

# Northwest Colorado Greater Sage-Grouse Approved Resource Management Plan Amendment

## Attachment 3

From the Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region including the Greater Sage-Grouse Sub-Regions of: Lewistown, North Dakota, Northwest Colorado, and Wyoming and the Approved Resource Management Plans for: Billings, Buffalo, Cody, HiLine, Miles City, Pompeys Pillar National Monument, South Dakota, and Worland

Prepared by  
US Department of the Interior  
Bureau of Land Management  
Northwest Colorado District Office  
Colorado State Office

September 2015



## **MISSION STATEMENT**

The BLM manages more than 245 million acres of public land, the most of any Federal agency. This land, known as the National System of Public Lands, is primarily located in 12 Western states, including Alaska.

The BLM also administers 700 million acres of sub-surface mineral estate throughout the nation. The BLM's mission is to manage and conserve the public lands for the use and enjoyment of present and future generations under our mandate of multiple-use and sustained yield. In Fiscal Year 2014, the BLM generated \$5.2 billion in receipts from public lands.

BLM/CO/PL-15/018

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## State Director Recommendation for Approval

I hereby recommend for approval this resource management plan amendment.

SEP 15 2015



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Ruth Welch  
Colorado State Director

Date

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## ACRONYMS AND ABBREVIATIONS

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Full Phrase

ADH	all designated habitat (includes PHMA, GHMA, and LCHMA)
ARMPA	approved resource management plan amendment
BLM	United States Department of the Interior, Bureau of Land Management
CFR	Code of Federal Regulations
COA	condition of approval
COT	Conservation Objectives Team
CSU	controlled surface use
EIS	environmental impact statement
ESA	Endangered Species Act
ESR	emergency stabilization and rehabilitation
FLPMA	Federal Land Policy and Management Act of 1976
Forest Service	United States Department of Agriculture, Forest Service, Routt National Forest
GHMA	general habitat management area(s)
GIS	geographical information system
GRSG	Greater Sage-Grouse
HMA	herd management area
LCHMA	linkage/connectivity habitat management area(s)
LN	lease notice
MZ	management zone
NEPA	National Environmental Policy Act of 1969
NSO	no surface occupancy
NTT	Sage-Grouse National Technical Team
OHV	off-highway vehicle
PDF	preferred design feature
PHMA	priority habitat management area(s)
RDF	required design feature
RMP	resource management plan
ROD	record of decision
ROW	right-of-way
SDF	suggested design feature
TL	timing limitation
USFWS	United States Department of the Interior, Fish and Wildlife Service
WAFWA	Western Association of Fish and Wildlife Agencies

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# CHAPTER I

## INTRODUCTION

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

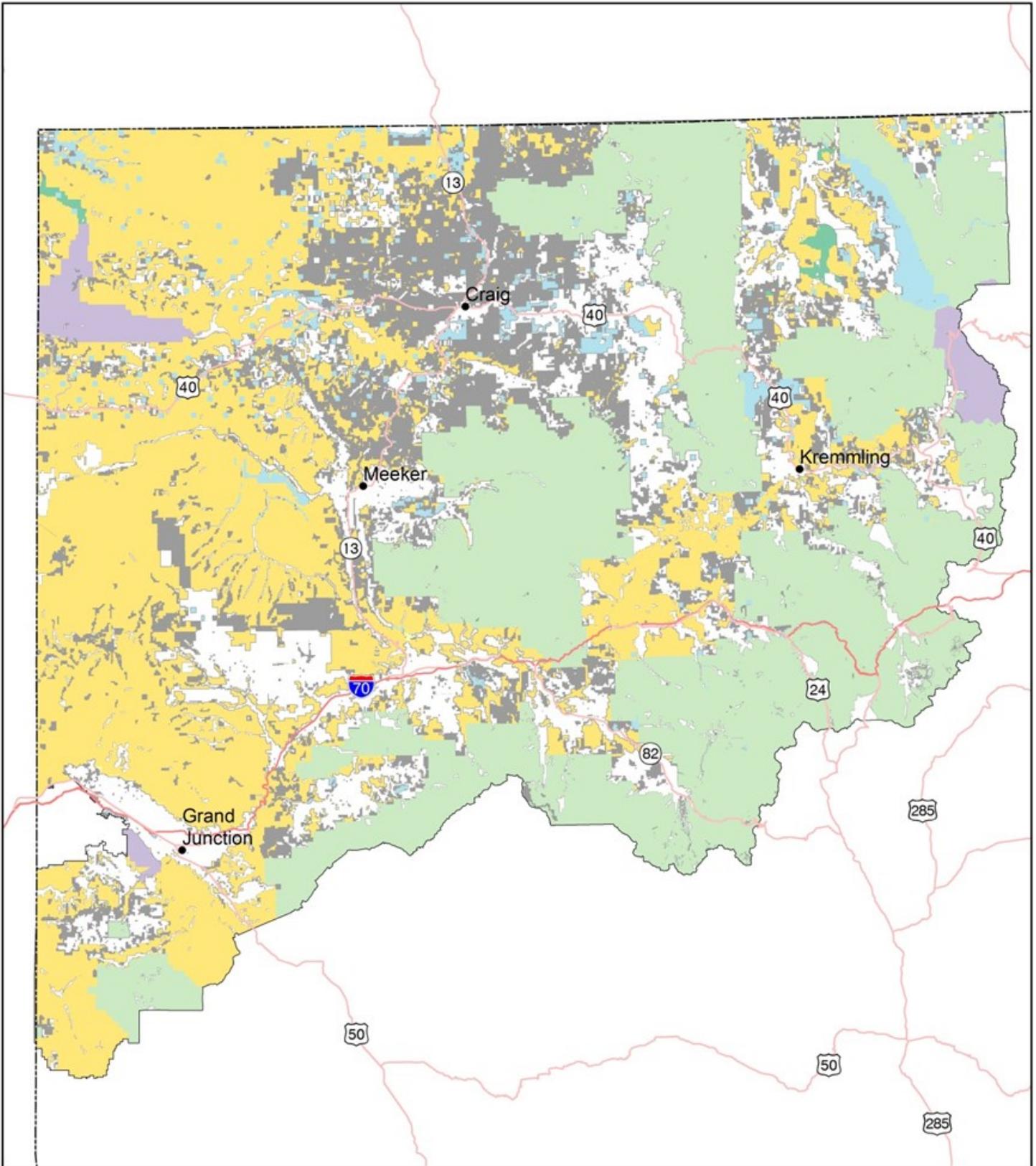
This Approved Resource Management Plan Amendment (ARMPA) is the result of the March 2010 US Fish and Wildlife Service (USFWS) 12-Month Finding for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (75 *Federal Register* 13910, March 23, 2010; USFWS 2010). In that finding, the USFWS concluded that the Greater Sage-Grouse (GRSG) was “warranted, but precluded” for listing as a threatened or endangered species.

The USFWS reviewed the status of and threats to the GRSG in relation to the five listing factors provided in Section 4(a)(1) of the Endangered Species Act (ESA). It determined that Factor A, “the present or threatened destruction, modification, or curtailment of the habitat or range of the GRSG,” and Factor D, “the inadequacy of existing regulatory mechanisms,” posed “a significant threat to the GRSG now and in the foreseeable future” (USFWS 2010). The USFWS identified the principal regulatory mechanisms for the BLM as conservation measures in RMPs.

### I.1 DESCRIPTION OF THE NORTHWEST COLORADO SUB-REGIONAL PLANNING AREA

The ARMPA planning area boundary includes all lands regardless of jurisdiction (see **Figure I-1**, Northwest Colorado Planning Area, and **Figure I-2**, Northwest Colorado Greater Sage-Grouse Habitat Management Areas across All Jurisdictions). **Table I-1**, Land Management in the Planning Area, lists the number of surface acres that are administered by specific federal agencies, states, and local governments and lands that are privately owned in the planning area. The planning area includes other BLM-administered lands that are not allocated as habitat management areas for GRSG. The ARMPA does not establish any additional management for these lands; they will continue to be managed according to the existing, underlying land use plan (LUP) for the areas.

The decision area for the ARMPA is BLM-administered lands in GRSG habitat management areas (see **Figure I-3**, Northwest Colorado Decision Area, Greater Sage-Grouse Habitat Management Areas for BLM Administered Lands), including surface and split-estate lands with BLM federal subsurface mineral



**Figure 1-1: Northwest Colorado Sub-Regional Planning Area, Surface Management and Sub-Surface Estate**

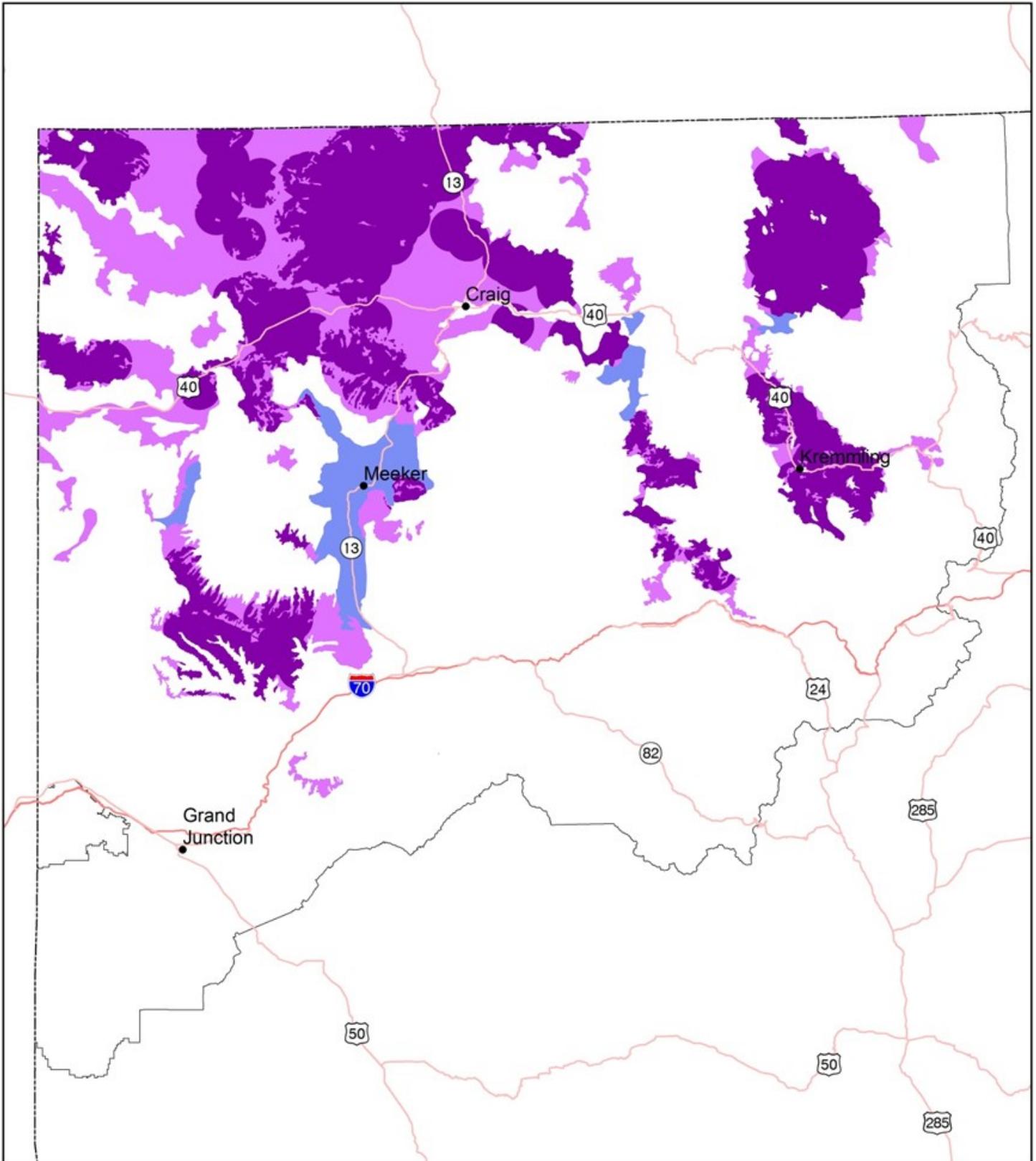
**Legend**

Bureau of Land Management	State/Local	Non-Federal Surface, Federal Sub-Surface
National Park Service	Private/Other	Planning Area Boundary
US Forest Service		State Boundary
US Fish and Wildlife		
Bureau of Reclamation		

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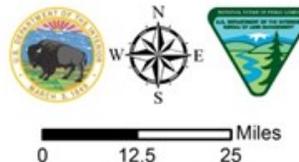
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



**Figure 1-2: Northwest Colorado Sub-Regional Planning Area, Greater Sage Grouse Habitat Management Areas Across all Jurisdictions**

**Legend**

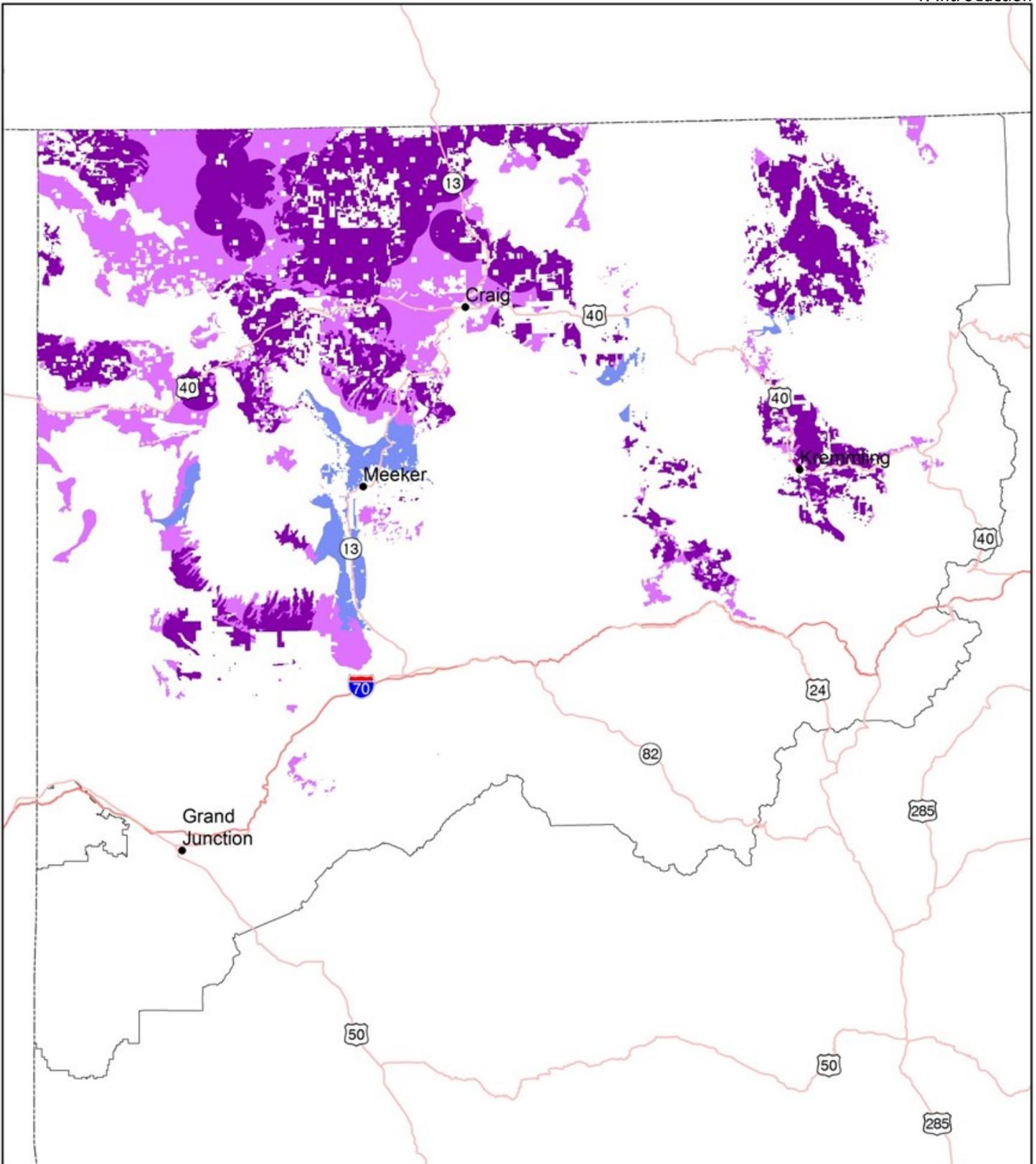
- Priority Habitat Management Areas (PHMAs)
- General Habitat Management Areas (GHMAs)
- Linkage Connectivity Habitat Management Areas (LCHMAs)
- Planning Area Boundary
- State Boundary



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**Figure 1-3: Northwest Colorado Sub-Regional Decision Area, Greater Sage Grouse Habitat Management Areas for BLM Administered Lands**

**Legend**

- Priority Habitat Management Areas (PHMAs)
- General Habitat Management Areas (GHMAs)
- Linkage Connectivity Habitat Management Areas (LCHMAs)
- Planning Area Boundary
- State Boundary

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**Table I-1  
Land Management in the Planning Area**

<b>Surface Land Management</b>	<b>Total Surface Land Management Acres within GRSG Habitat</b>
BLM	1,731,400
United States Department of Agriculture, Forest Service, Routt National Forest (Forest Service)	20,100
Private	2,051,500
USFWS	34,700
Other	300
State	263,400
National Park Service	9,900
Local government	41,700
<b>Total</b>	<b>4,153,000</b>

Source: BLM geographic information system (GIS) 2012

rights. Any decisions in the ARMPA apply only to BLM-administered lands, including split-estate lands within GRSG habitat management areas (the decision area). These decisions are limited to providing land use planning direction specific to conserving GRSG and its habitat.

