working groups within MZ II/VII include similar recommendations in their conservation plans. These actions could help ameliorate the threat on nonfederal lands.

On state lands within Colorado, the Colorado State Board of Land Commissioners has begun developing a Stewardship Action Plan for GRSG that will provide informative information (e.g., inventory data, goals, objectives, and action steps) when issuing recreation permits or leases.

Implementation of the action alternatives and Proposed LUPA described above, in concert with travel management planning on BLM and National Forest System 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 habitats and populations in MZ II/VI.

### **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 habitat availability for GRSG. Conifer expansion may be encouraged by human activities, including fire suppression and livestock grazing (Miller et al. 2011). If woodland development is sufficient to restrict shrub and herbaceous understory growth, habitat quality for GRSG would 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 power

lines (Manier et al. 2013). Locations within approximately 1,000 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 priority and general habitats) 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. The COT objective is to remove pinyon-juniper from areas of sagebrush that are most likely to support GRSG (post-removal) at a rate that is at least equal to the rate of pinyon-juniper incursion (USFWS 2013, p. 47). Specific RDFs common to all BLM/Forest Service Proposed LUPAs in MZ II/VII include removal of standing and encroaching trees within 100 meters (328 feet) of occupied leks and other habitats (e.g., nesting, wintering, and brood-rearing). Additionally, reintroduction of appropriate fire regimes would limit conifer encroachment into sagebrush plant communities. These actions would benefit GRSG by improving habitat quality throughout the MZ.

Alternative A (current management) does not take specific actions to prevent conifer encroachment; however, existing vegetation management and treatments could address this threat. Alternatives B, C, D, and the Proposed LUPA would prioritize habitat-restoration projects in areas most likely to benefit GRSG. Additionally, reintroduction of appropriate fire regimes would limit conifer encroachment into sagebrush plant communities. These actions would benefit GRSG by improving habitat quality and functionality.

Recommendations within the Wyoming GRSG Conservation Plan (Wyoming Sage-Grouse Working Group 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-administered lands and non-National Forest System lands. On state and private lands, the CPW has conducted conifer encroachment treatments on sagebrush habitats and has worked with private landowners to promote habitat restoration. For example, since 2008, the CPW has conducted 6 treatment projects within the northwest Colorado population totaling 2,600 acres (Colorado Department of Natural Resources 2013). These types of conifer treatment projects, in combination with other habitat restoration efforts in Wyoming, Utah, and Montana, would reduce the conifer encroachment threat throughout MZ II/VII.

The SGI 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 (Natural Resources Conservation Service 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 LUPA, implementing mechanical treatments, reintroduction of appropriate fire regimes, and implementing BLM/Forest Service RDFs and BMPs (e.g., removing standing and encroaching trees within 100 meters [328 feet] of occupied leks and other GRSG habitats) under the Proposed LUPA would result in a net conservation gain for GRSG.

#### **5.4.7 Conclusions**

In addition to BLM and Forest Service management in the Northwest Colorado planning area and other 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 Northwest Colorado LUPA in conjunction with state and private initiatives and past, present, and reasonably foreseeable future actions. For purposes of this analysis, the BLM and Forest Service have determined that the Proposed LUPs 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, the SGI has secured conservation easements on 243,400 acres within MZ II/VII. Additionally, the SGI has worked with landowners to increase fence marking, native vegetation seeding, and conifer removal, and to implement prescribed livestock 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 and Forest Service management can accomplish on BLM-administered and National Forest System lands. Ranchers in MZ II/VII are also using Candidate Conservation Agreement with Assurances with USFWS. Under these instruments, 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 the GRSG range, thus far the agreements have been applied to only a small number of ranches in Wyoming and Montana.

As discussed in **Section 5.4.4**, Regional Efforts to Manage Threats to GRSG, Colorado, Idaho, Montana, Utah, and Wyoming 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 land ownership 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 and National Forest System lands in the Northwest Colorado planning area. The BLM/Forest Service would not designate PHMA or GHMA, and would not manage any additional ROW avoidance or exclusion areas within the Northwest Colorado planning area. 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.

In the remainder of MZ II/VII, other BLM/Forest Service LUPA planning efforts would implement their Proposed LUPs to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies, as discussed in **Section 5.4.4**, would be implemented on nonfederal lands. As a result, the lack of protections under the Alternative A would be offset to an extent by more-protective management elsewhere in MZ II/VII. However, in the Northwest Colorado 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 Instruction Memoranda, 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 LUPA. Thus, Alternative A would not meet the goals and objectives in this LUPA to identify and incorporate conservation measures for GRSG; it may meet the COT report objectives for present and widespread threats to GRSG, but only in localized areas and not on BLM-administered and National Forest System lands within the Northwest Colorado planning area.

#### **Alternative B**

GRSG conservation measures in *A Report on National Greater Sage-Grouse Conservation Measures* (NTT 2011) were used to form BLM and Forest Service management direction under Alternative B. Under this alternative, management

actions focused on protecting GRSG and its habitat would be implemented, including designating PHMA and GHMA and managing new ROW exclusion and avoidance areas. NSO stipulations and fluid mineral leasing closures would help protect GRSG habitat from oil and gas development.

Implementing these protective measures on BLM-administered and National Forest System lands within the Northwest Colorado LUPA planning area would help preserve GRSG habitat, but would risk pushing development onto adjacent lands with fewer regulatory constraints. In the remainder of MZ II/VII, other BLM/Forest Service planning efforts would implement their Proposed LUPs to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies, as discussed in **Section 5.4.4**, would be implemented on nonfederal lands. The incremental effects of other regional efforts, combined with implementation of Alternative B, would result in a net conservation gain for GRSG in MZ II/VII.

#### **Alternative C**

Management actions under Alternative C would result in the most protection to GRSG on BLM-administered and National Forest System lands in MZ II/VII. ACECs would be designated on all PHMA administered by the BLM within the planning area, and fluid mineral leasing closures would protect the most acres of habitat under this alternative. However, similar to Alternative B, extensive restrictions on energy, infrastructure, and resource use on BLM and National Forest System lands could push development onto state and private lands in Colorado. Grazing restrictions would reduce GRSG disturbance, although exclusion of livestock from BLM and National Forest System lands would require additional fencing, which could increase predation and collision risk and contribute to fragmentation. An indirect impact from excluding livestock grazing from BLM and National Forest System lands is the potential conversion of adjacent private grazing lands to agriculture or other land uses, including development, within the planning area.

In the remainder of MZ II/VII, other BLM/Forest Service planning efforts would implement their Proposed LUPs to improve protection of GRSG and its habitat. In addition, other regional GRSG conservation strategies, as discussed in **Section 5.4.4**, would be implemented on nonfederal lands. The COT report objectives for fire, invasive plants, range management, recreation, infrastructure, energy, and mining would likely be met. The incremental effects of other regional efforts, combined with implementation of Alternative C, would result in a net conservation gain for GRSG in MZ II/VII. However, the strict protective measures on BLM-administered and National Forest System lands in the Northwest Colorado planning area may have an unintended effect of increasing resource development pressure on nonfederal lands as described above, thereby reducing conservation gains.

**Alternative D**

Under Alternative D, the BLM and Forest Service would work towards improving GRSG habitat protection over current management, but with more site-specific flexibility than the other action alternatives. Anthropogenic surface disturbance would be managed not exceed 5 percent in ecological sites that support sagebrush within PHMAs. No additional fluid mineral leasing closures would occur beyond current management. Additionally, the BLM and Forest Service would manage ROW avoidance areas rather than ROW exclusion areas, which would provide more flexibility when siting new infrastructure projects. These provisions would allow for limited development on BLM and National Forest System lands, which could reduce development pressure on state and private lands.

In the rest of MZ II/VII, other BLM/Forest Service planning efforts would implement their Proposed LUPs to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies, as discussed in **Section 5.4.4**, would be implemented on nonfederal lands. The COT report objectives for fire, invasive plants, range management, recreation, infrastructure, energy, and mining would likely be met. The incremental effects of other regional efforts, combined with implementation of Alternative D, would result in a net conservation gain for GRSG in MZ II/VII.

**Proposed LUPA**

The Proposed LUPA seeks to allocate resources among competing human interests and land uses and to conserve natural resource values, including GRSG habitat. As a result, development would be allowed on federal lands with certain restrictions and precautions taken to preserve GRSG habitat. This would reduce development pressure on nonfederal lands, compared to Alternative C, where less regulatory protections are afforded to GRSG, by not entirely prohibiting development on BLM and National Forest System lands. Conservation measures under the Proposed LUPA are focused on PHMA and GHMA, as well as active leks (regardless of which type of habitat the active lek is located within). The Proposed LUPA would meet the COT report objectives for fire, invasive plants, range management, recreation, infrastructure, energy, and mining by targeting these threats in the LUPA and implementing management actions that specifically address these threats. Specifically, the following measures that would be implemented under the Proposed LUPA, 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 nonnative, invasive plant species by reducing disturbances that promote weed spread.

- 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-administered and non-National Forest System lands. Applying a 5 percent disturbance limit (under the Wyoming, Montana, and Utah GRSG plans/executive orders) would reduce impacts contributing to population declines and range erosion associated with multiple threats including energy, mining, and infrastructure.
- Removal of standing and encroaching trees within 100 meters (328 feet) of occupied leks and other habitats (e.g., nesting, wintering, and brood-rearing) would reduce the rate of pinyon-juniper incursion and help to maintain health 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, prescribed grazing systems implementation, conifer removal, and vegetation seeding would help meet the COT objectives for range management structures, grazing, and nonnative, pinyon-juniper expansion and invasive plant species.

In the remainder of MZ II/VII, other BLM/Forest Service LUPA planning efforts would implement their Proposed LUPs to improve protection of GRSG and their habitat. In addition, other regional GRSG conservation strategies, as discussed in **Section 5.4.4**, would be implemented on nonfederal 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 of the BLM/Forest Service Proposed LUPs that encompass MZ II/VII, where those projects occur on BLM/Forest Service decision area lands. On nonfederal 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 LUPA, 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, weed spread, conversion to agriculture, fire, recreation, and conifer spread (USFWS 2013).

Infrastructure and energy development are of particular concern in MZ II/VII because they affect the greatest land area. 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 LUPs 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 LUPA would protect 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 LUPA area-wide restrictions on land use, in combination with project-specific BMPs and RDFs and other regional efforts, would achieve an overall net conservation for the regional population and would help mitigate the effects on small, at-risk populations.

Implementation of Alternatives B, C, and D and the Proposed LUPA is anticipated to result in a net conservation gain for GRSG in MZ II/VII when compared to current management (Alternative A). Alternatives B and C emphasize conservation of biological resources and contain more resource use restrictions than the other alternatives. Restrictions on BLM and National Forest System lands could increase resource use pressure on private and state lands; however, the Wyoming and Montana executive orders (as discussed in Section 5.4.4) would help minimize this effect. While not as extensive as Alternatives B or C, Alternative D and the Proposed LUPA include GRSG conservation measures and resource use allocations that would improve baseline conditions and exert less development pressure on nonfederal lands.

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

#### **5.4.8 Reasonably Foreseeable Future Actions in MZ II/VII Likely to Impact GRSG Habitat**

**Table 5.14** shows those actions in the MZ which are likely to impact GRSG habitat, regardless of land ownership. This list is not intended to be a comprehensive description of all reasonably foreseeable future actions in GRSG habitat within MZ II/VII. Rather, this list highlights those actions which may

result in cumulative effects on the landscape level, Additional relevant cumulative actions occurring in MZ II/VII are described in the RMPs/LUPAs for Northwest Colorado, 9-Plan, Lander, Bighorn Basin, Billings, Idaho and Southwestern Montana, and Utah.

**Table 5.14**  
**Reasonably Foreseeable Future Projects Occurring Within MZ II/VII**

<b>MZ</b>	<b>Planning Area</b>	<b>GRSG Population(s) Affected</b>	<b>Project Name</b>	<b>Project Location</b>	<b>Project Description, Estimated Footprint</b>	<b>Project Status</b>
<b>Energy and Mining</b>						
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. <sup>1</sup>	Proposed
II/VII	9-Plan	Wyoming Basin	LaBarge Platform Exploration and 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. <sup>2</sup>	Proposed
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. <sup>3</sup>	Proposed

**Table 5.14**  
**Reasonably Foreseeable Future Projects Occurring Within MZ II/VII**

<b>MZ</b>	<b>Planning Area</b>	<b>GRSG Population(s) Affected</b>	<b>Project Name</b>	<b>Project Location</b>	<b>Project Description, Estimated Footprint</b>	<b>Project Status</b>
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. <sup>4</sup>	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. <sup>5</sup>	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. <sup>6</sup>	Proposed

**Table 5.14**  
**Reasonably Foreseeable Future Projects Occurring Within MZ II/VII**

<b>MZ</b>	<b>Planning Area</b>	<b>GRSG Population(s) Affected</b>	<b>Project Name</b>	<b>Project Location</b>	<b>Project Description, Estimated Footprint</b>	<b>Project Status</b>
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 oil shale, and approximately 132,000 acres available for development of tar sands. <sup>7</sup>	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. <sup>8</sup>	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. <sup>9</sup>	Proposed

**Table 5.14**  
**Reasonably Foreseeable Future Projects Occurring Within MZ II/VII**

<b>MZ</b>	<b>Planning Area</b>	<b>GRSG Population(s) Affected</b>	<b>Project Name</b>	<b>Project Location</b>	<b>Project Description, Estimated Footprint</b>	<b>Project Status</b>
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. <sup>14</sup>	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. <sup>15</sup>	Proposed
<b>Rights-of-way</b>						
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. <sup>10</sup>	Proposed

**Table 5.14**  
**Reasonably Foreseeable Future Projects Occurring Within MZ II/VII**

<b>MZ</b>	<b>Planning Area</b>	<b>GRSG Population(s) Affected</b>	<b>Project Name</b>	<b>Project Location</b>	<b>Project Description, Estimated Footprint</b>	<b>Project Status</b>
II/VII III	9-Plan, NW Colorado, Utah	Wyoming Basin, Northwest Colorado, Sheeprocks, 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 PPH and PGH. <sup>11</sup>	Proposed
II/VII IV	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. <sup>12</sup>	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. <sup>13</sup>	Proposed

**Table 5.14**  
**Reasonably Foreseeable Future Projects Occurring Within MZ II/VII**

MZ	Planning Area	GRSG Population(s) Affected	Project Name	Project Location	Project Description, Estimated Footprint	Project Status
<b>Weeds</b>						
II/VII I	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. <sup>16</sup>	Proposed

<sup>1</sup>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>

<sup>2</sup>LaBarge Platform Exploration & Development Project: [http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/labarge\\_platform.html](http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/labarge_platform.html)

<sup>3</sup>Continental Divide-Creston Natural Gas Project: [http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/cd\\_creston.html](http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/cd_creston.html)

<sup>4</sup>Moneta Divide Natural Gas and Oil Development Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/lfo/moneta-divide.html>

<sup>5</sup>Pinedale Anticline Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/anticline/seis.html>

<sup>6</sup>Black Forks Project (Formally Moxa Arch Area Infill Project): [http://www.blm.gov/wy/st/en/info/NEPA/documents/kfo/moxa\\_arch.html](http://www.blm.gov/wy/st/en/info/NEPA/documents/kfo/moxa_arch.html)

<sup>7</sup>Oil Shale and Tar Sands Programmatic EIS: <http://ostseis.anl.gov/>

<sup>8</sup>Atlantic Rim Natural Gas Field Development Project: [http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/atlantic\\_rim.html](http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/atlantic_rim.html)

<sup>9</sup>Chokecherry/Sierra Madre Wind Farm: <http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/Chokecherry.html>

<sup>10</sup>Gateway South Transmission Line Project: [http://www.blm.gov/wy/st/en/info/NEPA/documents/hdd/gateway\\_south.html](http://www.blm.gov/wy/st/en/info/NEPA/documents/hdd/gateway_south.html)

<sup>11</sup>TransWest Express Transmission Line Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/hdd/transwest.html>

<sup>12</sup>Gateway West Transmission Line Project: <http://www.gatewaywestproject.com/>

<sup>13</sup>Riley Ridge to Natrona Pipeline Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/rsfo/RRNP.html>

<sup>14</sup>Normally Pressured Lance Natural Gas Development Project: <http://www.blm.gov/wy/st/en/info/NEPA/documents/pfo/npl.html>

<sup>15</sup>Bird Canyon Natural Gas Infill: <http://www.blm.gov/wy/st/en/info/NEPA/documents/rsfo/birdcanyon.html>

<sup>16</sup>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\\_SB8K8xLLM9MSSzPy8xBz9CP0os3gDfxMDT8MwRydLA|cj72BTMwMTAwjQL8h2VAQArb- RA!!/?ss=110206&navtype=BROWSEBYSUBJECT&navid=130110000000000&pnavid=1300000000000000&accessDB=true&position=Project\\*&groupid=19692&ttype=projectdetail&pname=Medicine%20Bow-Routt%20National%20Forests%20&%20Thunder%20Basin%20National%20Grassland-%20Projects](http://www.fs.usda.gov/wps/portal/fsinternet!/ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gDfxMDT8MwRydLA|cj72BTMwMTAwjQL8h2VAQArb- RA!!/?ss=110206&navtype=BROWSEBYSUBJECT&navid=130110000000000&pnavid=1300000000000000&accessDB=true&position=Project*&groupid=19692&ttype=projectdetail&pname=Medicine%20Bow-Routt%20National%20Forests%20&%20Thunder%20Basin%20National%20Grassland-%20Projects)

## 5.5 SPECIAL STATUS SPECIES (OTHER SPECIES OF ISSUE)

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect special status species other than GRSG are mineral exploration and development, forestry, grazing, recreation, road construction, water diversion and withdrawals, weed invasion and spread, prescribed and wildland fires, land planning efforts, vegetation treatments, habitat improvement projects, insects and disease, and drought.