GRSG habitat on BLM-administered lands in the decision area consists of lands allocated as priority habitat management areas (PHMA), general habitat management areas (GHMA), and linkage/connectivity habitat management areas (LCHMA) (see **Table I-2**). PHMA, GHMA, and LCHMA are defined as follows:

- PHMA—BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as priority areas for conservation in the USFWS’s 2013 Conservation Objectives Team (COT) report (USFWS 2013). These are areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations; they include breeding, late brood-rearing, and winter concentration areas.
- GHMA—BLM-administered lands where some special management would apply to sustain GRSG populations. These are areas of seasonal or year-round habitat outside of priority habitat.
- LCHMA—Areas that have been identified as broader regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes.

Collectively, PHMA, GHMA, and LCHMA are considered all designated habitat (ADH). PHMA, GHMA, and LCHMA on BLM-administered lands in the decision area fall within 10 counties in northwest Colorado: Eagle, Garfield, Grand, Jackson, Larimer, Mesa, Moffat, Rio Blanco, Routt, and Summit (see **Table I-3**). The habitat management areas also span five BLM field offices: Colorado River Valley, Grand Junction, Kremmling, Little Snake, and White River (see **Table I-4**).

**Table I-2**  
**Acres of PHMA and GHMA in the Decision Area for the ARMPA**

<b>Surface Land Management</b>	<b>PHMA</b>	<b>GHMA</b>
BLM	921,500	728,000
<b>Subsurface Management</b>	<b>PHMA</b>	<b>GHMA</b>
BLM	1,241,700	896,000

Source: BLM GIS 2012

**Table I-3**  
**Acres of GRSG Habitat by County in the Decision Area (BLM-Administered Lands Only<sup>1</sup>)**

<b>County</b>	<b>ARMPA</b>		
	<b>PHMA</b>	<b>GHMA</b>	<b>Total</b>
Eagle	20,900	16,100	37,000
Garfield	24,800	35,900	60,700
Grand	60,700	11,300	72,000
Jackson	137,600	1,100	138,700
Larimer	0	6,700	6,700
Mesa	0	4,500	4,500
Moffat	623,300	542,000	1,165,300
Rio Blanco	36,400	108,800	145,200
Routt	17,100	1,600	18,700
Summit	700	0	700
<b>Total</b>	<b>921,500</b>	<b>728,000</b>	<b>1,649,500</b>

Source: BLM GIS 2012

<sup>1</sup>Does not include subsurface mineral estate

**Table I-4**  
**Acres of GRSG Habitat by BLM District/Field Office in the Decision Area (BLM-Administered Surface Lands Only)**

<b>BLM Field Office</b>	<b>ARMPA</b>		
	<b>PHMA</b>	<b>GHMA</b>	<b>Total</b>
Colorado River Valley Field Office	24,700	40,200	64,900
Grand Junction Field Office	5,600	8,900	14,500
Kremmling Field Office	198,900	18,900	217,800
Little Snake Field Office	570,400	479,700	1,050,100
White River Field Office	122,000	180,200	302,200

Source: BLM GIS 2012

The following BLM RMPs are hereby amended to incorporate appropriate GRSG conservation measures:

- Colorado River Valley RMP (BLM 2015a)
- Grand Junction RMP (BLM 2015b)
- Kremmling RMP (BLM 2015c)
- Little Snake RMP (BLM 2011)
- White River RMP (BLM 1997) and associated amendments, including the White River Oil and Gas Amendment (BLM 2015d)

## **I.2 PURPOSE AND NEED**

The BLM has prepared this ARMPA with an associated environmental impact statement (EIS) to amend RMPs for its field offices and district offices containing GRSG habitat. This planning process is needed to respond to the USFWS's March 2010 "warranted, but precluded" ESA listing decision for GRSG. The USFWS identified the present or threatened destruction, modification, or curtailment of habitat or range and the inadequacy of existing regulatory mechanisms as significant threats. It also identified the principal regulatory mechanisms for the BLM as conservation measures incorporated into LUPs.

The purpose of the ARMPA is to identify and incorporate appropriate measures in existing LUPs to conserve, enhance, and restore GRSG habitat by avoiding, minimizing, or compensating for unavoidable impacts on GRSG habitat in the context of the BLM's multiple use and sustained yield mission under FLPMA. Changes in management of GRSG habitats are necessary to avoid the continued decline of populations across the species' range. This ARMPA focuses on areas affected by threats to GRSG habitat identified by the USFWS in the March 2010 listing decision and in the USFWS 2013 COT report.

The major threats to GRSG and GRSG habitat on BLM-administered lands in the northwest Colorado sub-region are the following:

- Fluid mineral development—fragmentation of GRSG habitat due to mineral exploration and development
- Infrastructure—fragmentation of GRSG habitat due to development, such as rights-of-way (ROWs) and renewable energy development
- Grazing—loss of habitat components due to improper livestock grazing
- Wildfire—loss of large areas of GRSG habitat due to wildfire
- Invasive species—conversion of GRSG habitat to cheatgrass-dominated plant communities

Because the BLM administers a large portion of GRSG habitat in the affected states, changes in GRSG habitat management are anticipated to have a considerable beneficial impact on present and future GRSG populations.

## **I.3 NORTHWEST COLORADO SUB-REGIONAL GRSG CONSERVATION SUMMARY**

The ARMPA identifies and incorporates measures to conserve, enhance, and restore GRSG habitat by avoiding, minimizing, and compensating for unavoidable impacts of threats to GRSG habitat. The ARMPA

addresses threats to GRSG and its habitat identified by the GRSG National Technical Team (NTT) (2011), by the USFWS in the March 2010 listing decision. It also addresses threats described in the USFWS's 2013 COT report, in which the USFWS identified threats to GRSG by population across the range and stated whether that threat is present and widespread, present but localized, or unknown for that specific population.

**Table I-5** identifies the GRSG populations and the threats identified in the COT contained within the Northwest Colorado Sub-region.

**Table I-5**  
**Threats to GRSG in the Northwest Colorado Sub-region, as Identified by the COT**

<b>GRSG Identified Populations in Colorado from the COT Report Applicable to the Northwest Colorado Sub-region</b>	<b>Population Number</b>	<b>Isolated Small Size</b>	<b>Sagebrush Elimination</b>	<b>Agriculture Conversion</b>	<b>Fire</b>	<b>Conifers</b>	<b>Weeds/Annual Grasses</b>	<b>Energy</b>	<b>Mining</b>	<b>Infrastructure</b>	<b>Improper Grazing</b>	<b>Free-Roaming Equids</b>	<b>Recreation</b>	<b>Urbanization</b>
Eagle-South Routt)	5	Y	L	Y	L	L	Y	Y		Y	Y		L	Y
Middle Park	6	Y	Y	Y	Y		Y	Y	Y	Y	Y		Y	Y
North Park	9d		Y	Y	Y		Y	Y	Y	Y	Y		Y	Y
Northwest Colorado	9e		L	Y	Y	L	Y	Y	Y	Y	Y	L	Y	L
Parachute-Piceance-Roan Basin	34	Y	L		Y	Y	L	Y	Y	Y	Y	Y		
Meeker-White River	35	Y	Y	Y	Y		L	Y	Y	Y	Y			Y

Source: USFWS 2013

Threats are characterized as Y = threat is present and widespread, L = threat present but localized, and U = unknown.

**Table I-6** provides a crosswalk as to how the ARMPA for the Northwest Colorado Sub-region addresses the threats from the COT report.

The ARMPA also identifies and incorporates measures for other uses and resources that are designed to conserve, enhance, and restore GRSG habitat. Specifically, the ARMPA requires the following summarized management decisions, subject to valid existing rights:

- Requiring specific design features for certain land and realty uses
- Implementing the disturbance cap to limit disturbance in PHMA
- Including GRSG habitat objectives in land health standards.
- Adjusting grazing practices as necessary, based on GRSG habitat objectives, land health standards, and ecological site potential

**Table I-6  
Key Components of the Northwest Colorado GRSG ARMPA Addressing COT Report  
Threats**

<b>Threats to GRSG and its Habitat (from COT Report)</b>	<b>Key Component of the Northwest Colorado ARMPA</b>
All threats	<ul style="list-style-type: none"> <li>• Implement the adaptive management plan, which allows for more restrictive land use allocations and management actions to be implemented if habitat or population hard triggers are met</li> <li>• Require and ensure mitigation that provides a net conservation gain to GRSG for actions that result in habitat loss and degradation</li> <li>• Monitor implementation and effectiveness of conservation measures in GRSG habitats according to the habitat assessment framework</li> </ul>
All development threats, including mining, infrastructure, and energy development	<ul style="list-style-type: none"> <li>• PHMA—Implement the disturbance cap, which provides a human disturbance cap of 3 percent within the biologically significant unit (BSU)</li> <li>• PHMA—Implement a density cap of an average of 1 energy and mining facility per 640 acres</li> <li>• Apply buffers necessary based on project type and location to address impacts on leks when authorizing actions in GRSG habitat</li> <li>• Apply required design features (RDFs) when authorizing actions in GRSG habitat</li> <li>• Minimize effects of infrastructure projects, including siting, using the best available science, updated as monitoring information on current infrastructure projects becomes available</li> </ul>
Energy development—fluid minerals, including geothermal resources	<ul style="list-style-type: none"> <li>• PHMA—Closed to fluid mineral leasing within 1 mile of active leks; open to fluid mineral leasing subject to no surface occupancy (NSO) stipulation without waiver or modification and with limited exception</li> <li>• GHMA—Closed to fluid mineral leasing within 1 mile of active leks; open to fluid mineral leasing subject to NSO with waiver, modification, or exception within 2 miles of active leks; open to fluid mineral leasing subject to timing limitation (TL) stipulations</li> <li>• Prioritize the leasing and development of fluid mineral resources outside of GRSG habitat</li> </ul>
Energy development—wind energy	<ul style="list-style-type: none"> <li>• PHMA—Exclusion area (not available for wind energy development under any conditions)</li> <li>• GHMA—Avoidance area (may be available for wind energy development with special stipulations)</li> </ul>
Energy development—solar energy	<ul style="list-style-type: none"> <li>• PHMA—Exclusion area (not available for solar energy development under any conditions)</li> <li>• GHMA—Exclusion area (not available for solar energy development under any conditions)</li> </ul>
Infrastructure—major ROWs	<ul style="list-style-type: none"> <li>• PHMA—Avoidance area (may be available for major ROWs with special stipulations)</li> <li>• GHMA—Avoidance area (may be available for major ROWs with special stipulations)</li> </ul>

**Table I-6  
Key Components of the Northwest Colorado GRSG ARMPA Addressing COT Report  
Threats**

<b>Threats to GRSG and its Habitat (from COT Report)</b>	<b>Key Component of the Northwest Colorado ARMPA</b>
Infrastructure—minor ROWs	<ul style="list-style-type: none"> <li>• PHMA—Avoidance area (may be available for minor ROWs with special stipulations)</li> <li>• GHMA—Avoidance area (may be available for minor ROWs with special stipulations)</li> </ul>
Mining—locatable minerals	<ul style="list-style-type: none"> <li>• PHMA—Apply RDFs to locatable minerals consistent with applicable law.</li> </ul>
Mining—nonenergy leasable minerals	<ul style="list-style-type: none"> <li>• PHMA—Closed area (not available for nonenergy leasable minerals)</li> </ul>
Mining—salable minerals	<ul style="list-style-type: none"> <li>• PHMA—Closed area (not available for salable minerals) with a limited exception (may remain open to free use permits and expansion of existing active pits if criteria are met)</li> </ul>
Mining—coal	<ul style="list-style-type: none"> <li>• PHMA is essential habitat for GRSG for purposes of the suitability criteria set forth at 43 Code of Federal Regulations (CFR), Part 3461.5(o)(1).</li> </ul>
Improper Livestock grazing	<ul style="list-style-type: none"> <li>• Prioritize the review and processing of grazing permits and leases in PHMA</li> <li>• Include in National Environmental Policy Act of 1969 (NEPA) analysis for renewals and modifications of grazing permits and leases specific management thresholds, based on the GRSG habitat objectives table land health standards and ecological site potential, to allow adjustments to grazing that have already been subjected to NEPA analysis</li> </ul>
Free-roaming equid (wild horses and burros) management	<ul style="list-style-type: none"> <li>• Manage herd management areas (HMAs) in GRSG habitat within established appropriate management level ranges to achieve and maintain GRSG habitat objectives</li> <li>• Prioritize rangeland health assessment, gathers and population growth suppression techniques, monitoring, and review and adjustment of appropriate management levels and preparation of HMA plans in GRSG habitat</li> </ul>
Range management structures	<ul style="list-style-type: none"> <li>• Allow range improvements that do not impact GRSG or that provide a conservation benefit to GRSG, such as fences for protecting important seasonal habitats</li> </ul>
Recreation	<ul style="list-style-type: none"> <li>• Allow special recreation permits only if their impacts on GRSG and its habitat are neutral or result in a net conservation gain</li> </ul>
Fire	<ul style="list-style-type: none"> <li>• Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection</li> <li>• Prioritize post-fire treatments in PHMA and GHMA</li> </ul>
Nonnative, invasive plant species	<ul style="list-style-type: none"> <li>• Improve GRSG habitat by treating annual grasses</li> <li>• Treat sites in PHMA and GHMA that contain invasive species infestations through integrated pest management</li> </ul>

**Table I-6  
Key Components of the Northwest Colorado GRSG ARMPA Addressing COT Report  
Threats**

<b>Threats to GRSG and its Habitat (from COT Report)</b>	<b>Key Component of the Northwest Colorado ARMPA</b>
Sagebrush removal	<ul style="list-style-type: none"> <li>• PHMA—Maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions</li> <li>• Ensure that all BLM use authorizations contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives for GRSG</li> </ul>
Pinyon and juniper expansion	<ul style="list-style-type: none"> <li>• Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values, prioritizing occupied GRSG habitat</li> </ul>
Agricultural conversion and exurban development	<ul style="list-style-type: none"> <li>• PHMA—Retain under federal management</li> </ul>

The ARMPA also establishes screening criteria and conditions for new human activities in PHMA and GHMA to ensure a net conservation gain to GRSG. The ARMPA would reduce habitat disturbance and fragmentation by limiting surface-disturbing activities, while addressing changes in resource condition and use through monitoring and adaptive management.

For a full description of the BLM’s ARMPA, see **Section 2**.

#### **I.4 PLANNING CRITERIA**

Planning criteria are based on appropriate laws, regulations, BLM manual and handbook sections, and policy directives. It is also based on public participation and coordination with cooperating agencies, other federal agencies and state and local governments, and Native American tribes. Planning criteria are the standards, rules, and factors used as a framework to resolve issues and develop alternatives. Planning criteria are prepared to ensure decision-making is tailored to the issues and to ensure that the BLM avoid unnecessary data collection and analysis. Preliminary planning criteria were included in the Draft RMP Amendment/Draft EIS and were further refined for the Proposed RMP Amendment/Final EIS.

Planning criteria carried forward for this ARMPA are as follows:

- The BLM used the Western Association of Fish and Wildlife Agencies (WAFWA) Conservation Assessment of GRSG and Sagebrush Habitats (Connelly et al. 2004; Coates and Delehanty 2004, 2008, 2010) and any other appropriate resources to identify GRSG habitat requirements and RDFs.
- The ARMPA is consistent with the BLM’s 2011 National GRSG Conservation Strategy.
- The ARMPA complies with BLM direction, such as FLPMA, NEPA, and Council on Environmental Quality regulations at 40 CFR, Parts 1500-1508; US Department of the Interior regulations at 43 CFR, Parts 4 and 1600; the BLM H-1601-1 Land Use Planning Handbook, “Appendix C: Program-Specific and Resource-Specific Decision Guidance

- Requirements,” for affected resource programs (BLM 2005); the 2008 BLM NEPA Handbook (H-1790-1; BLM 2008); and all other applicable BLM policies and guidance.
- The ARMPA is limited to providing direction specific to conserving GRSG species and habitats.
  - The BLM considered land allocations and prescriptive standards to conserve GRSG and its habitat, as well as objectives and management actions to restore, enhance, and improve GRSG habitat.
  - The ARMPA recognizes valid existing rights.
  - The ARMPA addresses BLM-administered land in GRSG habitats, including surface and split-estate lands with BLM subsurface mineral rights. Any decisions in the ARMPA apply only to BLM-administered lands.
  - The BLM used a collaborative and multi-jurisdictional approach, where appropriate, to determine the desired future condition of BLM-administered lands for conserving GRSG and their habitats.
  - As described by law and policy, the BLM ensured that conservation measures are as consistent as possible with other planning jurisdictions within the planning area boundaries.
  - The BLM considered a range of reasonable alternatives, including appropriate management prescriptions that focus on the relative values of resources, while contributing to the conservation of the GRSG and GRSG habitat.
  - The BLM addressed socioeconomic impacts of the alternatives. It used such tools as the input-output quantitative models Impact Analysis for Planning and the National Renewable Energy Laboratory’s Jobs and Economic Development Impact model for renewable energy analysis, where quantitative data was available.
  - The BLM used the best available scientific information, research, technologies, and results of inventory, monitoring, and coordination to inform appropriate local and regional management strategies that will enhance or restore GRSG habitats.
  - The BLM is consistent with the objectives in BLM Manual 6840 which are to preserve the ecosystem that species depend on and to initiate proactive conservation measures that minimize listing the species under the ESA.
  - Management of GRSG habitat that intersects with designated wilderness areas on BLM-administered lands is guided by BLM Manual 6340, Management of Designated Wilderness Areas. Land use allocations made for GRSG are consistent with BLM Manual 6340 and other laws, regulations, and policies related to wilderness area management.
  - Management of GRSG habitat that intersects with National Conservation Areas on BLM-administered lands is guided by BLM Manual 6220, Management of National Conservation Areas. Land use allocations made for GRSG are consistent with BLM Manual 6220; other laws, regulations, and policies related to areas on BLM-administered lands are guided by BLM Manual 6220, Management of National Conservation Area management.
  - Management of GRSG habitat that intersects with eligible, suitable, or designated wild and scenic rivers are guided by BLM Manual 6400, Wild and Scenic Rivers—Policy and Program

Direction for Identification, Evaluation, Planning, and Management. Land use allocations made for GRSG are consistent with BLM Manual 6400 and other laws, regulations, and policies related to wild and scenic rivers management.

- Management of GRSG habitat that intersects with National Historic Trails or trails under study for possible designation (study trails) are guided by BLM Manual 6280, Management of National Scenic and Historic Trails and Trails Under Study or Recommended as Suitable for Congressional Designation. Land use allocations made for GRSG are consistent with BLM Manual 6280 and other laws, regulations, and policies related to National Historic Trail management.
- Management of GRSG habitat that intersects with lands with wilderness characteristics on BLM-administered lands is guided by BLM Manuals 6310 and 6320, Conducting Wilderness Characteristics Inventory on BLM Lands and Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process. Land use allocations made for GRSG are consistent with BLM Manuals 6310 and 6320 and other laws, regulations, and policies related to lands with wilderness characteristics management.
- Management of GRSG habitat that intersects with wilderness study areas on BLM-administered lands are guided by the Manual 6330, Management of Wilderness Study Areas. Land use allocations made for wilderness study areas are consistent with Manual 6330 and with other laws, regulations, and policies related to wilderness study area management.
- For BLM-administered lands, all activities and uses in GRSG habitats have followed existing land health standards. Standards and guidelines for livestock grazing and other programs that have developed standards and guidelines are applicable to all alternatives for BLM-administered lands. For National Forest System lands, all activities in GRSG habitat will achieve the GRSG habitat objectives.
- The BLM has consulted with Native American tribes to identify sites, areas, and objects important to their cultural and religious heritage in GRSG habitats.
- The BLM has coordinated and communicated with state, local, and tribal governments to ensure that the BLM considered providing pertinent plans, sought to resolve inconsistencies between state, local, and tribal plans, and provided ample opportunities for state, local, and tribal governments to comment on the development of amendments.
- The ARMPA has incorporated the principles of adaptive management.
- Reasonably foreseeable development scenarios (RDFs) and planning for fluid minerals follow the BLM Handbook H-1624-1 and current fluid minerals manual guidance (oil and gas, coal bed methane, and oil shale) and geothermal resources (BLM 1990).
- Data used in developing the ARMPA are consistent with the principles of the Information Quality Act of 2000 (Public Law 106-554, Section 515); state data was used as the basis for PHMA and GHMA identification.
- State fish and wildlife agencies' GRSG data and expertise have been considered in making management determinations on BLM-administered lands.

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

# CHAPTER 2

## APPROVED RESOURCE MANAGEMENT PLAN AMENDMENT

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### 2.1 APPROVED RESOURCE MANAGEMENT PLAN AMENDMENT INSTRUCTIONS

This ARMPA is now the baseline plan for managing GRSG in northwest Colorado in the following Field Offices: Colorado River Valley, Grand Junction, Kremmling, Little Snake, and White River. The ARMPA adopts the management described in the Northwest Colorado Greater Sage-Grouse Proposed Resource Management Plan Amendment and Final EIS (BLM and Forest Service 2015), with modifications and clarifications as described in the *Modifications and Clarifications* section of the record of decision (ROD).

In the event there are inconsistencies or discrepancies between previously approved RMPs and this ARMPA, the decisions contained in this ARMPA will be followed, unless there are more restrictive decisions in the existing plans. The BLM will continue to tier to statewide, national, and programmatic EISs and other NEPA and planning documents. It will consider and apply RDFs or other management protocols contained in other planning documents after appropriate site-specific analysis.

All future resource authorizations and actions in GRSG habitat will conform to or be consistent with the decisions contained in this ARMPA. All existing operations and activities authorized under permits, contracts, cooperative agreements, or other authorizations will be modified, as necessary and appropriate, to conform to this plan amendment within a reasonable time frame. However, this ARMPA does not repeal valid existing rights on public lands. These are claims or authorizations that take precedence over the decisions developed in this plan. If such authorizations come up for review and can be modified, they will also be brought into conformance with this plan amendment, as appropriate.

While the Final EIS for the Northwest Colorado Proposed GRSG RMP Amendment constitutes compliance with NEPA for the broad-scale decisions made in this ARMPA, the BLM will continue to prepare environmental assessments and EISs where appropriate as part of implementation-level planning and decision-making.

## 2.2 GOALS, OBJECTIVES, AND MANAGEMENT DECISIONS

This section of the ARMPA presents the goals, objectives, land use allocations, and management actions established for protecting and preserving GRSG and its habitat on BLM-administered lands in Northwest Colorado. These management decisions are presented by program area. Not all types of decisions were identified for each program. A *Monitoring Framework* is also included (in **Appendix D**) to describe how the implemented program decisions will be monitored.

This section is organized by program area beginning with the special status species program, which identifies specific goals, objectives, and management actions for GRSG and its habitat. For ease of identification into the future, each program area has identified abbreviations (see below) for these program areas and each decision in that program is numbered in coordination with the abbreviation:

- Special Status Species (**SSS**)
- Vegetation (**VEG**)
  - Sagebrush Steppe
  - Conifer Encroachment
  - Invasive Species
  - Riparian and Wetlands
- Fire and Fuels Management (**FIRE**)
  - Pre-Suppression
  - Suppression
  - Fuels Management
  - Post-Fire Management
- Range Management (**RM**)
- Wild Horses and Burros (**WHB**)
- Minerals (**MR**)
  - Leasable Minerals
  - Locatable Minerals
  - Salable Minerals
  - Nonenergy Leasable Minerals
  - Coal
- Renewable Energy (Wind and Solar) (**RE**)
- Lands and Realty (**LR**)
  - Utility Corridors and Communication Sites
  - Land Use Authorizations
  - Land Tenure

## – Recommended Withdrawals

- Recreation **(REC)**
- Travel and Transportation **(TTM)**

**Table 2-1** is a summary of the allocation decisions presented for each GRSG habitat management area.

**Table 2-1**  
**Summary of Allocation Decisions by GRSG Habitat Management Areas**

<b>Resource</b>	<b>PHMA</b>	<b>GHMA</b>	<b>LCHMA</b>
Land Tenure	Retain		
Solar	Exclusion	Avoidance	Open
Wind	Exclusion	Avoidance	Open
Major ROWs	Avoidance	Avoidance	Open
Minor ROWs	Avoidance	Avoidance	Open
Oil and Gas	Closed within 1 mile of active leks Remainder of PHMA Open with Major Stipulations	Closed within 1 mile of active leks Open with Major Stipulations within 2 miles of active leks Remainder of GHMA Open with Standard Stipulations	Open with Standard Stipulations
Nonenergy Leasables	Closed	Open	Open
Salable Minerals	Closed	Open	Open
Locatable Minerals	Open	Open	Open
Travel Management	Limited	Limited	Limited
Livestock Grazing	Open	Open	Open

### 2.2.1 Special Status Species (SSS)

**Objective SSS-1:** Maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain GRSG populations.

#### *Management Decisions (MD)*

**MD SSS-1: Adaptive Management:** Implement Adaptive Management Plan including soft and hard triggers as described in **Appendix H** (Guidelines for Implementation and Adaptive Management). The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.

**MD SSS-2:** In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review ([Open File Report 2014-1239](#)) in accordance with **Appendix B**.

**MD SSS-3:** In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and

degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.

## 2.2.2 Vegetation (VEG)

### **Sagebrush Steppe (Habitat Restoration)**

**Objective VEG-1:** (1) Use habitat restoration as a tool to create and/or maintain landscapes that benefit GRSG; (2) Use Integrated Vegetation Management to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2; and (3) In PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6).

#### *Management Decisions (MD)*

**MD VEG-1:** (ADH) When planning restoration treatments in GRSG habitat, identify seasonal habitat availability, and prioritize treatments in areas that are thought to be limiting GRSG distribution and/or abundance.

The habitat objectives for GRSG (**Table 2-2**) are a list of indicators and values that describe GRSG seasonal habitat conditions. The values for the indicators were derived using a synthesis of current local and regional GRSG habitat research and data and reflect variability of ecological sites. The habitat cover indicators are consistent with existing indicators used by the BLM.

**Table 2-2**  
**Seasonal Habitat Desired Conditions for GRSG**

Attribute	Indicators	Desired Condition
<b>BREEDING AND NESTING</b> <sup>1,2,3</sup> (Seasonal Use Period March 1-June 15) Apply 4 miles from active leks. <sup>15</sup>		
Lek Security	Proximity of trees <sup>4</sup>	Trees or other tall structures are none to uncommon within 1.86 miles of leks <sup>5,6</sup>
	Proximity of sagebrush to leks <sup>5</sup>	Adjacent protective sagebrush cover within 328 feet of lek <sup>5</sup>
Cover	Seasonal habitat extent <sup>6</sup>	>80% of the breeding and nesting habitat
	Sagebrush canopy cover <sup>5,6,7,17</sup> Arid sites Mesic sites	15 to 30% 20 to 30% <sup>17</sup>
	Sagebrush height <sup>6,17</sup> Arid sites <sup>5,6,9</sup> Mesic sites <sup>5,6,10</sup>	11.8 to 31.5 inches (30-80 cm) 15.7 to 31.5 inches (40-80 cm)
	Predominant sagebrush shape <sup>5</sup>	>50% in spreading <sup>11</sup>
	Perennial grass canopy cover (such as native bunchgrasses) <sup>5,6,17</sup> Arid sites <sup>6,9</sup> Mesic sites <sup>6,10,17</sup>	≥10% ≥20% <sup>17</sup>
	Perennial grass and forb height (includes residual grasses) <sup>5,6,7</sup>	>6 inches <sup>6,16,17</sup>

**Table 2-2**  
**Seasonal Habitat Desired Conditions for GRSG**

Attribute	Indicators	Desired Condition
	Perennial forb canopy cover <sup>5,6,7</sup> Arid sites <sup>9</sup> Mesic sites <sup>10</sup>	≥5% <sup>5,6,17</sup> ≥15% <sup>5,6,17</sup>
<b>BROOD-REARING/SUMMER<sup>1</sup> (Seasonal Use Period June 16-October 31)</b>		
Cover	Seasonal habitat extent <sup>6</sup>	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover <sup>5,6,7,17</sup> Arid sites Mesic sites	10 to 25% 10 to 25%
	Sagebrush height <sup>6,7,17</sup> Arid sites Mesic sites	11.8 to 31.5 inches (30 to 80 cm) 13.8 to 31.5 inches (35 to 80 cm)
	Perennial grass canopy cover and forbs <sup>6,7,17</sup> Arid sites Mesic sites	>15% <sup>17</sup> >25% <sup>17</sup>
	Riparian areas (both lentic and lotic systems)	Proper Functioning Condition <sup>13</sup>
	Upland and riparian perennial forb availability <sup>5,6</sup>	Preferred forbs are common with several preferred species present <sup>12</sup>
<b>WINTER<sup>1</sup> (Seasonal Use Period November 1-February 28)</b>		
Cover and Food	Seasonal habitat extent <sup>5,6,7</sup>	>80% of the winter habitat
	Sagebrush canopy cover above snow <sup>5,6,7,17</sup>	>20% Arid, 25% Mesic <sup>17</sup>
	Sagebrush height above snow <sup>5,6,7</sup>	>10 inches <sup>14</sup>

<sup>1</sup> Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.

<sup>2</sup> Doherty 2008

<sup>3</sup> Holloran and Anderson 2005.

<sup>4</sup> Baruch-Mordo et al. 2013

<sup>5</sup> Stiver et. al. 2014

<sup>6</sup> Connelly et al. 2000

<sup>7</sup> Connelly et al. 2003

<sup>9</sup> 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).

<sup>10</sup> ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).

<sup>11</sup> Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree or columnar shaped (Stiver et. al. 2014).

<sup>12</sup> Preferred forbs are listed in Habitat Assessment Framework Table III-2 (Stiver et. al. 2014). Overall, total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.

<sup>13</sup> Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting GRSG habitat requirements.

<sup>14</sup> The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

<sup>15</sup> Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.

<sup>16</sup> Measured as “droop height”; the highest naturally growing portion of the plant.

<sup>17</sup> Colorado Greater Sage-grouse Steering Committee 2008

When determining if a site is meeting habitat objectives, the measurements from that particular site would be assessed based on the range of values for the indicators in **Table 2-2**. **Table 2-2** is one component of GRSG multi-scale habitat assessment (see **Appendix D**, Greater Sage-Grouse Monitoring Framework). The results of the habitat assessment would be used during the land health evaluation to ascertain if the land health standard applicable to GRSG habitat (e.g., special status species habitat standard) is being met.

When authorizing activities in GRSG habitat, the BLM would consider if habitat objectives are being achieved. If the habitat objectives are not being achieved, and the site has the potential for achieving these objectives, the BLM would determine the causal factor(s) and make the necessary management adjustments to address the causal factor(s), following current BLM regulations and policy.

**MD VEG-2:** (PHMA) Include GRSG habitat parameters as defined by Connelly et al. (2000), Hagen et al. (2007), or, if available, state GRSG conservation plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within GRSG PHMA areas a high restoration priority.

**MD VEG-3:** (ADH) Require use of native plant seeds that are beneficial for GRSG for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where probability of success or native seed availability is low, use species that meet soil stability and hydrologic function objectives as well as vegetation and GRSG habitat objectives (Pyke 2011).

**MD VEG-4:** (PHMA) Design post restoration management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses, to achieve and maintain the desired condition of emergency stabilization and rehabilitation (ESR) projects to benefit GRSG (Eiswerth and Shonkwiler 2006).

**MD VEG-5:** (ADH) Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that would adversely affect GRSG populations.

**MD VEG-6:** (ADH) Make reestablishment of sagebrush and desirable understory plant cover (relative to ecological site potential) the highest priority for restoration efforts. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption.