The cumulative impact analysis areas used to analyze potential impacts on special status fish, wildlife, and plants are comprised of the ranges for those species, which are listed in **Chapter 3, Affected Environment, Table 3.6,** and **Table 3.7.**

Cumulative impacts on other special status species of issue are related to those described for vegetation and fish and wildlife. Many of the activities listed above can change habitat conditions, which then can cause or favor other habitat changes. For example, wildland fire removes habitat, and affected areas are then more susceptible to weed invasion, soil erosion, and sedimentation of waterways, all of which degrade habitats for special status species. In general, resource use activities have cumulatively caused habitat removal, fragmentation, noise, increased human presence, and weed spread, whereas land planning efforts and vegetation, habitat, and weed treatments have countered these effects by improving habitat connectivity, productivity, diversity, and health.

Climate change could cause an increase or decrease in temperatures and precipitation, which would affect soil conditions, vegetative health, and water flows and temperature. Such changes would alter habitat conditions, potentially creating conditions that could favor certain species or communities, weeds, or pests. Since special status species often inhabit very specific microhabitats, small changes could cause increased effects on these species.

Under all of the alternatives, impacts on special status species would be minimized to the extent practical and feasible through compliance with the ESA and BLM Manual 6840. Habitat conditions would be improved through treatments, weed prevention and control, use of prescribed and wildland fire, forestry management, and grazing management. Since Alternative A would emphasize the most resource use and development, impacts on special status species would be more likely to occur under this alternative. As a result, management under Alternative A could contribute the most cumulative impacts on special status species. In contrast, the incremental contribution of management actions under Alternatives B, C, and D and the Proposed LUPA to cumulative impacts on special status species is expected to be less than significant, due to restrictions on development and land uses specified under those alternatives.

## 5.6 LANDS AND REALTY

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect the lands and realty program include new and existing ROWs for projects such as pipelines, transmission lines, communication sites, minerals and renewable energy developments, and housing subdivisions on private lands.

The cumulative impact analysis area used to analyze cumulative impacts on the uses administered by the lands and realty program is composed of the planning area, the Vernal and Moab BLM Field Offices in Utah, and the Rawlins and Rock Springs Field Offices in Wyoming.

Increasing interest in utility, mineral, and renewable energy development in the cumulative impact analysis area has placed and is expected to continue placing a greater demand on lands and realty actions. These demands create the need for land tenure adjustments and additional ROWs for pipelines, transmission lines, and other facilities supporting development. Restrictions on ROWs outlined in the alternatives, combined with restrictions from other management plans in the area, would have a significant cumulative effect by reducing routing options and possibly increasing project construction or implementation costs.

Roadway development activities, the Designation of Energy Corridors on Federal Lands in the 11 Western States PEIS, and ongoing climate changes and anticipated associated changes in the regulation of greenhouse gases would contribute direct and indirect long-term impacts on the utilization of solar and wind resources in the cumulative impact analysis area. Restrictions placed on wind and solar energy development in the alternatives would cumulatively reduce siting options and could increase project construction or implementation costs, especially in high wind and solar potential areas.

Cumulative impacts on lands and realty are expected to be the greatest under Alternative C, since it would place the most restrictions on development. In contrast, management under Alternative A would place the fewest restrictions on the lands and realty program and would therefore be expected to contribute the fewest cumulative impacts on lands and realty. Management under Alternatives B and D would also place restrictions on development, but to a lesser extent than under Alternative C. Under the Proposed LUPA, both PHMA and GHMA would be managed as avoidance areas, and disturbance would be limited to 3 percent in PHMA. Cumulative impacts on ROW availability would be similar to those described for Alternative D. Due to the potential for proposed transmission line construction (see **Table 5.1**), and the potential for that construction to exceed the disturbance cap, other land use authorizations could be precluded in those Colorado MZs where the lines may be built. Management under Alternatives B and D and the Proposed LUPA would therefore be expected to cumulatively contribute fewer impacts on lands and realty than Alternative C.

## **5.7 VEGETATION (FOREST, RANGELANDS, RIPARIAN AND WETLANDS, AND NOXIOUS WEEDS)**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect vegetation are mineral exploration and development, livestock grazing, recreation, road construction, ROWs (including large transmission lines or pipelines), weed invasion and spread, prescribed and wildland fires, land planning efforts, vegetation treatments, habitat improvement projects, insects and disease, and drought. Many of these create conditions that cause or favor other vegetation changes. For example, wildland fire causes vegetation removal, which makes affected areas more susceptible to weed invasion and soil erosion.

Drought conditions reduce vegetative health, which makes vegetation prone to insect infestation or disease. In general, resource use activities have cumulatively caused vegetation removal, fragmentation, weed spread, soil compaction, and erosion, whereas land planning efforts and vegetation and weed treatments have countered these effects by improving vegetative connectivity, productivity, diversity, and health.

Climate change within the cumulative impact analysis area could cause an increase or decrease in temperatures and precipitation, which would affect soil conditions, vegetative health, and water availability. Such changes would alter the conditions to which vegetative communities are adapted, potentially creating conditions that could favor certain species or communities, weeds, or pests.

Under the alternatives, impacts on vegetation would be minimized to the extent practical and feasible through restrictions; stipulations; closures to mineral exploration and development, recreation, and motorized travel; and by concentrating development in previously disturbed areas. Vegetative conditions would be improved through restrictions on development, treatments, weed prevention and control, habitat improvements, use of prescribed and wildland fire, and proper grazing practices.

In general, management under each alternative would work toward achieving land health but would differ in the time and methods used to reach that goal. Since existing management, Alternative A, emphasizes more resource use and development, impacts on vegetation are more likely to occur under this alternative. As a result, management under Alternative A could significantly contribute to cumulative impacts on vegetation. In contrast, under Alternatives B, C, and D and the Proposed LUPA, BLM and Forest Service management actions are expected to contribute to positive cumulative impacts on vegetation by placing restrictions on development and prioritizing fuels treatments and habitat treatments in GRSG habitat, for example.

## **5.8 WILDLAND FIRE ECOLOGY AND MANAGEMENT**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue

to affect wildland fire ecology and management are the creation of wildland-urban interface areas, creation of recreation areas, fuels treatments, habitat treatments, and livestock grazing.

The cumulative impact analysis area for fire and fuels is delineated by the fourth-order watersheds that completely or partially overlap the planning area. Rather than following administrative boundaries, wildland fires burn based on fuels, weather, and topography. Because of continuous fuels and historic high fire occurrence, northwest Colorado fire management activities could affect fire management and resources outside of the planning area. For example, there is a high likelihood of fires burning from northwest Colorado to southwest Wyoming and from western Colorado to eastern Utah and vice versa. There is also the potential for wildland fires to impact private and state lands.

Past and present management actions and natural events within the cumulative impact analysis area have altered the condition of vegetation and natural fire regimes across the landscape. These include fire suppression, vegetation treatments, grazing, noxious and invasive weed spread, drought, and insect and disease outbreaks. In some cases, areas have become more prone to large intense fires.

Urban development and recreational activities in the cumulative impact analysis area are expected to increase over the life of the LUPA, creating additional potential ignition sources and the probability of wildland fire occurrence. Of these two factors, urbanization, especially the expansion of residential areas, is expected to be the larger contributor on cumulative wildland fire impacts. Additional wildland-urban interface would increase the need for hazardous fuels projects to reduce the risk of wildland fires burning from BLM-administered and National Forest System lands into the wildland-urban interface. Increased wildland-urban interface can also increase costs associated with suppression and is more dangerous to firefighters and the public. Additional fire suppression resources could be needed, including federal, state, and local agency resources.

Changing land use patterns and increased recreation and visitation would also result in the modification of vegetation communities; both trends present new vectors for the introduction of noxious weeds and nonnative vegetation species lacking adequate vegetative cover. These introduced species could eventually alter the fire regime of certain areas and potentially increase the frequency, size, and intensity of wildland fires.

Prioritization of fuels treatments and suppression in GRSG habitat areas could cumulatively affect areas inside and outside of the planning area by placing a lower priority on non-GRSG habitat areas. This prioritization could cause more fires in non-habitat areas due to fewer fuels treatments and suppression efforts.

Cumulative impacts on wildland fire ecology and management are expected to be the greatest under Alternative C, because the BLM and Forest Service would

place the most restrictions on fire management in the most areas. Management under Alternative A would result in the fewest cumulative impacts on fire management because it would place the fewest restrictions on that program in the fewest areas. Under Alternatives B and D and the Proposed LUPA, the BLM and Forest Service would place fewer restrictions on fire management in a smaller area than Alternative A.

## **5.9 MINERALS – LEASABLE, LOCATABLE, SALABLE, AND NONENERGY LEASABLE**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect leasable, locatable, salable, and nonenergy leasable minerals are: market fluctuations, pipeline capacity, available markets for distribution, regulatory constraints, new technologies, and reservoir/reserve depletion.

The cumulative impact analysis area for leasable, locatable, salable, and nonenergy leasable minerals is the planning area, the Moab and Vernal Field Offices in eastern Utah, and the Rawlins and Rock Springs Field Offices in southwest Wyoming, regardless of land ownership. Impacts on the ability to develop and extract mineral resources could cumulatively reduce exploration and production of commodities from BLM-administered and National Forest System lands.

Impacts on mineral resources that are individually minor may cumulatively reduce exploration and production of commodities from BLM-administered and National Forest System lands. The BLM and Forest Service have no control over many of the factors that affect mineral extraction and prospecting. These factors include regulatory policy, public perception and concerns, transportation, well spacing, low commodity prices, taxes, and housing and other necessities for workers.

Coal exploration and development would continue under all alternatives on existing leases. However, new coal leases and development would be impacted from an increase in the amount of lands allocated as unacceptable for coal leasing and development. Restrictions on new coal developments across all of the alternatives would reduce exploration opportunities.

Interest in domestic oil and gas exploration and development mirrors the swings in the mineral commodity prices. As the price increases, the development of existing leases increases, as well as the demand for new leases, even in areas with less development potential. Restrictions on oil and gas leasing would have a cumulative effect on the ability to develop these resources. Under Alternative A, oil and gas exploration and development is expected to continue as correlated with mineral commodity prices. Under all of the action alternatives (Alternatives B, C, and D and the Proposed LUPA), oil and gas production would decrease due to restrictions placed on development. Decreases in production would be greatest under Alternative C, under which the BLM/Forest Service would close all PHMA to fluid mineral leasing.

Locatable mineral development is an ongoing enterprise in the cumulative impact analysis area and is expected to continue under Alternative A. As prices for gold remain high, exploration for gold is expected to increase. Under all of the action alternatives (Alternatives B, C, and D and the Proposed LUPA), locatable mineral development would decrease due to restrictions placed on development. Decreases in production would be greatest under Alternatives B and C, under which the BLM and Forest Service would recommend that all PHMA be withdrawn from mineral entry.

Salable mineral extraction and use is expected to increase, along with increasing mining activity, commercial development, recreation, and private property development, especially along the Interstate 70, Interstate 80 (Wyoming), and state highway corridors. As the amount of BLM-administered and National Forest System land available for disposition of salable materials is reduced, it is expected that demand for salable minerals would increase in other areas adjacent to the cumulative impact analysis area.

Nonenergy leasable mineral development is also an ongoing enterprise in the cumulative impact analysis area and is expected to continue as such under Alternative A. Under all of the action alternatives (Alternatives B, C, and D and the Proposed LUPA), nonenergy leasable mineral development would decrease due to restrictions placed on development. Decreases in production would be greatest under Alternatives B and C, under which the BLM and Forest Service would close all PHMA to nonenergy leasable mineral development.

Mineral exploration and development would continue to occur under all alternatives. However, acreages open to exploration and development would vary by alternative. Under the Proposed LUPA, disturbance would be limited to 3 percent in PHMA. Cumulative impacts on mineral development would be similar to those described for Alternative D. Due to the potential for proposed transmission line construction (see **Table 5.1**), and the potential for that construction to exceed the disturbance cap, mineral development could be precluded in those Colorado MZs where the transmission lines may be built. Overall, management under Alternative C would be the most restrictive to mineral development and could result in the greatest number of cumulative impacts on mineral exploration and development in the cumulative impact analysis area.

## **5.10 RECREATION AND TRAVEL MANAGEMENT**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect recreation are increased visitation (especially from residents within the planning area and those from the surrounding region), urbanization of communities in northwest Colorado, advances in outdoor recreation equipment, management in existing Recreation Management Areas, and energy development.

The cumulative impact analysis area used to analyze cumulative impacts on recreation resources includes the planning area. The cumulative impact analysis area for travel and transportation extends along major roads and trails where management inside the planning area could impact use outside the planning area boundary.

At the broadest level, the physical, social, and operational recreation character of National Forest System and BLM-administered lands are quickly changing from natural to more developed, from less crowded to more contacts with others, and from less restrictive to more rules and regulations. These changes are expected to impact the activity opportunities that can be offered and the recreation experience and benefit opportunities that can be produced.

Forest plans for adjacent National Forest System lands and RMPs for adjacent BLM-administered lands have closed areas and routes to motorized recreation, causing users to move to other National Forest System and BLM-administered lands in the planning area. Increasing urban and suburban populations proximate to and within the planning area have greatly increased the level of recreational and route use on National Forest System and BLM-administered lands. The combination of the region's growing population and the bounty of desirable recreation settings have combined to greatly increase use in northwest Colorado.

There is a strong correlation between population growth, visitation, and recreation in large part because many new residents have moved to the area specifically because of easy access to recreation opportunities on BLM-administered and National Forest System lands. The expanding suburban development footprint has also placed many new neighborhoods directly adjacent to BLM and Forest Service boundaries, resulting in increased trespass onto private property and resource impacts from private property owners accessing public lands from adjoining private land (e.g., social trailing, etc.).

Advances in technology are at least partly responsible for increased recreation across the planning area. Motorized vehicles are more capable of accessing previously remote areas of northwest Colorado.

Reasonably foreseeable trends that would result in cumulative impacts on recreation, travel and transportation include continued growth patterns in demand for all recreation experiences, increased demand for close-to-home recreation opportunities for local residents, continued and increased visitation from a growing regional population, and increased popularity of adjacent public lands. However, restrictions on development of public lands to protect GRSG habitat could cumulatively benefit recreation.

Issuance of SRPs and management of travel and transportation will continue as they are managed currently under Alternative A. Under Alternative B, the BLM and Forest Service would place some restrictions on recreation, travel and

transportation, which could cumulatively add to a decrease in this resource use. Under Alternative C, the BLM and Forest Service would place the most restrictions on recreation, travel, and transportation, resulting in the greatest number of cumulative impacts. Under Alternatives D and E, the BLM and Forest Service would place fewer restrictions on recreation, travel, and transportation than under Alternatives B and C, but would place more restrictions than under Alternative A, resulting in fewer cumulative impacts than Alternatives B and C, but more than Alternative A.

## 5.11 RANGE MANAGEMENT

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect range management are wildfires, surface-disturbing activities, the presence and abundance of grazing wildlife and/or wild horses, increased recreational demands, and protections for sensitive resources.

The cumulative impact analysis area used to analyze cumulative impacts on range management includes allotments located entirely or partially within the planning area. Past actions that have affected livestock grazing include human-caused surface disturbances (mineral development, recreation, prescribed burning, mechanical vegetation treatments, WSAs and historic grazing practices) and wildland fires that have contributed to current ecological conditions.

Cumulative projects that increase human disturbance in grazing areas could also indirectly impact grazing by increasing weeds and invasive species. As stated above, weed invasion can reduce preferred livestock and wildlife forage and increase the chance of weeds being dispersed by roaming cattle. Cumulative projects that increase human disturbance in grazing areas could directly impact grazing by displacing, injuring, or killing animals. Due to the potential for proposed transmission line construction (see **Table 5.1**), and the potential for that construction to exceed the disturbance cap, development of range improvements could be precluded in those Colorado MZs where the transmission lines may be built.

Present actions affecting livestock grazing are mainly those that reduce available grazing acreage, restrict management actions or the level of forage production in those areas. Key examples include wildland fires, land disposals, motorized vehicle use, recreation, habitat restoration, fuels reduction, and special designations that restrict grazing. Future actions affecting livestock grazing would be similar to present actions, except under Alternative C, under which the BLM and Forest Service would close ADH to livestock grazing.

The cumulative impacts under each alternative would parallel the impacts of the alternatives in the general impact analysis, above. In general, management actions in every alternative would result in short- and/or long-term availability of forage due to treatment activities, other surface-disturbing and disruptive activities, human disturbance, special designations, and the presence of grazing

wildlife, threatened, or endangered species. Although forage would increase over the long term under Alternative C if grazing were restricted in ADH, Alternative C would also have the greatest impact on livestock grazing. Under Alternatives A, B, and D and the Proposed LUPA, forage would be utilized annually at various levels relative to the protections provided in the four alternatives. Management under Alternative A would contribute the most cumulative effects to range management by allowing the most surface disturbance, which would cumulatively decrease forage availability.

## 5.12 WILD HORSE MANAGEMENT

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area for BLM-administered lands that have affected and will likely to continue to affect wild horse and burro management are wildfires, surface-disturbing activities, the presence and abundance of grazing wildlife, increased recreational demands, and protections for sensitive resources. No wild horses occupy or are known to occupy National Forest System lands within the planning area.

The cumulative impact analysis area used to analyze cumulative impacts on wild horses includes the entire planning area because impacts are expected to be limited to those actions originating within the planning area.

Wild horses would directly benefit from actions to increase forage opportunities, to improve range conditions, to maintain or improve water sources, and to eliminate barriers to movement. Wild horses would indirectly benefit from restrictions on motorized travel or other potentials for disturbance from people, vehicles, and industrial activity.

Cumulative impacts on wild horse and burro management are expected to be the greatest under Alternative A since it allows the highest level of development, which could disrupt wild horses in the planning area the most. However, Alternative A also allows the most development of range improvement projects, which cumulatively benefits wild horses. Management under Alternatives B, C, and D and the Proposed LUPA would place restrictions on development and would therefore contribute fewer cumulative impacts on wild horses than Alternative A.

The prioritization of gathers in PHMA under Alternatives B, C, and D and the Proposed LUPA could cumulatively affect herd areas and HMAs outside of habitat by delaying gathers in those areas, and potentially causing more impacts from overpopulation of horses in those areas.