**MD VEG-7:** (ADH) Authorize local sagebrush seed collection to support local restoration efforts.

**MD VEG-8:** (ADH) Treat areas that contain *Bromus tectorum* and other invasive or noxious species to minimize competition and favor establishment of desired species.

### **Conifer Encroachment**

**MD VEG-8:** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those

included in the Fire and Invasives Assessment Team report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. See **Appendix H**, Guidelines for Implementation and Adaptive Management.

### 2.2.3 Fire and Fuels Management (FIRE)

#### **Suppression (Fire Operations)**

**Objective FIRE-1:** Manage fire to maintain and enhance large blocks of contiguous sagebrush.

#### *Management Decisions (MD)*

**MD FIRE-1:** (PHMA) The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Consider GRSG habitat requirements commensurate with all resource values at risk managed by the BLM.

**MD FIRE-2:** (GHMA) The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Consider GRSG habitat requirements commensurate with all resource values at risk managed by the BLM.

**MD FIRE-3:** (PHMA/GHMA) Temporary closures would be considered in accordance with 43 CFR subparts 8364, 8351, 6302 and 8341. Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas

#### **Fuels Management**

**Objective FIRE-2:** Manage the fuels program to avoid GRSG habitat loss and restore damaged habitat.

**MD FIRE-4:** (PHMA) Do not reduce sagebrush canopy cover to less than 15 percent (Connelly et al. 2000; Hagen et al. 2007) in a project area unless a vegetation management objective requires additional reduction in sagebrush cover to meet strategic protection of GRSG PHMA and conserve habitat quality for the species, in consultation with the State of Colorado.

**MD FIRE-5:** (PHMA) Apply appropriate seasonal restrictions for implementing vegetation management treatments according to the type of seasonal habitats present in a Colorado management zone (MZ).

**MD FIRE-6:** (PHMA) Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality, unless in consultation with the State of Colorado it is deemed necessary to reduce risk to life and property.

**MD FIRE-7:** (ADH) Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species) (Connelly et al. 2000; Hagen et al. 2007; Beck et al. 2009). However, if as a last resort and after all other treatment opportunities have been explored, and site-specific variables allow, the use of prescribed fire or natural ignition fire for fuels breaks that would disrupt fuel continuity or enhance land health could be considered where cheatgrass is deemed a minor threat.

If prescribed fire is used in GRSG habitat, the NEPA analysis for the burn plan will address:

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

Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect GRSG habitat in PHMA (e.g., creating fuel designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer-reduction treatments, or being used as a component with other treatment methods to combat annual grasses and restore native plant communities).

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

**MD FIRE-8:** (ADH) Monitor and control invasive vegetation post treatment.

**MD FIRE-9:** (ADH) Require use of native plant seeds for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where probability of success or native seed availability is low, use species that meet soil stability and hydrologic function objectives as well as vegetation and GRSG habitat objectives (Pyke 2011).

**MD FIRE-10:** (PHMA) Design post fuels management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses, to achieve and maintain the desired condition of ESR projects to benefit GRSG (Eiswerth and Shonkwiler 2006).

**MD FIRE-11:** (ADH) Design vegetation treatments in GRSG habitats to strategically facilitate firefighter safety, reduce wildfire threats, and extreme fire behavior. This may involve spatially arranging new vegetation treatments with past treatments, vegetation with fire-resistant serial stages, natural barriers, and roads in order to constrain fire spread and growth. This may require vegetation treatments to be implemented in a more linear versus block design (Launchbaugh et al. 2007).

**MD FIRE-12:** (PHMA) During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels (Diamond et al. 2009), and implement grazing management that will accomplish this objective (Davies et al. 2011; Launchbaugh et al. 2007). Consult with ecologists to minimize impacts to native perennial grasses consistent with the objectives and conservation measures of the grazing section.

### **Post-Fire Management (Emergency Stabilization and Rehabilitation)**

**Objective FIRE-3:** Use ESR to address post-wildfire threats to GRSG habitat.

#### *Management Decisions (MD)*

**MD FIRE-13:** (ADH) Require use of native plant seeds that are beneficial for GRSG for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where attempts to use native seeds have failed, or native seed availability is low, use species that meet soil stability and hydrologic function objectives, as well as vegetation and GRSG habitat objectives (Pyke 2011).

**MD FIRE-14:** (ADH) Design post-fire ESR and Burn Area Emergency Rehabilitation management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses to achieve and maintain the desired condition of ESR and Burn Area Emergency Rehabilitation projects to benefit GRSG (Eiswerth and Shonkwiler 2006).

**MD FIRE-15:** (ADH) Rest burned areas from grazing for two full growing seasons unless vegetation recovery dictates otherwise (Wyoming Game and Fish Department 2011).

### **2.2.4 Range Management (RM)**

**Objective RM-1:** GRSG objectives and well-managed livestock operations are compatible because forage availability for livestock and hiding cover for GRSG are both dependent on healthy plant communities. Agreements with partners that promote sustainable GRSG populations concurrent with sustainable ranch operations offer long-term stability. In the context of sustainable range operations, manage the range program to: 1) maintain or enhance vigorous and productive plant communities; 2) maintain residual herbaceous cover to reduce predation during GRSG nesting and early brood-rearing; 3) avoid direct adverse impacts to GRSG-associated range project infrastructure; and 4) employ grazing management strategies that avoid concentrating animals on key GRSG habitats during key seasons.

#### *Management Decisions (MD)*

**MD RM-1:** (ADH) Within ADH, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through Allotment Management Plans.

**MD RM-2:** (ADH) Work cooperatively on integrated ranch planning within GRSG habitat. Develop management strategies that are seamless with respect to actions on public and private lands within BLM grazing allotments.

**MD RM-3:** (PHMA) The BLM will prioritize:

1. the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and
2. the processing of grazing permits/leases in PHMA.

In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.

**MD RM-4:** (ADH) Conduct land health assessments that include (at a minimum) indicators and measurements of vegetation structure/condition/composition specific to achieving GRSG habitat objectives (Doherty et al. 2011). If local/state seasonal habitat objectives are not available, use GRSG habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007.

#### Implementing Management Actions after Land Health and Habitat Evaluations

**MD RM-5:** (ADH) Develop specific objectives—through NEPA analysis conducted in accordance with the permit/lease renewal process—to conserve, enhance, or restore GRSG habitat. Base benchmarks on Ecological Site/Range Site Descriptions. When existing on Ecological Site/Range Site Descriptions have not been developed, or are too general to serve adequately as benchmarks, identify and document local reference sites for areas of similar potential that exemplify achievement of GRSG habitat objectives and use these sites as the benchmark reference. Establish measurable objectives related to GRSG habitat from baseline monitoring data, ecological site descriptions, or land health assessments/evaluations, or other habitat and successional stage objectives.

**MD RM-6:** (ADH) Manage for vegetation composition and structure consistent with ecological site potential and within the reference state subject to habitat objectives, including successional stages.

**MD RM-7:** (ADH) Include terms and conditions on grazing permits and leases that address disruptive activities that affect GRSG and assure plant growth requirements are met and residual forage remains available for GRSG hiding cover.

Specify as necessary:

1. Season or timing of use
2. Numbers of livestock (include temporary non-use or livestock removal)
3. Distributions of livestock use
4. Intensity of use (utilization or stubble height objectives)
5. Kind of livestock (e.g., cattle, sheep, horse, llama, alpaca, and goat)

6. Class of livestock (e.g., yearlings versus cow/calf pairs)
7. Locations of bed grounds, sheep camps, trail routes, and the like

**MD RM-8:** (ADH) Develop drought contingency plans at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Plans shall establish policy for addressing ongoing drought and post-drought recovery for GRSG habitat objectives.

**MD RM-9:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA would include specific management thresholds based on Table 2.3 in the Proposed Plan, Land Health Standards (43 CFR, Part 4180.2), ecological site potential, and one or more defined responses that would allow the authorizing officer to make adjustments to livestock grazing that have already been subject to NEPA analysis.

**MD RM-10:** Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, would be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.

#### ***Riparian Areas and Wet Meadows***

**MD RM-11:** (ADH) Manage riparian areas and wet meadows for proper functioning condition within ADH.

**MD RM-12:** (ADH) Within ADH, manage wet meadows to maintain diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state).

**MD RM-13:** (ADH) Establish permit/lease terms and conditions in conjunction with grazing strategies to ensure that the timing and level of utilization results in wet meadows with diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state).

**MD RM-14:** (ADH) Authorize new water development only after determining that the project will not adversely impact GRSG from habitat loss. Ensure that adequate long-term grazing management is in effect before authorizing water developments that may increase levels of use or change season of use. Give specific consideration to adjacent or downstream wetland habitat when a project entails a diversion from a spring or seep.

**MD RM-15:** (ADH) Analyze springs, seeps and associated pipelines to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area. If necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss, modify the project as necessary to restore the applicable wetland habitat.

#### ***Treatments to Increase Forage for Livestock/Wild Ungulates***

**MD RM-16:** (ADH) Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that would adversely affect GRSG populations. See **Appendix H**, Guidelines for Implementation and Adaptive Management.

**MD RM-17:** (PHMA) Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to GRSG PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an Allotment Management Plan/Conservation Plan or if they provide value in conserving or enhancing the rest of PHMA, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments (Davies et al. 2011).

For example: Some introduced grass seedings are an integral part of a livestock management plan and reduce grazing pressure in important sagebrush habitats or serve as a strategic fuels management area.

### ***Structural Range Improvements and Livestock Management Tools***

**MD RM-18:** (ADH) Design new range improvement projects to enhance livestock distribution and to control the timing and intensity of utilization. Examples of structural range improvement projects are cattle guards, fences, corrals, pipelines, troughs, storage tanks, windmills, ponds/reservoirs, solar panels, and spring developments.

Include a plan to monitor and control invasive plant species following any related ground disturbance. Place mineral or salt supplements away from water sources and leks in locations that enhance livestock distribution.

**MD RM-19:** (PHMA) Where conditions create the potential for impacts from West Nile virus from developments or modification of water developments, use preferred design features (PDFs)/RDFs to mitigate the potential impacts. See **Appendix C** (Required Design Features, Preferred Design Features, and Suggested Design Features).

**MD RM-20:** (PHMA) Evaluate existing structural range improvements to determine if modifications are necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss. Modify, relocate, or remove projects as necessary.

Place mineral and salt supplements away from water sources and leks in locations that enhance livestock distribution.

**MD RM-21:** (ADH) Mark fences in high risk areas (Christiansen 2009; Stevens 2011).

(PHMA) Where marking fences does not reduce fence-related GRSG mortality, modify fences. Where modification does not reduce GRSG mortality and the fence-related mortality is sufficient to adversely affect GRSG populations, remove fences.

**MD RM-22:** (ADH) Monitor for and treat invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007).

### ***Retirement of Grazing Privileges***

**MD RM-23:** (ADH) At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.

When a permittee or lessee voluntarily relinquishes grazing preference, consider conversion of the allotment to a reserve common allotment that will remain available for use on a temporary, nonrenewable basis for the benefit of GRSG habitat. Authorize temporary nonrenewal permits in Reserve Common Allotments to meet resource objectives elsewhere such as rest or deferment due to fire or vegetation treatments. Temporary use of reserve common allotments would not be allowed due to drought or overuse of customary allotments.

### **2.2.5 Wild Horses and Burros (WHB)**

**Objective WHB-1:** Manage wild horses in a manner designed to 1) avoid reductions in grass, forb, and shrub cover, and 2) avoid increasing unpalatable forbs and invasive plants such as *Bromus tectorum*.

#### *Management Decisions (MD)*

**MD WHB-1:** (ADH) Manage wild horse population levels within established appropriate management levels.

**MD WHB-2:** (ADH) Prioritize gathers in GRSG PHMA, unless removals are necessary in other areas to prevent catastrophic environmental issues, including herd health impacts. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption.

**MD WHB-3:** (PHMA) Within PHMA, develop or amend BLM HMA plans to incorporate GRSG habitat objectives and management considerations for all BLM HMAs. When developing HMA plans, apply all appropriate conservation measures from the range program, including, but not limited to, utilization of forage and structural range improvements.

**MD WHB-4:** (PHMA) For all BLM HMAs within PHMA, prioritize the evaluation of all appropriate management levels based on indicators that address vegetation structure/condition/composition and measurements specific to achieving GRSG habitat objectives. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption.

**MD WHB-5:** (ADH) Coordinate with other resources (range, wildlife, and riparian) to conduct land health assessments to determine existing vegetation structure/condition/composition within all BLM HMAs.

**MD WHB-6:** (PHMA) When conducting NEPA analysis for wild horse management activities, water developments, or other rangeland improvements for wild horses in PHMA, address the direct and indirect effects to GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock identified above in PHMA.

## 2.2.6 Minerals (MR)

### *Leasable Fluid Minerals<sup>1</sup>*

**Objective MR-1:** Manage fluid minerals to avoid, minimize, and compensate for: 1) direct disturbance, displacement, or mortality of GRSG; 2) direct loss of habitat or loss of effective habitat through fragmentation; and 3) cumulative landscape-level impacts. Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 US Code 226(p) and 43 CFR, Part 3162.3-1(h).

### *Management Decisions (MD)*

#### Unleased Fluid Minerals

**MD MR-1:** No new leasing 1 mile from active leks in ADH.

**MD MR-2: No Surface Occupancy (NSO)** without waiver or modification in PHMA. See **Appendix G** (Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations) for exceptions. The following stipulation would apply:

**GRSG NSO-46e:** See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations, for waiver, modification, and exception criteria.

**MD MR-3:** In GHMA, any new leases would include **TL** stipulations to protect GRSG and its habitat. The following stipulation would apply:

**GRSG TL-46e:** No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15). Authorized Officer could grant an exception, modification, or waiver in consultation with the State of Colorado (**Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations).

**MD MR-4: No Surface Occupancy (NSO)** within 2 miles of active leks in GHMA. Waivers, exceptions, and modification could be obtained under conditions described in **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.

**MD MR-5:** disturbance on new leases would be limited to 3 percent in PHMA (biologically significant unit) (see **Appendix E**, Methodology for Calculating Disturbance Caps) and would be limited to 1 disturbance per 640 acres calculated by Colorado MZ. The following Lease Notice (LN) would apply:

**GRSG LN-46e:** Any lands leased in PHMA are subject to the restrictions of 1 disturbance per 640 acres calculated by biologically significant unit (Colorado populations) and proposed project analysis area

<sup>1</sup> The Oil Shale and Tar Sands Programmatic EIS (March 2013) excludes from oil shale leasing all core/priority GRSG habitat (PHMA in Colorado). Note that in GHMA, the management actions for fluid minerals also pertain to oil shale resources through all alternatives. Decisions for leasable fluid minerals also apply to uranium.

(Colorado MZ) to allow clustered development (**Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations).

**MD MR-6:** No new leasing in PHMA if disturbance cap exceeds 3 percent calculated by biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) or 1 disturbance per 640 acres density is exceeded (see **Appendix E**, Methodology for Calculating Disturbance Caps).

**MD MR-7:** (PHMA) Allow geophysical exploration within PHMA to obtain information for existing federal fluid mineral leases or areas adjacent to state or fee lands within PHMA. Allow geophysical operations only using helicopter-portable drilling, wheeled or tracked vehicles on existing roads, or other approved methods conducted in accordance with seasonal TLs and other restrictions that may apply. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood-rearing, and winter habitats during their season of use by GRSG.

#### Leased Fluid Minerals

**Objective MR-2:** Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator or project proponent in developing an Application for Permit to Drill for the lease to avoid, minimize, and compensate for impacts to GRSG or its habitat and will ensure that the best information about GRSG and its habitat informs and helps guide development of such federal leases.

**MD MR-8:** Within 1 mile of active leks, disturbance, disruptive activities, and occupancy are precluded.

If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 disturbance per 640 acres and/or the 3 percent disturbance cap (see **Appendix E**, Methodology for Calculating Disturbance Caps), use the **criteria\*** below to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in **Appendix F** (Greater Sage-Grouse Mitigation Strategy).

**MD MR-9:** In PHMA and within 4 miles of an active lek, the **criteria\*** below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG.

**MD MR-10:** Based on site-specific conditions, prohibit construction, drilling, and completion within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15). In consultation with the State of Colorado, this TL may be adjusted based on application of the criteria below.

#### **Criteria\*:**

- Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat

- An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation
- An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines

To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.

**MD MR-11:** Within PHMA, operators would be encouraged to complete Master Development Plans in consultation with the State of Colorado, instead of single-well Applications for Permit to Drill for all but exploratory wells. (Notice to Lessees-54e: see **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.)