## 5.13 SPECIAL DESIGNATIONS

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect special designations are wildfires, surface-disturbing activities, increased recreational demands, and protections for sensitive resources.

The cumulative impact analysis area for special designations includes the planning area. Cumulative impacts on special designations could result from non-BLM and Forest Service actions and decisions on lands adjacent to WSAs and ACECs. While protections exist within WSAs and ACECs, population growth, development, and recreation throughout the planning area may, over time, encroach upon these areas, causing potential degradation of the important and relevant resources, such as through displacement of species, habitat fragmentation, and changes to the visual landscape that could indirectly affect resources within WSAs and ACECs. Impacts would be greater in areas where recreation areas, such as SRMAs or ERMAs, or development were adjacent to a WSA or ACEC. The BLM and Forest Service would adaptively manage to protect WSA and ACEC values and minimize impacts where applicable and feasible.

Cumulative impacts on special designations are expected to be the greatest under Alternative A, since it would allow the highest level of development. Alternatives B, C, and D and the Proposed LUPA would all place restrictions on development and would therefore be expected to cumulatively contribute fewer impacts on special designations than Alternative A.

#### **5.14 SOIL AND WATER RESOURCES**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect soil and water resources are mineral development, livestock grazing, infrastructure development, vegetation treatments, wildfires, recreation, and travel and transportation activities.

The cumulative impact analysis area used to analyze cumulative impacts on soils includes the entire planning area. Surface-disturbing activities occurring within the planning area are not expected to affect soil resources outside of the planning area. The cumulative impact analysis area used to analyze cumulative impacts on water quality and watershed resources extends outside of the planning area, following fourth-order watershed boundaries. Given that the hydrologic influence of the surrounding area is primarily focused in the stream channels and that delineation of the cumulative impact analysis area was based on watershed boundaries, the area of analysis is sufficient. The hydrologic influence of the planning area on areas outside the planning area is primarily the result of hydrograph alteration and quality of the water flowing from the area.

Combined with the proposed management actions, cumulative impacts on soil resources could present challenges to meeting BLM Colorado Public Land Health Standard I. Impacts on soil resources would not be as substantial under Alternative B, C, D, or E when compared with Alternative A. Management under Alternative C would provide the greatest protection of soil resources, followed by Alternatives B and D and the Proposed LUPA, respectively. Alternative A would provide the lowest level of protection of soil resources.

Mineral development, including oil and gas, coal, and other minerals, could cause localized impacts on soils. Intensive mechanical vegetation treatments likely have and would continue to impact soils resources locally, but they would increase vegetation cover, and thus soil health, over the long term. Past livestock grazing has impacted soil resources. Active management of grazing allotments has led to improvements in soil health over time in the planning area.

An important trend in the planning area is rapidly increasing recreational use. This growth in recreation on public lands is due to local population growth, as well as the planning area's reputation as a national and international recreation destination. All forms of recreational activities can increase potential for erosion, sedimentation, gully creation, biologic soil crust damage, and riparian and upland vegetation damage. Recreation activities may also directly and indirectly impact water quality due to erosion and sediment production potential. However, the significance of such impacts varies with the nature and degree of disturbance as well as site specific environmental conditions. Typically larger disturbances represent greater potential to damage soils and vegetation, degrade water quality, and impair overall watershed function and condition than smaller disturbances.

Potential cumulative impacts on water resources in the planning area would result from alteration of functional vegetative communities and could lead to increased runoff and sediment/contaminant delivery. Activities with impacts on water resources include management actions attributed to the alteration of natural vegetative communities (e.g., pinyon-juniper invasion and cheatgrass), historic grazing practices, surface-disturbing actions in areas of low reclamation potential, conversion of native rangelands to irrigated agricultural lands (on non-BLM-administered and non-National Forest System lands), improper maintenance of transportation facilities, spills/leaks of substances used to develop mineral resources, and recreational use. These activities cause surface disturbances by removing vegetation cover, displacing and compacting soils, and altering soil structure and chemistry. The result is exposed surfaces that increase the potential for runoff and erosion, which delivers sediment and contaminants to nearby waterways. Sedimentation in waterways can cause changes in water chemistry as well as geomorphic adjustments that could have negative effects on stream function.

Urban growth and development in the planning area is anticipated to have impacts on water quantity and water quality. The demand for water is anticipated to increase with urban expansion. The number of water right applications for waters flowing from or through BLM-administered and National Forest System lands is also expected to rise along with the demand. Additionally, demand and use of water flowing to BLM-administered and National Forest System lands is expected to continue to rise. This includes water used on National Forest System and private lands upstream of BLM-administered and National Forest System lands in the planning area.

Impacts on water quantity could affect wildlife habitat (e.g., riparian areas and wetlands, aquatic habitat, wildlife, water quality, and fisheries). Loss of vegetation and disturbed soils associated with construction and development projects would leave denuded surfaces susceptible to soil detachment and transport during runoff. Increased runoff and erosion following runoff events and mass wasting could further deliver sediment and contaminants to nearby waterways. In addition, agricultural runoff would introduce nutrients, pesticides, and herbicides to shallow groundwater and adjacent hydrologic features.

Unavoidable water quality impacts would include temporary increases in suspended load in flowing streams as a result of culvert installation, vehicle use of low-water crossings, and livestock, wildlife, and wild horse use of stream banks and wetlands; permitted channel fills resulting from construction of oil and gas pads, roads, and pipelines; and the introduction of nutrients from irrigation practices occurring on private lands. Water quantity impacts would include water withdrawals for livestock use, oil and gas and other mineral resource exploration, development and production, and watering of roads for dust mitigation. Dust on snow resulting from fugitive dust production outside of the planning area would continue to impact the timing of melt out and the quantity of water available for downstream users.

Under all alternatives, water resources would be protected due to management in accordance with the Clean Water Act, the Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration, and other applicable state and federal water quality standards. Site-specific mitigation and RDFs, PDFs, and SDFs for surface-disturbing activities would further reduce impacts on water resources. Adherence to these standards would reduce many of the impacts from future actions.

Alternative actions that allow the least amount of soil disturbance, loss of vegetation, energy and minerals development, recreational use, and roadway and transportation facilities development would be the least impactful on water resources. Alternative C would cause the fewest cumulative impacts on water, followed by Alternatives B and D and the Proposed LUPA. Management under Alternative C, which includes the most restoration of plant communities, revegetation, and protected areas (such as ACECs), would have the most beneficial cumulative impacts on water resources. Management under Alternative A allows the most surface disturbance and is expected to contribute the most cumulative effects on soil and water resources.

## **5.15 AIR QUALITY**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect air quality are mineral development, livestock grazing, travel and transportation, and recreation.

The cumulative impact analysis area used to analyze potential impacts on air quality includes the planning area and adjacent BLM field office RMP planning areas in Utah (Moab and Vernal Field Offices) and Wyoming (Rock Springs and Rawlins Field Offices). The cumulative impact analysis area was extended beyond the planning area to include reasonably foreseeable oil and gas development from adjacent areas that have the potential to affect or be affected by air quality in the planning area. In addition, the cumulative analysis included reasonably foreseeable oil and gas development for private and fee (i.e., nonfederal) minerals within the planning area.

The Colorado Department of Public Health and Environment compiles a statewide emissions inventory of air pollutants from several source categories every 3 years as required by the US EPA. The most recent statewide emissions inventory available was compiled for 2008 actual emissions. The 2008 emissions data for Eagle, Garfield, Grand, Jackson, Larimer, Mesa, Moffat, Rio Blanco, Routt, and Summit counties, as well as statewide emissions, can be obtained from the US EPA's National Emissions Inventory (US EPA 2011).

BLM and Forest Service actions combined with nonfederal oil and gas development within the planning area are expected to increase emissions of air pollutants in the planning area over the life of the plan under Alternative A. Under all of the action alternatives, emissions of air pollutants would decrease due to restrictions on development and land uses prescribed under those alternatives.

Total cumulative emissions from BLM and Forest Service and nonfederal actions and anticipated emissions from other source categories in Eagle, Garfield, Grand, Jackson, Larimer, Mesa, Moffat, Rio Blanco, Routt, and Summit counties combined with existing background concentrations of air pollutants have the potential to cause or contribute to adverse impacts within the planning area and affected areas outside of the planning area under Alternative A. Elevated levels of  $PM_{10}$  and  $PM_{2.5}$  background concentrations measured within the planning area, and elevated levels of winter ozone concentrations measured adjacent to the planning area in conjunction with estimated future cumulative emission increases may result in increased ambient concentrations of these pollutants as well as impacts on visibility, atmospheric deposition, and human health under Alternative A.

Cumulative impacts on air quality are anticipated to be the least under Alternative C due to proposed restrictions on surface management actions and lower predicted development. Cumulative estimated emissions under Alternative A could result in air quality impacts. Alternative A cumulative impacts are predicted to be the greatest of the four alternatives and most likely to contribute to adverse impacts on air quality.

Potential cumulative emissions of CO, and sulfur dioxide could cause ambient concentrations of these pollutants to increase slightly, but would be unlikely to

exceed air quality standards. Ozone, nitrous oxide, and particulate matter concentrations could be an issue of concern during the life of the plan, particularly under Alternative A which includes the most allowable oil and gas development.

Potential cumulative emissions of nitrogen oxide, sulfur dioxide, and particulate matter under Alternatives B, C, and D and the Proposed LUPA are likely to have minimal impacts on atmospheric deposition, including total nitrogen deposition, total sulfur deposition, and precipitation pH, would likely stay about the same and would be unlikely to exceed levels of concern. Potential cumulative emissions under Alternative A have the potential to result in increased nitrogen and sulfur loadings and may contribute towards impacts in sensitive areas and lakes.

Potential cumulative emissions of nitrogen oxide, sulfur dioxide, and PM<sub>2.5</sub> could result in impacts on visibility to stay about the same or degrade slightly under Alternatives B, C, and D and the Proposed LUPA. Visibility degradation in Class I areas downwind of the planning area could be an issue of concern under Alternative A due to the allowance of oil and gas development.

## 5.16 CLIMATE CHANGE

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect climate change are mineral development, livestock grazing, travel and transportation, and recreation.

Concentrations of certain gases in the earth's atmosphere have been identified as being effective at trapping heat reflected off the earth's surface thereby creating a "greenhouse effect." As concentrations of these greenhouse gases increase, the earth's surface warms, the composition of the atmosphere changes and global climate is affected. Concentrations of greenhouse gases have increased dramatically in the earth's atmosphere in the past century. Anthropogenic (human-made) sources and activities have been attributed to these increases particularly for carbon dioxide, methane, nitrous oxide, and fluorinated gases (US EPA 2010).

The US EPA has determined that six greenhouse gases are air pollutants and subject to regulation under the Clean Air Act: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Of these greenhouse gases, CO<sub>2</sub>, methane, and nitrous oxide are commonly emitted by the types of activities included in this analysis, while the remaining three greenhouse gases are emitted in extremely small quantities or are not emitted at all.

As the major component of natural gas, methane emissions from underground mining operations and oil and gas exploration and development can be

considerable. Emissions of carbon dioxide and nitrous oxide from fossil fuel combustion and fire can also be of concern.

Greenhouse gas emissions are estimated to increase over estimated base year emissions under Alternative A. Management under Alternative A is expected to cause the greatest increase of greenhouse gas emissions from the base year. Under Alternatives D and E, increases would be greater over the base year than under Alternatives B and C, but less than Alternative A.

Coal mining activities are predicted to be the largest contributor to greenhouse gas emissions in the planning area, followed by oil and gas development. Coal mining greenhouse gas emissions are primarily from fugitive methane emissions. The largest sources of greenhouse gas emissions within the oil and gas sector include carbon dioxide emissions from natural gas compressors and drill rig engines, and fugitive methane emissions from wellhead equipment, pneumatic devices, and tanks.

Several activities contribute to the phenomena of climate change, including emissions of greenhouse gas (especially carbon dioxide and methane) from fossil fuel development, large wildland fires and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that greenhouse gas will have a sustained climatic impact over different temporal scales. For example, recent emissions of carbon dioxide can influence climate for 100 years.

It may be difficult to discern whether global climate change is already affecting resources in the analysis area of the plan. It is important to note that projected changes are likely to occur over several decades to a century. Therefore, many of the projected changes associated with climate change may not be measurably discernible within the reasonably foreseeable future. Existing climate prediction models are global or continental in scale; therefore they are not appropriate to estimate potential impacts of climate change on the planning area. The current state of the science involves calculating potential quantities of greenhouse gases that may be added to the atmosphere from a particular activity. However, tools to analyze or predict how global or regional climate systems may be affected by a particular activity or activities within the planning area are not currently available. Assessing the impacts of greenhouse gas emissions on global climate change requires modeling on a global scale which is beyond the scope of this analysis. Potential impacts on climate change are influenced by greenhouse gas emission sources from around the globe, and it is not possible to distinguish the impacts on global climate.

## **5.17 VISUAL RESOURCES**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect visual resources are wildland fires, wildland fire management activities,

timber harvesting, mining, cross-country travel, noxious weed invasion, urban and suburban sprawl, and road construction.

The cumulative impact analysis area for visual resources is composed of those fourth-order watersheds that completely or partially overlap the planning area. Fourth-order watersheds were used as the basic unit of analysis because impacts from management actions proposed under this document and other existing activity plans are not expected to have cumulative influence beyond this scale.

Actions likely to have the greatest future effect on visual resources in the cumulative impact analysis area are activities associated with energy and minerals development, continued urbanization, road construction, vegetation management, developed recreation, and utility development.

Energy development, primarily dependent upon a variety of external factors, could have widespread and long-term effects on visual resources, and although sites are required to be reclaimed, some visual impacts remain (e.g., well caps). Urbanization has and is expected to continue to result in residential and/or commercial development expanding incrementally closer to National Forest System and BLM-administered lands.

Continued urban growth and development of lands in the vicinity of National Forest System and BLM-administered lands could also lead to an increased demand for energy resources, building materials, utilities, and minerals, all of which could spur development that would affect visual resources.

Cumulative impacts on visual resources are expected to be the greatest under Alternative A, since it would allow the highest level of development. Under Alternatives B, C, and D and the Proposed LUPA, the BLM and Forest Service would place restrictions on development and would therefore be expected to cumulatively contribute fewer impacts on visual resources than Alternative A.

## **5.18 LANDS WITH WILDERNESS CHARACTERISTICS**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect lands with wilderness characteristics are wildland fires, wildland fire management activities, mining, energy development, noxious weed invasion, urban and suburban sprawl, and road construction.

The cumulative impact analysis area used to analyze cumulative impacts on lands with wilderness characteristics includes the planning area and all adjacent BLM/Forest Service-identified lands with wilderness characteristics that are adjacent or overlap the planning area boundary.

Many past, present, and reasonably foreseeable actions have impacted or have the potential to impact the wilderness characteristics of lands with wilderness

characteristics. For example, continued residential development in the planning area will likely increase visitor use on BLM-administered and National Forest System lands including lands with wilderness characteristics, potentially impacting wilderness characteristics by reducing opportunities for solitude. Development of energy and minerals resources could introduce sights, noises, and infrastructure in or adjacent lands with wilderness characteristics, which could degrade their wilderness characteristics. In addition, vegetation management activities on public and private lands may alter landscape appearance and setting in the short and long term, protecting or degrading wilderness characteristics depending on the activity. Noxious weed infestations could degrade wilderness characteristics over time in the planning area. Impacts on lands with wilderness characteristics would be mitigated where those lands are managed to protect their wilderness characteristics and where management actions governing other resources complement wilderness characteristics.

Cumulative impacts on lands with wilderness characteristics are expected to be the greatest under Alternative A. Management under Alternatives B, C, and D and the Proposed LUPA would protect wilderness character to some degree by placing restrictions on development and land uses that could degrade the wilderness character.

### **5.19 SOUNDSCAPES**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect soundscapes are activities associated with energy and minerals development, continued urbanization, road construction, vegetation management, developed recreation, and utility development.

The cumulative impact analysis area used to analyze cumulative effects on soundscapes includes the planning area since activities outside of the decision area could influence soundscapes inside of the decision area and vice versa.

Energy development (including wind energy development) primarily dependent upon a variety of external factors could have widespread and long-term effects on soundscapes since energy infrastructure such as wind turbines and compressor stations produce high levels of sound. Urbanization has and is expected to continue to result in residential and commercial development expanding incrementally closer to National Forest System and BLM-administered lands.

Continued urban growth and development of lands in the vicinity of National Forest System and BLM-administered lands could also lead to an increased demand for energy resources, building materials, utilities, and minerals, all of which could spur development that would affect soundscapes.

Cumulative impacts on soundscapes are expected to be the greatest under Alternative A. Management under Alternatives B, C, and D and the Proposed

LUPA would protect soundscapes to some degree by placing restrictions on development and land uses that could generate noise and degrade the soundscape.

## 5.20 CULTURAL RESOURCES

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect cultural resources are destruction of cultural resources, loss of integrity due to physical or other disturbances, loss of setting, degradation from natural processes such as erosion and weathering, incremental disturbance from use or access, and effects from vandalism and unauthorized collection.

The cumulative impact analysis area used to analyze cumulative effects on cultural resources extends outside the planning area, following fourth-order watershed boundaries that completely or partially overlap the planning area. Fourth-order watersheds were used as the basic unit of analysis because effects from most management actions proposed under the LUPA and other existing activity plans are not expected to have cumulative influence beyond this scale.

Current and future trends in the cumulative impact analysis area include population growth, urban encroachment, increases in mining, fluid mineral leasing, leasable minerals, renewable energy development, ongoing grazing, increase in recreational demand, road construction, water diversions, invasive species, erosion, wildland fire, forest disease and insects, drought, and climate change. These trends would be most likely to occur in the future under Alternative A. Trends would continue to affect cultural resources and cultural landscapes through loss or disturbance of resources that are not or cannot be protected, changes in setting, pressure from incremental use, loss of access for Native Americans to resources, and theft or vandalism of cultural resources.