**MD MR-12:** When necessary, conduct effective mitigation in 1) GRSG PHMA or—less preferably—2) GHMA (dependent upon the area-specific ability to increase GRSG populations and in consultation with the State of Colorado).

**MD MR-13:** Conduct effective compensatory mitigation first within PHMA in the same Colorado MZ where the impact is realized; if not possible, then conduct mitigation within the same population as the impact, or in other Colorado GRSG populations, in consultation with the State of Colorado.

**MD MR-14:** For future actions in ADH, require a full reclamation bond specific to the site in accordance with 43 CFR, Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation (Connelly et al. 2000; Hagen et al. 2007) that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work.

### ***Locatable Minerals***

**Objective MR-3:** Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.

**MD MR-15:** (PHMA) In plans of operations required prior to any proposed surface-disturbing activities include as appropriate effective mitigation for conservation in accordance with existing policy (BLM Washington Office Instruction Memorandum 2013-142).

**MD MR-16:** (PHMA) Where applicable to prevent unnecessary or undue degradation, apply seasonal restrictions if deemed necessary.

### ***Saleable Minerals***

**Objective MR-4:** Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.

**MD MR-17:** (PHMA) Close PHMA to new mineral material sales. However, these areas would remain open to free use permits and the expansion of existing active pits, only if the following criteria are met:

- The activity is within the biologically significant unit and the project area disturbance cap
- The activity is subject to the provisions set forth in the mitigation strategy (**Appendix F**)
- All applicable required/preferred design features are applied; and [if applicable] the activity is permissible under the regional screening criteria (**Appendix H**, Guidelines for Implementation and Adaptive Management).

**MD MR-18:** (ADH) Restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives. Require reclamation/restoration of GRSG habitat as a viable long-term goal to improve the GRSG habitat (**Appendix H**, Guidelines for Implementation and Adaptive Management)

### ***Nonenergy Leasable Minerals***

**Objective MR-5:** Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.

**MD MR-19:** No new nonenergy mineral leasing in PHMA.

**MD MR-20:** Existing nonenergy mineral leases: Apply the following conservation measures as conditions of approval (COAs) where applicable and feasible:

- Preclude new surface occupancy on existing leases within 1 mile of active leks (Blickley et al. 2012; Harju et al. 2012).
- If the lease is entirely within 1 mile of an active lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (**Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations).
- Preclude new surface disturbance on existing leases within 2 miles of active leks within PHMA. If the lease is entirely within 2 miles of an active lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (**Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations).
- Limit permitted disturbances to 1 disturbance per 640 acres average across the landscape in PHMA. Disturbances may not exceed 3 percent in PHMA (see **Appendix E**, Methodology for Calculating Disturbance Caps) in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ).

**GRSG TL-47-51** – Based on site-specific conditions, prohibit surface occupancy or disturbance within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15).

### ***Mineral Split-Estate***

**Objective MR-6:** Utilize federal authority to protect GRSG habitat on split-estate lands to the extent provided by law.

**MD MR-21:** (PHMA/GHMA) Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in nonfederal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs/PDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.

**MD MR-22:** (PHMA/GHMA) Where the federal government owns the surface and the mineral estate is in nonfederal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs/PDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.

### **Solid Minerals – Coal**

**Objective MR-7:** Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.

**MD MR-23:** (ADH) *Existing Coal Leases:* During the term of the lease, encourage the lessee to voluntarily follow PDFs (**Appendix C**, Required Design Features, Preferred Design Features, and Suggested Design Features) to reduce and mitigate any adverse impacts to GRSG. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is “unsuitable” for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).

To authorize expansion of existing leases, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG based on these criteria:

- Important GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat
- An evaluation of the threats affecting the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation
- An evaluation of terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.

**MD MR-24:** No new surface coal mine leases would be allowed in PHMA. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM would determine whether the lease application area is “unsuitable” for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).

**MD MR-25:** *New Underground Coal Mine Leases would be subject to:* Special Stipulations:

- All surface disturbances will be placed more than 2 miles from active leks.
- No surface disturbance on remainder of PHMA subject to the following conditions:

If, after consultation with the State of Colorado, and in consideration of the following criteria, there is no significant direct disturbance, displacement, or mortality of GRSG or impact to GRSG habitat;

- 3 percent disturbance cap in PHMA with disturbances limited to 1 disturbance per 640 acres density calculated by Colorado MZ and proposed project analysis area would apply to new lease activities
- No new leasing in PHMA if disturbance cap exceeds 3 percent (see **Appendix E**, Methodology for Calculating Disturbance Caps) for the biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) or 1 disturbance per 640 acres is exceeded

**MD MR-26:** (ADH) Underground mining exemption criteria for new leases:

- I. Federal lands with coal deposits that would be mined by underground mining methods shall not be assessed as unsuitable where there would be no surface coal mining operations, as defined in 43 CFR, Part 3400.0-5(mm) of this title, on any lease, if issued.

Where underground mining will include surface operations and surface impacts on federal lands to which a criterion applies, the lands shall be assessed as unsuitable unless the surface management agency find that a relevant exception or exemption applies. See 43 CFR, Part 3461.1(b). Where practicable, limit permitted disturbances as defined in **Appendix H**, Guidelines for Implementation and Adaptive Management, to 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). Where disturbance exceeds 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), make additional, effective mitigation necessary to offset the resulting loss of GRSG habitat.

**MD MR-27:** (PHMA) See 43 CFR, Part 3461.4 (a) and (b), Exploration. Authorized exploration activities may be conducted only if the Authorized Officer reviews any application for an exploration license on such lands to ensure that any exploration does not harm any value for which the area has been assessed as unsuitable and determines that the exploration will not adversely affect GRSG populations due to habitat loss or disruptive activities or that the impact can be fully mitigated. Where practicable, limit permitted disturbances as defined in **Appendix H**, Guidelines for Implementation and Adaptive Management, to 3 percent in PHMA any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). Where disturbance exceeds 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), make additional, effective mitigation necessary to offset the resulting loss of GRSG habitat.

**MD MR-28:** (PHMA) *Underground mining – lease renewals:*

- Require that all surface mining appurtenant facilities for underground mining be located outside of PHMA (unless the lessee establishes that that such location is not technically feasible).
- If surface mining facilities must be located in PHMA, require the facilities be located in areas of existing disturbance and to have the smallest footprint possible utilizing design strategies to minimize disturbance, such as those identified in the PDF section of this table.

- Apply as conditions of lease renewal all appropriate conservation measures, PDFs, and mitigation designed to avoid or minimize impacts to GRSG.

(ADH) *Surface mining – lease renewals/readjustments*: Apply as conditions of lease renewal all appropriate conservation measures, PDFs, and mitigation designed to avoid or minimize impacts to GRSG.

**MD MR-29:** (ADH) Recommend or require as appropriate during all relevant points of the coal leasing and authorization process, minimization of surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on important seasonal GRSG habitats. Apply these measures during activity-level planning (jurisdiction is managed by the State). The Office of Surface Mining or a delegated State Regulatory authority under the Surface Mining Control and Reclamation Act of 1977 authorizes surface-disturbing activities of active coal mining operations on federal mineral estate. The BLM coordinates with the Surface Mining Control and Reclamation Act of 1977 in overseeing coal leasing and permitting on federal lands. The resource recovery and protection plan for which BLM recommends approval to the Secretary integrates the reclamation plan recommended by the Surface Mining Control and Reclamation Act of 1977 for active coal mines on federal mineral estate. Approval of coal mining plans on lands containing leased federal coal is reserved to the Secretary of the Interior (30 CFR, Part 740.4). BLM issues coal leases and exploration licenses for right of entry to promote development of minerals on federal lands. See the following in regards to BLM exploration: 43 CFR, Part 3461.4, Exploration. States with delegated authority on federal lands from the Office of Surface Mining may have their own GRSG guidance in association with state wildlife agencies and such guidance may differ from state to state.

**MD MR-30:** (ADH) (a) Assessment of any area as unsuitable for all or certain stipulated methods of coal mining operations pursuant to Section 522 of the Surface Mining Control and Reclamation Act of 1977 (30 US Code 1272) and the regulations of this subpart does not prohibit exploration of such area under 43 CFR, Parts 3410 and 3480, and 43 CFR, Part 3461.4(a)

**MD MR-31:** (ADH) (b) An application for an exploration license on any lands assessed as unsuitable for all or certain stipulated methods of coal mining shall be reviewed by the BLM to ensure that exploration does not harm any value for which the area has been assessed as unsuitable (43 CFR, Part 3461.4(b))

### 2.2.7 Renewable Energy (Wind and Solar) (RE)

**Objective RE-I:** Manage the Lands and Realty program to avoid, minimize, and compensate for the loss of habitat and habitat connectivity through the authorizations of ROWs, land tenure adjustments, proposed land withdrawals, agreements with partners, and incentive programs.

#### *Wind Energy Development*

**MD RE-1:** (PHMA) Manage PHMA as exclusion areas for wind energy development.

**MD RE-2:** (GHMA) Manage GHMA as avoidance areas for wind energy development.

#### *Industrial Solar Development*

**MD RE-3:** (PHMA) Manage PHMA as exclusion areas for industrial solar projects.

**MD RE-4:** (GHMA) Manage GHMA as avoidance areas for industrial solar projects.

### 2.2.8 Lands and Realty (LR)

**Objective LR-1:** Manage the Lands and Realty program to avoid, minimize, and compensate for the loss of habitat and habitat connectivity through the authorizations of ROWs, land tenure adjustments, proposed land withdrawals, agreements with partners, and incentive programs.

**Objective LR-2:** Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.

#### **Land Use Authorizations**

**MD LR-1:** Manage areas within PHMA as avoidance areas\* for BLM ROW permits. (See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.)

**MD LR-2:** Manage areas within GHMA as avoidance areas\* for major (transmission lines greater than 100 kilovolts and pipelines greater than 24 inches) and minor BLM ROW permits. (See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.)

**MD LR-3:** No new roads or above-ground structures would be authorized within 1 mile of an active lek.

Above-ground structures are defined as structures that are located on or above the surface of the ground, including but not limited to: roads, fences, communication towers, and/or any structure that would provide perches.

Above-ground structures would only be authorized if:

1. It is consistent with the overall objective of the RMP Amendment;
2. The effect on GRSG populations or habitat is nominal or incidental;
3. Allowing the exception prevents implementation of an alternative more detrimental to GRSG or similar environmental concern, and;
4. Rigid adherence to the restriction would be the only reason for denying the action.

**MD LR-4:** PHMA and GHMA are designated as avoidance areas for high-voltage transmission line ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this ARMPA, including the RDFs and avoidance criteria presented in this document. The BLM is currently processing applications for the TransWest and Energy Gateway South Transmission Line projects, and the NEPA review for these projects is well underway. Conservation measures for GRSG are being analyzed through the projects' NEPA review process, which should achieve a net conservation benefit for the GRSG.

**\*GRSG PHMA ROW Avoidance.** ROWs may be issued after documenting that the ROWs would not adversely affect GRSG populations based on the following criteria:

- Location of proposed activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat.
- An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation
- An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.

**MD LR-5:** Any new projects within PHMA would be subject to the 3 percent disturbance cap as described in **Appendix E**, Methodology for Calculating Disturbance Caps. If the 3 percent disturbance cap is exceeded in PHMA in any Colorado MZ, no new ROW would be authorized in PHMA within that biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), unless site-specific analysis documents no impact to GRSG. Within existing designated utility corridors, the 3 percent disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.

**MD LR-6:** Prohibit surface occupancy and surface-disturbing activities associated with BLM ROW within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15). (See special stipulations applicable to **GRSG PHMA ROW TL**.)

**MD LR-7:** Construct new roads to the appropriate Gold Book standard and add the surface disturbance to the total disturbance in the PHMA.

**MD LR-8:** (PHMA) In PHMA, or within 4 miles of an active lek, for ROW renewals, where existing facilities cannot be removed, buried, or modified, require perch deterrents.

**MD LR-9:** (PHMA) Reclaim and restore ROWs considering GRSG habitat requirements.

**MD LR-10:** (PHMA) Designate new ROW corridors in GRSG PHMA only where there is a compelling reason to do so and location of the corridor within PHMA will not adversely affect GRSG populations due to habitat loss or disruptive activities.

**MD LR-11:** (PHMA) Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table D.2 of the Monitoring Framework (**Appendix D**)—under valid existing rights prior to authorizing new projects in PHMA.

### **Land Tenure Adjustment**

**MD LR-11:** Retain public ownership of GRSG PHMA. Consider exceptions where:

It can be demonstrated that: 1) disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG; or 2) the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on GRSG conservation.

There is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within the GRSG PHMA.

**MD LR-12:** (PHMA) In isolated federal parcels, only allow tract disposals that are beneficial or neutral to long-term management of GRSG populations.

**MD LR-13:** (GHMA) For lands in GHMA that are identified for disposal, the BLM would only dispose of such lands consistent with the goals and objectives of this ARMPA, including, but not limited to, the ARMPA objective to maintain or increase GRSG abundance and distribution.

**MD LR-14:** (ADH) Consider GRSG habitat values in acquisitions. For example: Identify key GRSG habitats on private or state land, adjacent to existing BLM land, where acquisition and protection by BLM could substantially benefit the local GRSG population. This could be accomplished via purchase, exchange, or donation to satisfy mitigation requirements.

### 2.2.9 Recreation (REC)

**Objective REC-1:** Manage recreation to avoid activities that 1) disrupt GRSG, 2) fragment GRSG habitat, or 3) spread noxious weeds.

**MD REC-1:** (PHMA) Do not allow special recreation permits with the potential to adversely affect GRSG or GRSG habitat.

### 2.2.10 Travel and Transportation (TTM)

**Objective TTM-1:** Manage travel and transportation to 1) reduce mortality from vehicle collisions, 2) limit change in GRSG behavior, 3) avoid, minimize, and compensate for habitat fragmentation, 4) limit the spread of noxious weeds, and 5) limit disruptive activity associated with human access.

**MD TTM-1:** (PHMA) Limit off-highway vehicle (OHV) travel to existing roads, primitive roads, and trails at a minimum. Special Zone Provision: Colorado MZ 13 – Manage the Wolford Mountain open OHV area.

**MD TTM-2:** (PHMA) Evaluate and consider permanent or seasonal road or area closures as needed to address a current threat.

**MD TTM-3:** (PHMA) Complete activity level travel plans as soon as possible, subject to funding. During activity level planning, where appropriate, designate routes with current administrative/agency purpose or need to administrative access only.

**MD TTM-4:** (PHMA) Complete activity level travel plans as soon as possible, subject to funding. Limit route construction to routes that will not adversely affect GRSG populations due to habitat loss or disruptive activities.

**MD TTM-5:** (PHMA) Use existing roads or realignments whenever possible. If it is necessary to build a new road, and the use of existing roads would cause adverse impacts to GRSG, construct new roads to the appropriate minimum Gold Book standard and add the surface disturbance to the total disturbance in the PHMA if it meets the criteria in **Appendix H**, Guidelines for Implementation and Adaptive Management.

Construct no new roads if the biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) is over the 3 percent disturbance cap (see **Appendix E**, Methodology for Calculating Disturbance Caps), unless there is an immediate health and safety need, or to support valid existing rights that cannot be avoided. Evaluate and implement additional, effective mitigation necessary to offset the resulting loss of GRSg habitat.

**MD TTM-6:** (PHMA) Allow upgrades to existing routes after documenting that the upgrade will not adversely affect GRSg populations due to habitat loss or disruptive activities.

**MD TTM-7:** (PHMA) Conduct restoration of roads, primitive roads and trails not designated in travel management plans. This also includes primitive route/roads that were not designated in wilderness study areas and within lands with wilderness characteristics that have been selected for protection in previous LUPs.

**MD TTM-8:** (PHMA) When reseeding roads, primitive roads and trails, use appropriate seed mixes and consider the use of transplanted sagebrush.

# CHAPTER 3

## CONSULTATION, COORDINATION, AND PUBLIC INVOLVEMENT

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The BLM land use planning activities are conducted in accordance with NEPA requirements, the Council on Environmental Quality regulations, and Department of the Interior and BLM policies and procedures implementing NEPA. NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process. Public involvement and agency consultation and coordination, which have been at the heart of the planning process leading to this ARMPA, were achieved through *Federal Register* notices, public and informal meetings, individual contacts, media releases, planning bulletins, and the Northwest Colorado GRSG website ([http://www.blm.gov/co/st/en/BLM\\_Programs/wildlife/sage-grouse.html](http://www.blm.gov/co/st/en/BLM_Programs/wildlife/sage-grouse.html)).

### 3.1 CONSULTATION AND COORDINATION

The BLM collaborated with numerous agencies, municipalities, and tribes throughout the preparation of this ARMPA. Its outreach and collaboration with cooperating agencies are described in Section 6.3 of the Proposed RMP and Final EIS. Fifteen agencies<sup>2</sup> accepted the offer to participate in the BLM planning process as cooperating agencies. The BLM formally invited the cooperating agencies to participate in developing the alternatives for the RMP Amendment and EIS and to provide data and other information related to their agency responsibilities, goals, mandates, and expertise.

#### 3.1.1 Section 7 Consultation

Under Section 7 of the ESA, federal agencies must consult with the USFWS when any action the agency carries out, funds, or authorizes *may affect* a listed endangered or threatened species. The BLM Northwest Colorado District initiated consultation by requesting a species list from the local USFWS office for federally listed, federally proposed, or current federal candidate species that may be present in the planning area. The BLM subsequently prepared biological assessments based on the species list in which a determination is made, in accordance with Section 7 of the ESA, that the Northwest Colorado

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<sup>2</sup> Garfield County, Grand County, Jackson County, Mesa County, Moffat County, Rio Blanco County, Routt County, Colorado Department of Natural Resources, Colorado Parks and Wildlife, Denver Water Board, White River and Douglas Creek Conservation Districts, Natural Resources Conservation Service, Forest Service, and USFWS

ARMPA “may affect, is not likely to adversely affect” federally listed, proposed, or candidate species. Section 7 consultation was completed on July 20, 2015, when the USFWS provided the BLM with a letter concurring with their determination.

### **3.1.2 Native American Consultation**

In accordance with FLPMA and BLM guidance, the BLM consulted with Native American representatives and coordinated with Native American tribes throughout the planning process. The BLM contacted all Native American tribes and organizations with interests in the planning area by mail and encouraged them to be cooperating agencies. Tribes have been participating in the RMP Amendment/EIS process through meetings and other contacts. The BLM requested a consultation and sent copies of the RMP to the following tribes and reservations on June 19, 2012:

- Eastern Shoshone Tribe (Wind River Reservation)
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Southern Ute Indian Tribe
- Ute Indian Tribe (Uintah and Ouray Reservation)
- Ute Mountain Ute Tribe

The BLM received no written comments from tribal agencies during the scoping period, during the public comment period on the Draft ARMPA/EIS, after the consultation initiation letters were sent, or after the Proposed Plan was provided to the tribes. Tribal concerns or issues typically have been presented orally. Government-to-government consultation will continue throughout the ARMPA process to ensure that tribal groups’ concerns are considered.

As part of the NEPA scoping and consultation process and as an opportunity to provide comment, in accordance with Section 106 of the National Historic Preservation Act, the BLM notified the Colorado State Historic Preservation Officers seeking information on concerns with historic properties and land use planning direction in this ARMPA. The BLM has met its obligations under Section 106 of the National Historic Preservation Act, 54 USC, Section 306108, as outlined in the National Programmatic Agreement and the State Protocols.

## **3.2 PUBLIC INVOLVEMENT**

The public involvement process, consultation, and coordination conducted for the RMP are described in Chapter 6 of the Proposed RMP and Final EIS. As required by regulation, public scoping meetings were conducted following the publication of the notice of intent to prepare an EIS in the *Federal Register* on December 9, 2011.

A notice of availability for the Draft RMP Amendment/EIS was published in the *Federal Register* on August 16, 2013, initiating a 90-day public comment period, which was extended to December 2, 2013. The BLM held public comment open houses in Colorado for the Draft RMP Amendment/EIS on October 22 in Walden, October 23 in Lakewood, October 28 in Silt, and October 29 in Craig. All meetings were from 4:00 to 7:00 p.m. The comments received on the Draft RMP Amendment and EIS and the BLM’s responses were summarized in Appendix P of the Proposed RMP Amendment and Final EIS.

The notice of availability for the Proposed RMP and Final EIS was published on May 29, 2015, initiating a 30-day public protest period and a 60-day governor's consistency review period. The 30-day protest period ended on June 29, 2015. The BLM received 25 protest letters.

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# CHAPTER 4

## PLAN IMPLEMENTATION

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### 4.1 IMPLEMENTING THE PLAN

Implementation, after a BLM RMP or RMP amendment is approved, is a continuous and active process. Decisions presented as management decisions can be characterized as *immediate* or *one-time future* decisions.

**Immediate decisions**—These are the land use planning decisions that go into effect when the ROD is signed. They include goals, objectives, allowable uses, and management direction, such as the allocation of lands as open or closed for salable mineral sales, lands open with stipulations for oil and gas leasing, and areas designated for OHV use. These decisions require no additional analysis and guide future land management actions and subsequent site-specific implementation decisions in the planning area. Proposals for future actions, such as oil and gas leasing, land adjustments, and other allocation-based actions will be reviewed against these LUP decisions to determine if the proposal conforms with the LUP.

**One-time future decisions**—These types of decisions are those that are not implemented until additional decision-making and site-specific analysis is completed. Examples are implementation of the recommendations to withdraw lands from locatable mineral entry or development of travel management plans. Future one-time decisions require additional analysis and decision-making and are prioritized as part of the BLM budget process. Priorities for implementing one-time RMP decisions will be based on the following criteria:

- National BLM management direction
- Available resources

**General implementation schedule of one-time decisions**—Future decisions discussed in this ARMPA will be implemented over a period of years, depending on budget and staff availability. After issuing the ROD, the BLM will prepare implementation plans that establish tentative time frames for completing one-time decisions identified in the ARMPA. These actions require additional site-specific decision-making and analysis.

This schedule will assist BLM managers and staff in preparing budget requests and in scheduling work. However, the proposed schedule must be considered tentative and will be affected by future funding, nondiscretionary workloads, and by partner and external public cooperation. Yearly review of the plan will provide consistent tracking of accomplishments and information that can be used to develop annual budget requests to continue implementation.

## **4.2 MAINTAINING THE PLAN**

The ARMPA can be maintained as necessary to reflect minor changes in data. Plan maintenance is limited to further refining or documenting a previously approved decision incorporated in the plan or clarifying previously approved decisions.

The BLM expects that new information gathered from field inventories and assessments, research, other agency studies, and other sources will update baseline data or support new management techniques, best management practices, and scientific principles. Where monitoring shows LUP actions or best management practices are not effective, plan maintenance or amendment may begin, as appropriate.

Plan maintenance will be documented in supporting records; it does not require formal public involvement, interagency coordination, or NEPA analysis for making new LUP decisions.

## **4.3 CHANGING THE PLAN**

The ARMPA may be changed, should conditions warrant, through a plan amendment or plan revision. A plan amendment may become necessary if major changes are needed or to consider a proposal or action that is not in conformance with the plan. The results of monitoring, evaluation of new data, or policy changes and changing public needs might also provide a need for a plan amendment. If several areas of the plan become outdated or otherwise obsolete, a plan revision may become necessary. Plan amendments and revisions are accomplished with public input and the appropriate level of environmental analysis conducted according to the Council on Environmental Quality procedures for implementing NEPA.

Adjustments to PHMA or GHMA boundaries should be made if BLM biologists, in coordination with State of Colorado biologists and USFWS, determine, based on best available scientific information, that such changes would more accurately depict existing or potential GRSG habitat. The appropriate planning process (i.e., plan maintenance or plan amendment/revision) would be used, as determined on a case-by-case basis considering site-specific issues.

## **4.4 PLAN EVALUATION AND MONITORING**

Evaluation is a process in which the plan and monitoring data are reviewed to see if management goals and objectives are being met and if management direction is sound. RMP evaluations determine if decisions are being implemented, if mitigation measures are satisfactory, if there are significant changes in the related plans of other entities, if there is new data of significance to the plan, and if decisions should be changed through amendment or revision. Monitoring data gathered over time is examined and used to draw conclusions on whether management actions are meeting stated objectives, and if not, why not. Conclusions are then used to make recommendations on whether to continue current management or to identify what changes need to be made in management practices to meet objectives.

The BLM will use RMP evaluations to determine if the decisions in the RMP Amendment, supported by the accompanying NEPA analysis, are still valid in light of new information and monitoring data. Evaluations will follow the protocols established by the BLM Land Use Planning Handbook (H-1601-1) or other appropriate guidance in effect at the time the evaluation is initiated. The monitoring framework for this ARMPA can be found in **Appendix D**.

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# CHAPTER 5

## GLOSSARY

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**Adaptive management.** A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

**All designated habitat.** Includes PHMA, GHMA, and LCHMA.

**Allotment.** An area of land in which one or more livestock operators graze their livestock. Allotments generally consist of BLM-administered or National Forest System lands but may include other federally managed, state-owned, and private lands. An allotment may include one or more separate pastures. Livestock numbers and periods of use are specified for each allotment.

**Allotment management plan (AMP).** A concisely written program of livestock grazing management, including supportive measures if required, designed to attain specific, multiple-use management goals in a grazing allotment. An AMP is prepared in consultation with the permittees, lessees, and other affected interests. Livestock grazing is considered in relation to other uses of the range and to renewable resources, such as watersheds, vegetation, and wildlife. An AMP establishes seasons of use, the number of livestock to be permitted, the range improvements needed, and the grazing system.

**Amendment.** The process for considering or making changes in the terms, conditions, and decisions of approved resource management plans or management framework plans. Usually only one or two issues are considered that involve only a portion of the planning area.

**Anthropogenic (human) disturbances.** Features include paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, geothermal wells and associated facilities, pipelines, landfills, agricultural conversion, homes, and mines.

**Avoidance/avoidance area.** These terms usually address mitigation of some resource use. Paraphrasing the CEQ Regulations (40 CFR, Part 1508.20), avoidance means to circumvent or bypass an

impact altogether by not taking a certain action or parts of an action. Therefore, avoidance does not necessarily prohibit a proposed activity, but it may require relocating or totally redesigning an action to eliminate any potential impacts resulting from it.

**Candidate species.** Taxa for which the USFWS has sufficient information on their status and threats to propose the species for listing as endangered or threatened under the Endangered Species Act, but for which issuing a proposed rule is currently precluded by higher priority listing actions. Separate lists for plants, vertebrate animals, and invertebrate animals are published periodically in the Federal Register (BLM Manual 6840, Special Status Species Manual).

**Closed area.** Where one or more uses are prohibited, either temporarily or over the long term. Areas may be closed to such uses such as off-road vehicles, mineral leasing, mineral or vegetation collection, or target shooting. In areas closed to off-road vehicle use, motorized and mechanized off-road vehicle use is prohibited. Use of motorized and mechanized off-road vehicles in closed areas may be allowed for certain reasons; however, such use would be made only with the approval of the BLM Authorized Officer (43 CFR, Part 8340.0-5).

**Compensatory mitigation.** Compensating for the residual impact by replacing or providing substitute resources or environments (40 CFR, Part 1508.20).

**Controlled surface use.** Areas open to fluid mineral leasing, but the stipulation allows the BLM to require special operational constraints, or the activity can be shifted more than 656 feet to protect the specified resource or value.

**Cooperating agency.** Assists the lead federal agency in developing an environmental assessment or environmental impact statement. This can be any agency with jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR, Part 1501.6). Any tribe or federal, state, or local government jurisdiction with such qualifications may become a cooperating agency by agreement with the lead agency.

**Decision area.** Public lands and mineral estate managed by the United States Department of the Interior, Bureau of Land Management, and public lands managed by the United States Department of Agriculture, Forest Service, Routt National Forest, that are within the planning area and that are encompassed by all designated habitat, which includes PHMA, GHMA, and LCHMA.

**Exclusion area.** An area on the public lands where a certain activities are prohibited to ensure protection of other resource values on the site. The term is frequently used in reference to lands and realty actions and proposals (e.g., ROWs) but is not unique to them. This restriction is functionally analogous to no surface occupancy, which is used by the oil and gas program, and is applied as an absolute condition to those affected activities. The less restrictive analogous term is avoidance area. Also see *right-of-way exclusion area*.

**Facility, Energy or Mining.** Human-constructed assets designed and created to serve a particular function and to afford a particular convenience or service that is affixed to a specific locations, such as oil and gas well pads and associated infrastructure.

**Federal Land Policy and Management Act of 1976.** Public Law 94-579, October 21, 1976, often referred to as the BLM's Organic Act, which provides most of the BLM's legislated authority, direction policy, and basic management guidance.

**Federal mineral estate.** Subsurface mineral estate owned by the United States and administered by the BLM. Federal mineral estate under BLM jurisdiction is composed of mineral estate underlying BLM-administered lands, private lands, and state-owned lands.

**Fluid minerals.** Oil, gas, coal bed natural gas, and geothermal resources.

**General habitat management areas.** Areas of seasonal or year-round GRSG habitat outside of priority habitat. The BLM has identified these areas in coordination with respective state wildlife agencies.

**Goal.** A broad statement of a desired outcome, usually not quantifiable and may not have established time frames for achievement.

**Grazing relinquishment.** The voluntary and permanent surrender by an existing permittee or lessee (with concurrence of any base property lienholders) of their priority (preference) to use a livestock forage allocation on public land and their permission to use this forage. Relinquishments do not require the consent by or approval of BLM. The BLM's receipt of a relinquishment is not a decision to close areas to livestock grazing.

**Land tenure adjustments.** Landownership or jurisdictional changes. To improve the manageability of BLM-administered lands and their usefulness to the public, the BLM has numerous authorities for repositioning lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges but also through land sales, through jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

**Land use plan.** A set of decisions that establish management direction for land within an administrative area, as prescribed under the planning provisions of FLPMA; an assimilation of land use plan-level decisions developed through the planning process outlined in 43 CFR, Part 1600, regardless of the scale at which the decisions were developed. The term includes both RMPs and management framework plans (from H-1601-I, BLM Land Use Planning Handbook).

**Land use plan decision.** Establishes desired outcomes and actions needed to achieve them. Decisions are reached using the planning process in 43 CFR, Part 1600. When they are presented to the public as proposed decisions, they can be protested to the BLM Director. They are not appealable to Interior Board of Land Appeals.

**Large transmission lines.** The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to customers or is delivered to other electrical systems. Transmission is considered to end when the energy is transformed for distribution to the customer. For purposes of this EIS, large transmission lines are considered to be 230 kilovolts or higher; 230-kilovolt lines generally require a larger disturbance footprint to accommodate larger infrastructure.

**Late brood-rearing area.** Habitat that includes mesic sagebrush and mixed shrub communities, wet meadows, and riparian habitats, as well as some agricultural lands (e.g., alfalfa fields).

**Leasable minerals.** Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. These include energy-related mineral resources, such as oil, natural gas, coal, and geothermal, and some nonenergy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

**Lease.** Section 302 of the Federal Land Policy and Management Act of 1976 provides the BLM's authority to issue leases for the use, occupancy, and development of public lands. Leases are issued for such purposes as commercial filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, native or introduced species harvesting, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy (if the residential structures are not incidental to the mining operation), and water pipelines and well pumps related to irrigation and non-irrigation facilities. The regulations establishing procedures for processing these leases and permits are found in 43 CFR, Part 2920.

**Lease stipulation.** A modification of the terms and conditions on a standard lease form at the time of the lease sale.

**Lek.** An arena where male GRSG display to gain breeding territories and attract females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent. It is also called a "strutting ground" (Colorado Department of Natural Resources, Parks and Wildlife 2008a).

**Lek, active.** An open area that has been attended by more than two male GRSG for more than two of the previous five years (Connelly et al. 2000a). This definition is derived mainly from observations of leks in large stable populations and may not be appropriate for small populations with reduced numbers of males attending leks in fragmented sagebrush communities. Therefore, for smaller populations (e.g., Meeker – White River) that are isolated or disjunct from larger, more stable populations, an active lek is defined as an open area where one or more GRSG have been observed on more than one occasion engaging in courtship or breeding. An area used by displaying males in the last five years is considered an active lek (Colorado Department of Natural Resources, Parks and Wildlife 2008a).

**Lek, inactive.** Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. (Absence of strutting grouse during a single visit is insufficient documentation to establish that a lek is inactive.) This designation requires documentation of an absence of GRSG on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1 to May 7 or other appropriate date, based on local conditions, no precipitation, light or no wind, a half-hour before sunrise to one hour after sunrise). Alternatively, a ground check of the exact known lek site must be made late in the strutting season (after April 15) and fails to find any sign (tracks, droppings, or feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status because the aerial survey may actually disrupt activities.

**Lek complex.** A lek or group of leks within 1.5 miles of each other, between which male GRSG may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004).