Cultural resources adjacent to areas of growth and development would be most susceptible to future effects. Development near public lands is also increasing as adjacent agricultural lands are being converted into subdivisions, increasing the risk of effects on cultural resources. The effects on cultural resources on adjacent private lands would be greater than on federal lands since they would not be subject to the same requirements or protections. The construction of buildings, roads, and associated structures increases ground disturbance, causing effects on cultural resources and their settings. In general, more people and development in an area increases the potential for disturbance and increased cumulative effects on cultural resources. These impacts would be greatest under Alternative A.

Areas where motorized use is allowed would continue to expose cultural resources to effects. Limiting travel to designated routes can protect cultural resources located off the routes, but restrictions are difficult to enforce, especially as population and recreational use grows and other areas are closed. Increased use of GPS and off-road vehicles can facilitate vandalism and

unauthorized collecting. Increased use of the internet to disseminate site location and encourage visitation to sites that are unrecorded or have not been allocated to public use will continue to expose cultural resources to impacts.

Actions related to recreation, grazing, vegetation treatment, wildland fire, mineral development, and energy development have had past effects and are expected to continue to affect cultural resources. Increased frequency of wildland fire due to drought and climate change may lead to additional direct loss of cultural resources and effects due to suppression.

Decisions from this document would have effects that, when combined with other past, present, and reasonably foreseeable actions, could produce cumulative effects on cultural resources and religious, traditional, or other sensitive Native American resources. Cumulative effects would result from the destruction and loss of known and unrecorded resources and unanticipated discoveries. The continued documentation of new cultural resources from undertakings and permitted actions that would require inventory for compliance would result in additional information to expand and explain the area's cultural history. Restrictions on development and land use under Alternatives B, C, and D and the Proposed LUPA would improve current management of cultural resources in the decision area. Restrictions on open, cross-country use would drastically reduce the amount of land where cultural resources would be affected. Alternative C would be the most protective of the cultural resource base through measures targeting resource protection and restrictions on development. In addition, all undertakings would be subject to the Section 106 process of the NHPA and other applicable laws and regulations. Adherence to appropriate predevelopment, development, and post-development protective measures would reduce most effects to an insignificant level.

## 5.21 PALEONTOLOGICAL RESOURCES

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely to continue to affect paleontological resources are destruction or damage of resources without the benefit of scientific study or interpretation due to construction, recreation, theft, vandalism, and the effects of natural processes without the benefit of recovery, scientific study, or interpretation.

The cumulative impact analysis area used to analyze cumulative impacts on paleontological resources extends outside the decision area, following fourth-order watershed boundaries that completely or partially overlap the planning area. The fourth-order watersheds were used as the basic unit of analysis because impacts from most management actions proposed under the LUPA and other existing activity plans are not expected to have cumulative influence beyond this scale.

Current and future trends include population growth, urbanization, mining, fluid mineral leasing, renewable energy development, increase in recreational

demand, road construction, and erosion. These trends are expected to be most likely to occur under Alternative A. For actions on public land and the mineral estate managed by the BLM and Forest Service, impacts would be minimized through existing laws, regulations, and stipulations addressing surface-disturbing activities within Potential Fossil Yield Class 4 and 5 areas and other sensitive areas. Other ground-disturbing activities such as road construction, real estate development, and utility infrastructure in the cumulative impact analysis area may be reviewed by other federal, state, or local agencies for the presence and scientific value of paleontological resources and steps taken to recover or avoid significant finds. Actions on private land could result in the inadvertent destruction of paleontological resources or the removal of fossils without any scientific study. Population growth and increasing recreational demand can impact resources from unauthorized removal, vandalism, incremental damage of surface resources, and subsequent erosion.

Management actions in this document could contribute to cumulative impacts on paleontological resources when combined with other past, present, and reasonably foreseeable actions. The cumulative effects of surface-disturbing activities such as mineral development and lands and realty actions within Potential Fossil Yield Class 2, 3, 4, and 5 areas have the potential to damage or destroy some resources. Some fossils would be destroyed in the course of legitimate uses of public lands, as well as through natural weathering and erosion. Measures to identify resources in areas of high potential would allow evaluation by paleontologists in areas that had not been previously studied. Fossils that would have otherwise been destroyed would be avoided or recovered and made available for study in university and museum repositories. Beyond authorized ground disturbance, cumulative impacts could occur from intensive travel, dispersed recreation, wildfire suppression activities, erosion, unauthorized collection, and vandalism. These could result in the unmitigated loss of scientific information and could reduce the educational and interpretative potential of the resource. Management actions under Alternatives B, C, and D and the Proposed LUPA would reduce the potential effects on paleontological resources through restrictions on development and land uses. Adherence to appropriate predevelopment, development, and post-development protective measures would reduce most impacts to an insignificant level.

## **5.22 SOCIAL AND ECONOMIC CONDITIONS (INCLUDING ENVIRONMENTAL JUSTICE)**

Past, present, and reasonably foreseeable future actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect social and economic conditions are chiefly mining and mineral exploration and development, lands, realty, transportation, ROWs, renewable energy development, recreation, and livestock grazing.

The cumulative impact analysis area used to analyze potential impacts on social and economic conditions consists of the eight counties identified as the primary socioeconomic study area (Eagle, Garfield, Grand, Jackson, Mesa, Moffat, Rio

Blanco, and Routt). Although the BLM and Forest Service considered adding the secondary study area to the cumulative impact analysis area for socioeconomics, as documented in **Chapter 4, Environmental Consequences, Section 4.24, Social and Economic Impacts (Including Environmental Justice), and Appendix N, Socioeconomics Data and Methodology**, the impacts on the secondary study area are consistently very small (see **Chapter 4, Section 4.24, Social and Economic Impacts [Including Environmental Justice]**). In addition, the approach for analyzing cumulative socioeconomic impacts relies on economic forecast data specific to Colorado, and adding counties in Utah and Wyoming that constitute the secondary study area would create substantial analytical challenges. The cumulative impact analysis area does address forecasted social and economic development for private and fee (i.e., nonfederal) surface lands within the eight counties.

Changes to social and economic conditions result when individuals, businesses, governments, and other organizations initiate actions. Millions of decisions will be made by thousands of state residents and others, over the next several decades, that will affect trends in employment, income, housing, and property presented in **Chapter 3, Section 3.24, Social and Economic Conditions (Including Environmental Justice)**. Projections published by the State Demography Office within the Colorado Department of Local Affairs account for these individual decisions in the aggregate, and provide a baseline for comparing effects of alternatives in the future. The Colorado Department of Local Affairs projections represent a regional forecast taking a wide range of actions into account – management actions by the BLM and Forest Service as well as many other government entities, private citizens, and businesses. As a result, they incorporate the past, present, and reasonably foreseeable future projects that will form the basis of future economic and social trends in the cumulative impact analysis area. Current and future trends in the cumulative impact analysis area include population growth, increases in mining activity, including oil and gas development, renewable energy development, increases in recreational demand, and ongoing livestock grazing.

As noted in **Chapter 4, Section 4.24, Social and Economic Impacts (Including Environmental Justice)**, some of the predicted employment and income effects of the actions considered in this EIS could be quantified, including the indirect and induced impacts of these actions (calculated using IMPLAN, a regional economic model). **Table 5.15** shows projected employment for 2030, as forecast by Colorado Department of Local Affairs. Because Alternative A represents current management plans, employment would correspond most closely to the existing Colorado Department of Local Affairs forecasts. By contrast, employment under Alternatives B, C, and D and the Proposed LUPA would change from the Colorado Department of Local Affairs projections, with the best estimate for those changes being the quantities shown in **Chapter 4, Environmental Consequences**. Thus, **Table 5.15** shows the estimated change in

**Table 5.15**  
**Projected Employment by Alternative for Eight-County Primary Socioeconomic Study Area**

Item	Alternative A	Alternative B	Alternative C	Alternative D	Proposed LUPA
Employment (2010)	177,805	177,805	177,805	177,805	177,805
Change in employment (2030) related to oil and gas	N/A	-2,958	-8,651	-1,479	-1,680
Change in employment (2030) related to grazing (based on active AUMs)	N/A	-188	-376	-94	-94
Change in employment (2030) related to recreation	N/A	-62	-134	-8	-8
Overall change in 2030 employment	N/A	-3,208	-9,161	-1,581	-1,782
Projected 2030 employment	274,491	271,283	265,330	272,910	272,709
% change, 2010 to 2030	54.4%	52.6%	49.2%	53.5%	53.4%

Source: Colorado Department of Local Affairs 2013 (data for the eight counties of the primary socioeconomic study area), modified by estimates from IMPLAN. The values for Alternatives B and D represent midpoints over a range of possible values, as described in **Chapter 4, Section 4.24**, Social and Economic Impacts (Including Environmental Justice). The values for Alternative E (Proposed LUPA) were estimated relative to Alternative D

Changes related to specific sectors include direct, indirect, and induced effects from IMPLAN; see **Appendix N**, Socioeconomics Data and Methodology, for a detailed description of this model.

Note: The source of 2010 employment data used in this table (Colorado Department of Local Affairs 2013) differs from that used in **Chapter 3, Section 3.24**, Social and Economic Conditions (Including Environmental Justice), so there may be differences between the two estimates.

employment for these alternatives, based on modifying the projected 2030 employment by the estimated changes for the eight-county socioeconomic study area (from IMPLAN). **Table 5.16** shows a similar calculation for labor income (earnings) at the state level. Colorado Department of Local Affairs does not provide county-level projections for labor income.