**Lek, occupied.** A lek that has been active during at least one strutting season within the past 10 years.

**Lek, unoccupied.** A lek that has either been destroyed or abandoned.

**Lek, destroyed.** A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for GRSG breeding.

**Lek, abandoned.** A lek in otherwise suitable habitat that has not been active for 10 consecutive years. To be designated abandoned, a lek must be inactive (see above) in at least four nonconsecutive strutting seasons spanning 10 years. The site of an abandoned lek should be surveyed at least once every 10 years to determine whether it has been reoccupied.

**Linkage/connectivity habitat management areas (linkage/connectivity areas, linkages).** Areas that have been identified as broader regions of connectivity important to facilitate the movement of GRSG and to maintain ecological processes.

**Locatable minerals.** Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Act of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

**Management zone.** Two types of management zones are addressed:

- **Colorado Management Zones**—21 GRSG management zones, comprised of PHMA, GHMA, and LCHMA in order to manage disturbance caps and be able to identify specific habitat areas.
- **WAFWA Management Zones**—7 GRSG management zones established based on populations across the entire range of the GRSG. Northwest Colorado falls into WAFWA Management Zones II and VII. WAFWA management zones will be used to identify and address cross-state issues, such as regional mitigation and adaptive management monitoring response, through WAFWA Management Zone GRSG Conservation Teams (Teams). These Teams will convene and respond to issues at the appropriate scale, and will utilize existing coordination and management structures to the extent possible

**Mineral entry.** The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

**Mineral estate.** The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

**Mining claim.** A parcel of land that a miner takes and holds for mining, having acquired the right of possession by complying with the Mining Law of 1872 and local laws and rules. A mining claim may

contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, mill site, and tunnel site.

**Mining Law of 1872.** Provides for claiming and gaining title to locatable minerals on public lands. Also referred to as the General Mining Law or Mining Law.

**Mitigation.** Includes specific means, measures, or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can include avoiding the impact altogether by not taking a certain action or parts of an action, minimizing the impact by limiting the degree of magnitude of the action and its implementation, rectifying the impact by repairing, rehabilitation, or restoring the affected environment, reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, and compensating for the impact by replacing or providing substitute resources or environments.

**Modification.** A change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Depending on the specific modification, the stipulation may or may not apply to all sites within the leasehold to which the restrictive criteria are applied.

**Monitoring (plan monitoring).** The process of tracking the implementation of land use plan decisions and collecting and assessing data necessary to evaluate the effectiveness of land use planning decisions.

**Motorized vehicles or uses.** Vehicles that are motorized, including jeeps, all-terrain vehicles (such as four-wheelers and three-wheelers), trail motorcycles or dirt bikes, and aircraft.

**Multiple-use.** The management of public lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output (FLPMA; BLM Manual 6840, Special Status Species Manual).

**National Environmental Policy Act of 1969 (NEPA).** Public Law 91-190. Establishes environmental policy for the nation. Among other stipulations, NEPA requires federal agencies to consider environmental values in decision-making processes.

**Nonenergy leasable minerals.** Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. Nonenergy minerals include such resources as phosphate, sodium, potassium, and sulfur.

**No surface occupancy (NSO).** A major constraint where use or occupancy of the land surface for fluid mineral exploration or development and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells or pads) are prohibited to protect identified resource values. Areas identified as NSO are open to fluid mineral leasing, but surface occupancy or surface-disturbing activities associated with fluid mineral leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require horizontal drilling from outside the boundaries of the NSO area.

**Noxious weeds.** A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or nonnative, new, or not common to the United States.

**Objective.** A description of a desired outcome for a resource. Objectives can be quantified and measured and, where possible, have established time frames for achievement.

**Off-highway vehicle.** Any motorized vehicle capable of or designated for travel on or immediately over land, water, or other natural terrain. It excludes the following:

- Any non-amphibious registered motorboat
- Any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes
- Any vehicle whose use is expressly authorized by the BLM Authorized Officer or otherwise officially approved
- Vehicles in official use
- Any combat or combat support vehicle when used for national defense emergencies (43 CFR, Part 8340.0-5)

**Open.** Generally denotes that an area is available for a particular use or uses. Refer to specific program definitions found in law, regulations, or policy guidance for application to individual programs. For example, 43 CFR, Part 8340.0-5, defines the specific meaning as it relates to OHV use.

**Permitted use.** The forage allocated by or under the guidance of an applicable land use plan for livestock grazing in an allotment under a permit or lease and expressed in AUMs (43 CFR, Part 4100.0-5; from H-4180-1, BLM Rangeland Health Standards Manual).

**Permittee.** A person or company permitted to graze livestock on public land.

**Plan of operations.** Required for all mining exploration on greater than five acres or surface disturbance greater than casual use on certain special category lands. Special category lands are described under 43 CFR, Part 3809.11(c), and include such lands as designated areas of critical environmental concern, lands in the National Wilderness Preservation System, and areas closed to off-road vehicles, among others. In addition, a plan of operations is required for activity greater than casual use on lands patented under the Stock Raising Homestead Act with federal minerals where the operator does not have the written consent of the surface owner (43 CFR, Part 3814). The plan of operations needs to be filed in the BLM field office with jurisdiction over the land involved. It does not need to be

on a particular form but must address the information required by 43 CFR, Part 3809.401(b). It is required for all mining conducted under the General Mining Act of 1872, as amended, if the proposed operations will likely significantly disturb surface resources. The plan of operations describes the type of operations proposed and how they would be conducted, the type and standard of existing and proposed roads or access routes, the means of transportation to be used, the period during which the proposed activity will take place, and measures to be taken to meet the requirements for environmental protection (36 CFR, Part 228.4).

**Planning area.** The geographical area for which resource management plans are developed and maintained. The Northwest Colorado Greater Sage-Grouse ARMPA/EIS planning area boundary encompasses approximately 15 million acres in Eagle, Garfield, Grand, Jackson, Larimer, Mesa, Moffat, Rio Blanco, Routt, and Summit Counties. The planning area includes approximately 8.5 million acres of public lands managed by the Colorado River Valley, Grand Junction, Kremmling, Little Snake, and White River Field Offices and the Routt National Forest and approximately 7 million acres of National Park Service, US Department of Defense, USFWS, State of Colorado, County, City, and private lands.

**Planning criteria.** The standards, rules, and other factors developed by managers and interdisciplinary teams for their use in forming judgments about decision-making, analysis, and data collection during planning. Planning criteria streamlines and simplifies the resource management planning actions.

**Planning issues.** Concerns, conflicts, and problems with the existing management of public lands. Frequently, issues are based on how land uses affect resources. Some issues are concerned with how land uses can affect other land uses or how the protection of resources affects land uses.

**Priority Habitat Management Areas (PHMA).** Areas that have been identified as having the highest conservation value to maintaining sustainable GRSG populations. they include breeding, late brood-rearing, and winter concentration areas. The BLM has identified these areas in coordination with respective state wildlife agencies.

**Project area.** Encompasses the United States Department of the Interior, Bureau of Land Management Northwest Colorado District boundary, including all lands, regardless of ownership.

**Public land.** Land or interest in land owned by the United States and administered by the Secretary of the Interior through the BLM without regard to how the United States acquired ownership, except lands on the Outer Continental Shelf and lands held for the benefit of Indians, Aleuts, and Eskimos (H-1601-1, BLM Land Use Planning Handbook).

**Range improvement.** Any activity, structure or program on or relating to rangelands that is designed to improve production of forage, to change vegetative composition, to control patterns of use, to provide water, to stabilize soil and water conditions, and provide habitat for livestock and wildlife. The term includes structures, treatment projects, and use of mechanical means to accomplish the desired results.

**Range improvement project.** An authorized physical modification or treatment designed to improve production of forage, to change vegetation composition, to control patterns of use, to provide water, to stabilize soil and water conditions, to restore, protect, and improve the condition of rangeland ecosystems to benefit livestock, wild horses and burros, and fish and wildlife. This definition includes

structures, treatment projects and use of mechanical devices, or modifications achieved through mechanical means.

**Reclamation.** The suite of actions taken within an area affected by human disturbance, the outcome of which is intended to change the condition of the disturbed area to meet predetermined objectives or to make it acceptable for certain defined resources, such as wildlife habitat, grazing, and ecosystem function.

**Renewable energy.** Energy resources that constantly renew themselves or that are regarded as practically inexhaustible. These include solar, wind, geothermal, hydro, and biomass. Although particular geothermal formations can be depleted, the natural heat in the Earth is a virtually inexhaustible reserve of potential energy.

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

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

**Reserve common allotment.** An area designated in a land use plan as available for livestock grazing but reserved for use as an alternative to grazing in another allotment to facilitate rangeland restoration treatments and recovery from natural disturbances, such as drought or wildfire. The reserve common allotment would provide needed flexibility that would help the agency apply temporary rest from grazing where vegetation treatments or management would be most effective.

**Resource management plan.** A land use plan as prescribed by the Federal Land Policy and Management Act that establishes, for a given area of land, land use allocations, coordination guidelines for multiple use, objectives, and actions to be achieved.

**Restore/restoration.** Implementation of a set of actions that promotes plant community diversity and structure that allows plant communities to be more resilient to disturbance and invasive species over the long term. The long-term goal is to create functional high quality habitat that is occupied by GRSG. The short-term goals may be to restore the landform, soils, and hydrology and to increase the percentage of preferred vegetation, seeding of desired species, or treatment of undesired species.

**Restriction/restricted use.** A limitation or constraint on public land uses and operations. Restrictions can be of any kind, but they most commonly apply to certain types of vehicle use, temporal or spatial constraints, or certain authorizations.

**Right-of-way (ROW).** Public lands authorized to be used or occupied for specific purposes, pursuant to a right-of-way grant, which are in the public interest and require ROWs over, on, under, or through such lands.

**Right-of-way avoidance area.** An area identified through resource management planning to be avoided but may be available for ROW location with special stipulations.

**Right-of-way exclusion area.** An area identified through resource management planning that is not available for ROW location under any conditions.

**Road.** A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

**Routes.** Multiple roads, trails, and primitive roads; a group or set of roads, trails, and primitive roads that represents less than 100 percent of the BLM transportation system. Generically, components of the transportation system are described as routes.

**Scoping process.** An early and open public participation process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.

**Seeding.** Seeding is a vegetation treatment that applies grass, forb, or shrub seed, either by air or on the ground. In areas of gentle terrain, seed is often applied with a rangeland drill. Seeding allows the establishment of native species or placeholder species and restoration of disturbed areas to a perennial-dominated cover type, thereby decreasing the risk of subsequent invasion by exotic plant species. Seeding would be used primarily as a follow-up treatment in areas where disturbance or the previously described treatments have removed exotic plant species and their residue.

**Special status species.** BLM special status species are those listed, candidate, or proposed for listing under the Endangered Species Act and those requiring special management consideration to promote their conservation and to reduce the likelihood and need for future listing under the Endangered Species Act that are designated as BLM sensitive by the BLM State Director. All federally listed candidate species, proposed species, and delisted species in the five years following delisting are conserved as BLM sensitive species.

**Split-estate.** This is the circumstance where the surface of a particular parcel of land is owned by a different party than the one that owns the minerals underlying the surface. Split-estates may have any combination of surface or subsurface owners: federal/state, federal/private, state/private, or percentage ownerships. When referring to the split-estate ownership on a particular parcel of land, it is generally necessary to describe the surface or subsurface ownership pattern of the parcel.

**Standard lease terms and conditions.** Areas may be open to leasing with no specific management decisions defined in a resource management plan; however, these areas are subject to lease terms and

conditions defined on the lease form (Form 3100-11, Offer to Lease and Lease for Oil and Gas; and Form 3200-24, Offer to Lease and Lease for Geothermal Resources).

**Stipulation (general).** A term or condition in an agreement or contract.

**Stipulation (oil and gas).** A provision that modifies standard oil and gas lease terms and conditions in order to protect other resource values or land uses and is attached to and made a part of the lease. Typical lease stipulations include no surface occupancy, timing limitations, and controlled surface use. Lease stipulations are developed through the land use planning (RMP) process.

**Surface disturbance.** Suitable habitat is considered disturbed when it is removed and unavailable for immediate sage-grouse use.

- Long-term removal occurs when habitat is removed through activities that replace suitable habitat with long-term occupancy of unsuitable habitat, such as a roads, power lines, well pads, or active mines. Long-term removal may also result from any activities that cause soil mixing, soil removal, and soil exposure to erosion.
- Short-term removal occurs when vegetation is removed in small areas but is restored to suitable habitat within fewer than five years of disturbance, such as a successfully reclaimed pipeline, or successfully reclaimed drill hole or pit.
- Suitable habitat rendered unusable due to numerous human disturbances.
- Human surface disturbance are surface disturbances meeting the above definitions that result from human activities.

**Surface-disturbing activities.** An action that alters the vegetation, surface/near surface soil resources, or surface geologic features, beyond natural site conditions and on a scale that affects other public land values. Examples of surface-disturbing activities may include operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments (e.g., prescribed fire). Surface-disturbing activities may be either authorized or prohibited.

**Surface use.** This is all the various activities that may be present on the surface or near-surface, such as pipelines, of public lands. It does not refer to those subterranean activities, such as mining, occurring on the public lands or federal mineral estate. When administered as a use restriction (e.g., no surface use), this phrase prohibits all but specified resource uses and activities in a certain area to protect particular sensitive resource values and property. This designation typically applies to small acreage sensitive resource sites (e.g., plant community study enclosure) or administrative sites (e.g., government ware-yard) where only authorized agency personnel are admitted.

**Timing limitation (TL).** The TL stipulation, a moderate constraint, is applicable to fluid mineral leasing, all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, and construction of wells and pads), and other surface-disturbing activities (those not related to fluid mineral leasing). Areas identified for TL are closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames. This stipulation does not apply to operation and basic maintenance activities, including associated vehicle travel, unless otherwise specified. Construction, drilling, completions, and

other operations considered to be intensive are not allowed. Intensive maintenance, such as work overs on wells, is not permitted. TLs can overlap spatially with NSO and CSU, as well as with areas that have no other restrictions.

**Transfer of grazing preference.** The BLM's approval of an application to transfer grazing preference from one party to another or from one base property to another or both. Grazing preference means a superior or priority position against others for receiving a grazing permit or lease. This priority is attached to base property owned or controlled by the permittee or lessee.

**Transmission.** The movement or transfer of electric energy over an interconnected group of lines and associated equipment between points of supply and points at which it is transformed for delivery to consumers or is delivered to other electric systems. Transmission is considered to end when the energy is transformed for distribution to the consumer.

**Transmission line (large).** An electrical utility line with a capacity greater than or equal to 100 kilovolts or a natural gas, hydrogen, or water pipeline greater than or equal to 24 inches in diameter.

**Travel management areas.** Polygons or delineated areas where a rational approach has been taken to classify areas as open, closed, or limited and where a network of roads, trails, ways, landing strips, and other routes have been identified or designated that provide for public access and travel across the planning area. All designated travel routes within travel management areas should have a clearly identified need and purpose and clearly defined activity types, modes of travel, and seasons or time frames for allowable access or other limitations (BLM Handbook H-1601-1, Land Use Planning Handbook).

**Unitization.** Operation of multiple leases as a single lease under a single operator.

**Utility corridor.** Tract of land varying in width forming passageway through which various commodities are transported, such as oil, gas, and electricity.

**Valid existing rights.** Documented legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include fee title ownership, mineral rights, rights-of-way, easements, permits, and licenses. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.

**Vegetation treatments.** Management practices that change the vegetation structure to a different stage of development. Vegetation treatment methods include managed fire, prescribed fire, chemical, mechanical, and seeding.

**Wildfire.** Unplanned ignitions or prescribed fires that are declared wildfires. Wildfires may be managed to meet one or more objectives as specified in the ARMPA and these objectives can change as the fire spreads across the landscape.

**Wildfire suppression.** An appropriate management response to wildfire, escaped wildland fire use or prescribed fire that results in curtailment of fire spread and eliminates all identified threats from the particular fire.

**Wildland fire.** An unplanned, unwanted wildland fire including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out.

**Wildland fire use.** *A term no longer used; these fires are now included in the “Wildfire” definition.*

**Withdrawal.** An action that restricts the use of public land and segregates the land from the operation of some or all of the public land and mineral laws. Withdrawals are also used to transfer jurisdiction of management of public lands to other federal agencies.