As noted in **Chapter 4, Section 4.24**, Social and Economic Impacts (Including Environmental Justice), quantitative estimates were not produced for oil and gas for Alternative D or the Proposed LUPA or for livestock grazing for Alternatives B or D or the Proposed LUPA.

As noted in **Chapter 4, Section 4.24**, Social and Economic Impacts (Including Environmental Justice), the main driver of changes in employment and earnings in the study area is oil and gas activity. This is also evident in **Table 5.15**. Recreation and livestock grazing impacts were also measured quantitatively to the degree data were available. Trends in recreation that will influence social and economic conditions in a cumulative impacts context include continued growth patterns in demand for all recreation experiences, increased demand for close-to-home recreation opportunities for local residents, continued and increased visitation from a growing regional population, and increased popularity of adjacent public lands. Because the differences among the alternatives are

**Table 5.16**  
**Projected Labor Income (\$ millions) by Alternative for State of Colorado**

Item	Alternative A	Alternative B	Alternative C	Alternative D	Proposed LUPA
Labor income (2010)	\$114,319	\$114,319	\$114,319	\$114,319	\$114,319
Change in labor income (2030) related to oil and gas	N/A	-\$163.32	-\$477.85	-\$81.66	-\$92.76
Change in labor income (2030) related to grazing (based on active AUMs)	N/A	-\$5.57	-\$11.14	-\$2.79	-\$2.79
Change in labor income (2030) related to recreation	N/A	-\$2.14	-\$4.67	-\$0.30	-\$0.30
Overall change in 2030 labor income	N/A	-\$171.03	-\$493.66	-\$84.75	-\$95.85
Projected 2030 labor income	\$343,437	\$343,266	\$342,943	\$343,352	\$343,341
% change, 2010 to 2030	200.4%	200.3%	200.0%	200.4%	200.3%

Source: Colorado Department of Local Affairs 2013 (statewide data), modified by estimates from IMPLAN (presenting estimated impacts for the eight-county primary study area). The values for Alternatives B and D represent midpoints over a range of possible values, as described in **Chapter 4, Section 4.24**, Social and Economic Impacts (Including Environmental Justice). The values for the Proposed LUPA were estimated relative to Alternative D.

Changes related to specific sectors include direct, indirect, and induced effects from IMPLAN; see **Appendix N**, Socioeconomics Data and Methodology, for a detailed description of this model.

Note: The source of 2010 employment data used in this table (Colorado Department of Local Affairs 2013) differs from that used in **Chapter 3, Section 3.24**, Social and Economic Conditions (Including Environmental Justice), so there may be differences between the two estimates.

relatively minor, the effect in context of overall economic activity associated with recreation would be relatively small. In addition, although restrictions to recreational activities imposed by Alternatives B, C, or D could limit certain activities such as motorized recreation, they would also favor recreational activities requiring less disturbed and more primitive or natural settings. This is one of the reasons that the economic impacts associated with recreational activities are similar across all alternatives.

Present actions affecting livestock grazing are mainly those that reduce available grazing acreage or restrict management actions or the level of forage production in those areas. Alternative C would have the greatest impact on livestock grazing: Under Alternative C, the BLM and Forest Service would close ADH to grazing and contribute the most to adverse cumulative impacts on economic conditions. Although the impacts on employment and earnings appear small, **Table 5.15** shows the estimated change in employment for these alternatives. **Table 5.16** shows that the impacts in local areas could be dramatic and significant, especially areas where livestock grazing forms the foundation of regular (i.e., non-seasonal) economic activity and areas where the economy is relatively concentrated in livestock-related businesses. Additionally, the livestock grazing and ranching sector across Northwest Colorado is quite influential in terms of establishing community character, identity, and social values. Thus, land management decisions caused by the proposed action affecting livestock grazing, especially in Alternative C, have the potential to have far-reaching effects on the

social structure in the planning area. **Table 5.15** and **Table 5.16**, which provide more of a broad regional context, do not capture these effects.

Mineral exploration and development, including the development of minerals other than oil and gas (e.g., coal and several salable and locatable minerals), would continue to occur under all alternatives. However, acreages open to exploration and development would vary by alternative. Since management under Alternative C would be the most restrictive alternative on mineral development, it would likely result in the greatest cumulative impacts on mineral exploration and development. Because mineral exploration and development is a sizeable contributor to employment, output, earnings, and tax revenues in the study area, Alternative C would also have the greatest contribution to cumulative impacts on social and economic conditions related to mining exploration and development, especially oil and gas. However, as noted in **Chapter 4, Section 4.24, Social and Economic Impacts (Including Environmental Justice)**, exploration and development activity on state and private land may offset reductions on federal lands. This is true for Alternatives B and D and the Proposed LUPA, as well as Alternative C.

Management actions that affect development of infrastructure, including limitations on new ROWs and access routes or restrictions to route construction and to travel on existing roads, could increase the cost of new economic investments or make them no longer economically viable in the cumulative impact analysis area. These restrictions could deter renewable energy development in the cumulative impact analysis area. Management under Alternative A includes the fewest restrictions on ROW development and route construction and leaves the largest area open to travel. BLM and Forest Service management of renewable energy development would continue along current trends (with development considered on a case by case basis). Under Alternative C, the BLM and Forest Service would impose the most limitations, which could result in the most added costs to future economic investment in renewable energy development. Management under Alternative B would be very similar to Alternative C. Restrictions and the costs of infrastructure development under Alternative D and the Proposed LUPA would be greater than under Alternative A but less than under Alternatives B or C.

Decisions from this document would have effects that, when combined with other past, present, and reasonably foreseeable actions, would produce cumulative effects on social and economic conditions. However, if Alternative A is selected, current and future trends in social and economic conditions would not be impacted. Restrictions on development and land use under Alternatives B, C, and D and the Proposed LUPA could impair economic growth in some sectors as measured by employment and income in the cumulative impact analysis area. Based on the data from the IMPLAN model and qualitative analysis of economic activity from other sectors, cumulative impacts on earnings, output, employment, and tax revenues due to activities on BLM-administered and

National Forest System lands would be greatest under Alternative C. In the context of overall employment and earnings projections, and from a regional perspective, the impacts would be relatively minor. However, as documented in **Chapter 4, Section 4.24, Social and Economic Impacts (Including Environmental Justice)**, there are impacts on specific communities and local geographic areas that must be taken into account, even if they are not visible at the regional level. This is especially a concern for smaller communities that are adjacent to large areas of federally managed GRSG habitat, such as the town of Walden in Jackson County, and that have economies focused on ranching or oil and gas development.

Impacts from Northwest Colorado GRSG management alternatives could have cumulative effects with those of GRSG management in other sub-regions of the GRSG range. When GRSG range is analyzed as a whole, specific industrial sectors could be simultaneously impacted by management actions taken in different sub-regions. Comments on the GRSG Draft LUPA/EIS for various sub-regions expressed particular concern with the cumulative effects of GRSG management on mining. Quantitative estimates for the impacts of GRSG management on mineral production are not available for all minerals in all sub-regions. However, it is possible to obtain some reference for the magnitude of the impacts by looking at oil and gas production across the GRSG range and how it would be affected by management alternatives. According to the Energy Information Administration, oil production in 2013 in the 10 states<sup>1</sup> covered by BLM and Forest Service GRSG LUPAs was 707,580 thousand barrels of oil (Energy Information Administration 2014a). The cumulative impact of Northwest Colorado GRSG management alternatives and GRSG management alternatives estimated in the Draft LUPA/EISs of other sub-regions across the GRSG range would be approximately 1.7 percent of this total, if each managing unit chose to implement the most restrictive management alternative. Under less restrictive alternatives the impact would be considerably less. For example, for Alternative D, the cumulative impact would be approximately 0.25-percent in each sub-region. These estimates likely overestimate the impact of GRSG management because in several management units it is not possible to separate the effect of GRSG habitat management and other considerations included in management alternatives. Similarly, Energy Information Administration estimates gas marketed production in 2013 in those same 10 states to have been 4,452 billion cubic feet (Energy Information Administration 2014b). The cumulative impact of Northwest Colorado GRSG management alternatives and GRSG management alternatives estimated in the Draft LUPA/EISs of other sub-regions in the GRSG range between 6.9 percent and 14.6 percent of this total, if each managing unit chose to implement the most restrictive management alternative. The lower estimate reflects current trends in production and the higher estimate reflects potential production, as described in local Reasonable

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<sup>1</sup> California, Nevada, Oregon, Idaho, Montana, Utah, Wyoming, North Dakota, South Dakota, Colorado.

Foreseeable Development Scenarios. Under less restrictive management alternatives, the impacts would again be much less. For Alternative D, the cumulative impact would range between 1.4 percent and 1.9 percent of total 2013 gas marketed production in the 10 states<sup>2</sup> in each sub-region.

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<sup>2</sup> The Draft EIS for the BLM Lander Field Office includes increases in gas production under some of its management alternatives. As previously noted, in some management alternatives, it is not possible to separate the impact of GRSB habitat management from other measures included in management alternatives.

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