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## CHAPTER 6

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# Appendices

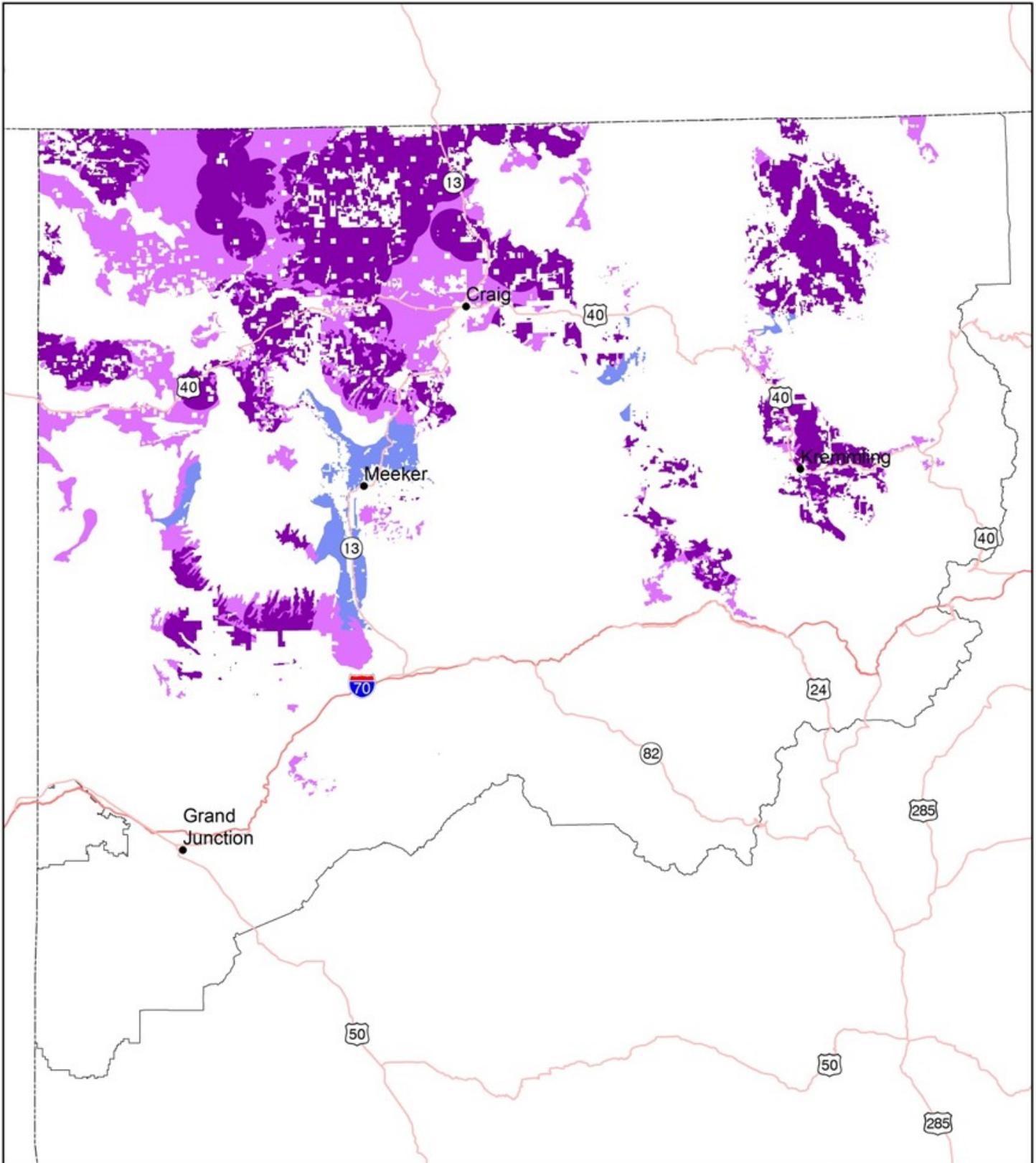


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# Appendix A

## Approved RMP Amendment Maps





**Figure 2-1: Northwest Colorado Sub-Regional Decision Area, Greater Sage Grouse Habitat Management Areas**

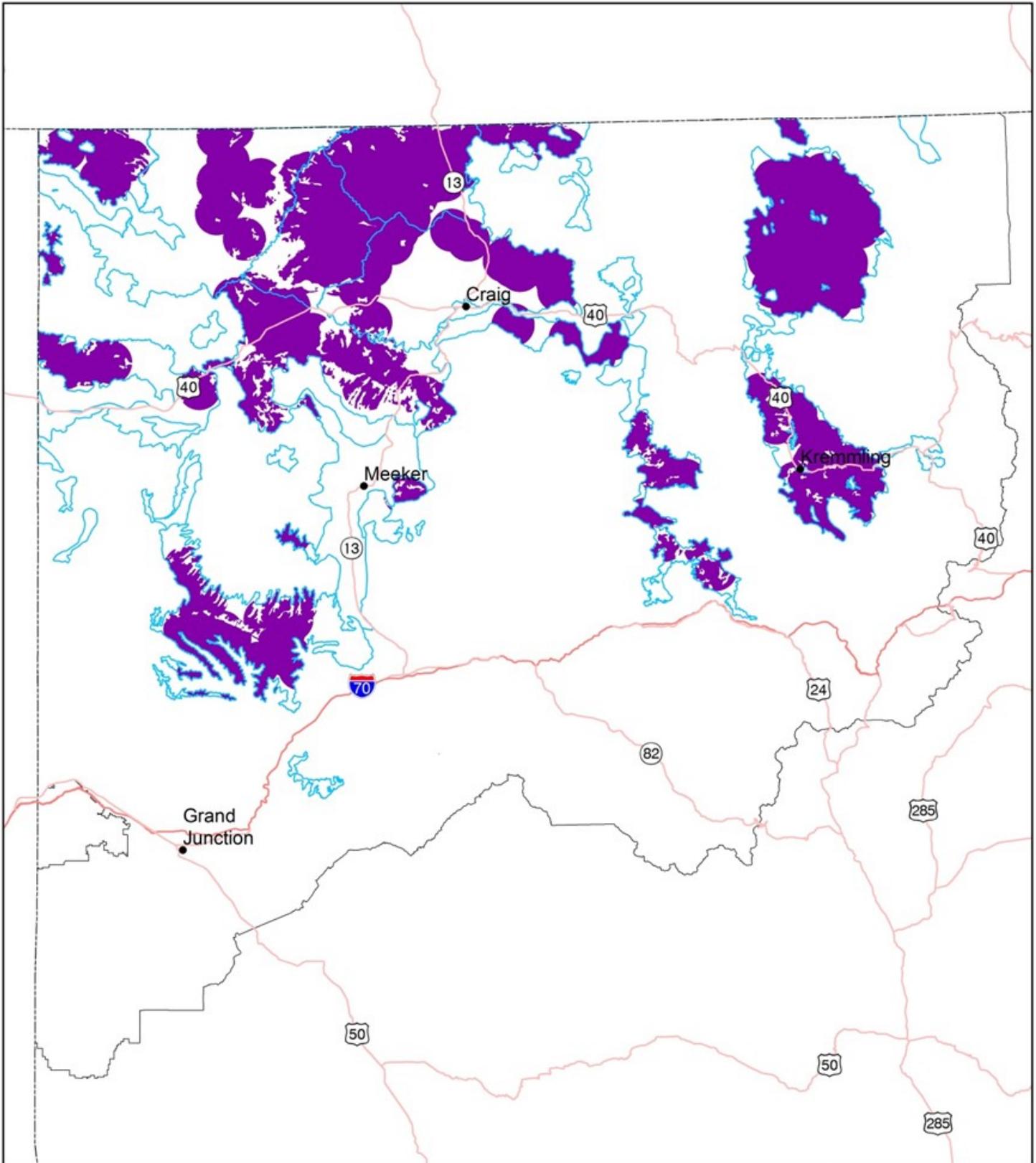
**Legend**

- Priority Habitat Management Areas (PHMAs)
- General Habitat Management Areas (GHMAs)
- Linkage Connectivity Habitat Management Areas (LCHMAs)
- Planning Area Boundary
- State Boundary

September 2015



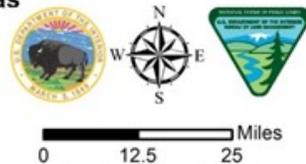
No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.



**Figure 2-2: Northwest Colorado Sub-Regional Planning Area, Greater Sage Grouse Biologically Significant Units and Priority Habitat Management Areas**

**Legend**

- Priority Habitat Management Areas (PHMAs)
- Biologically Significant Units (BSUs)
- Planning Area Boundary
- State Boundary

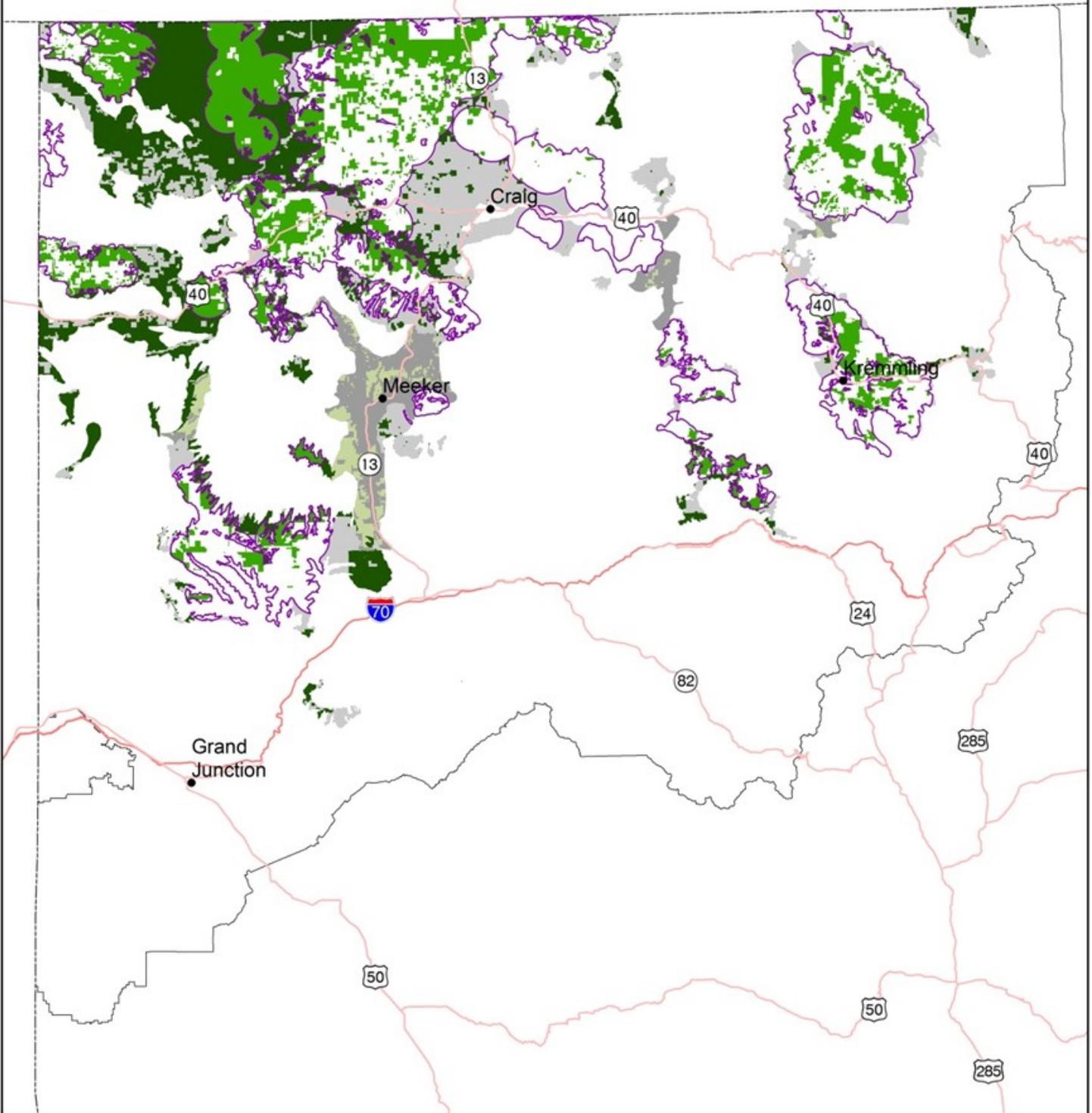


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Note: This map depicts livestock grazing decisions for the management of all resources. Please refer to the ARMPA for details regarding livestock grazing decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps



**Figure 2-3: Northwest Colorado Sub-Regional Planning Area, Livestock Grazing**

PHMA  
LCHMA  
GHMA

- Areas Available for livestock Grazing
- Areas with grazing decisions
- Outside BLM Decision Area
- Planning Area Boundary
- State Boundary

0 12.5 25 Miles  
September 2015



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Note: This map depicts fluid mineral decisions for Greater Sage-Grouse protection as well as all other fluid mineral decisions existing for the management of all other resources. Please refer to the ARMPA for details regarding fluid mineral decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps

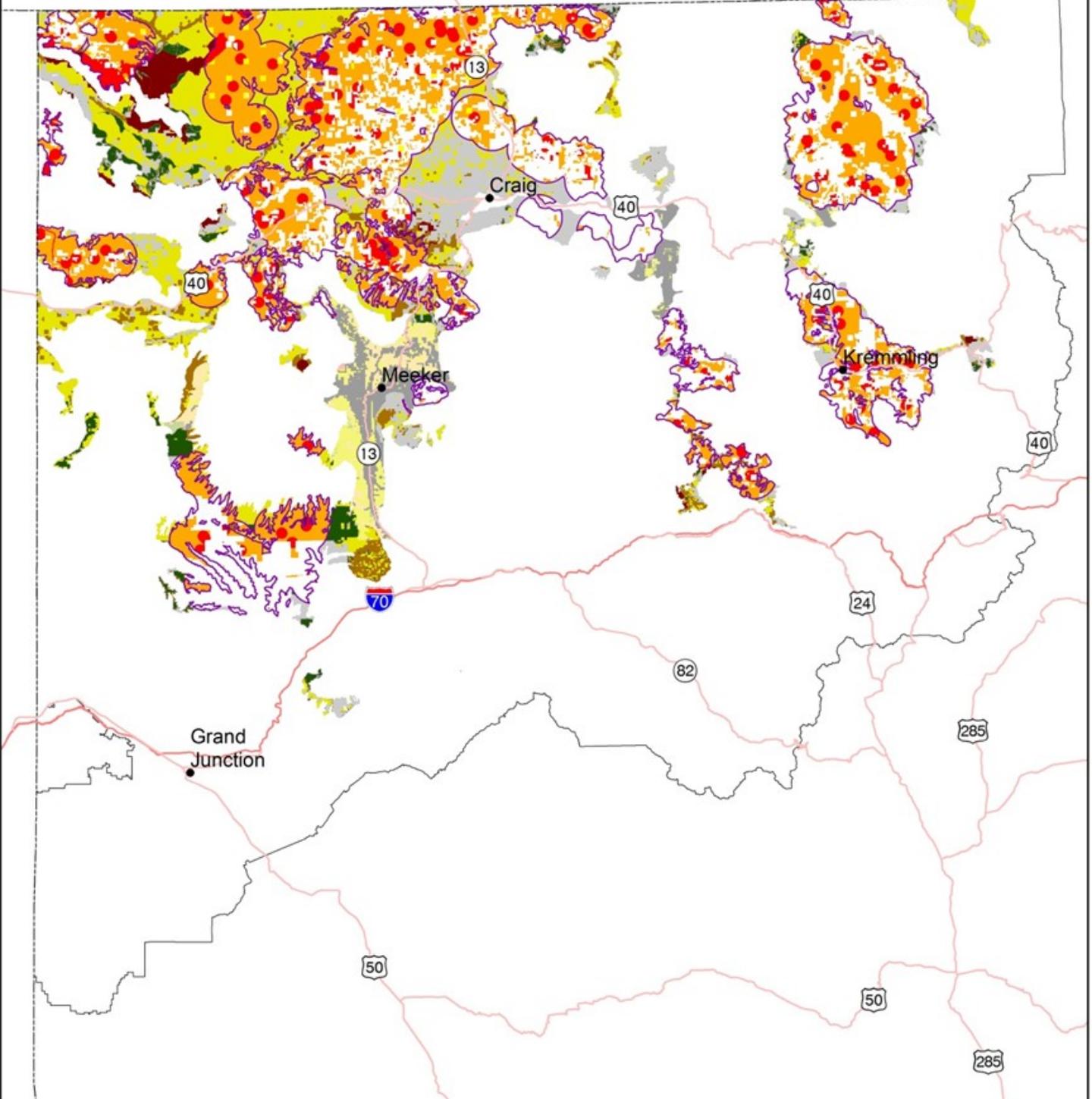
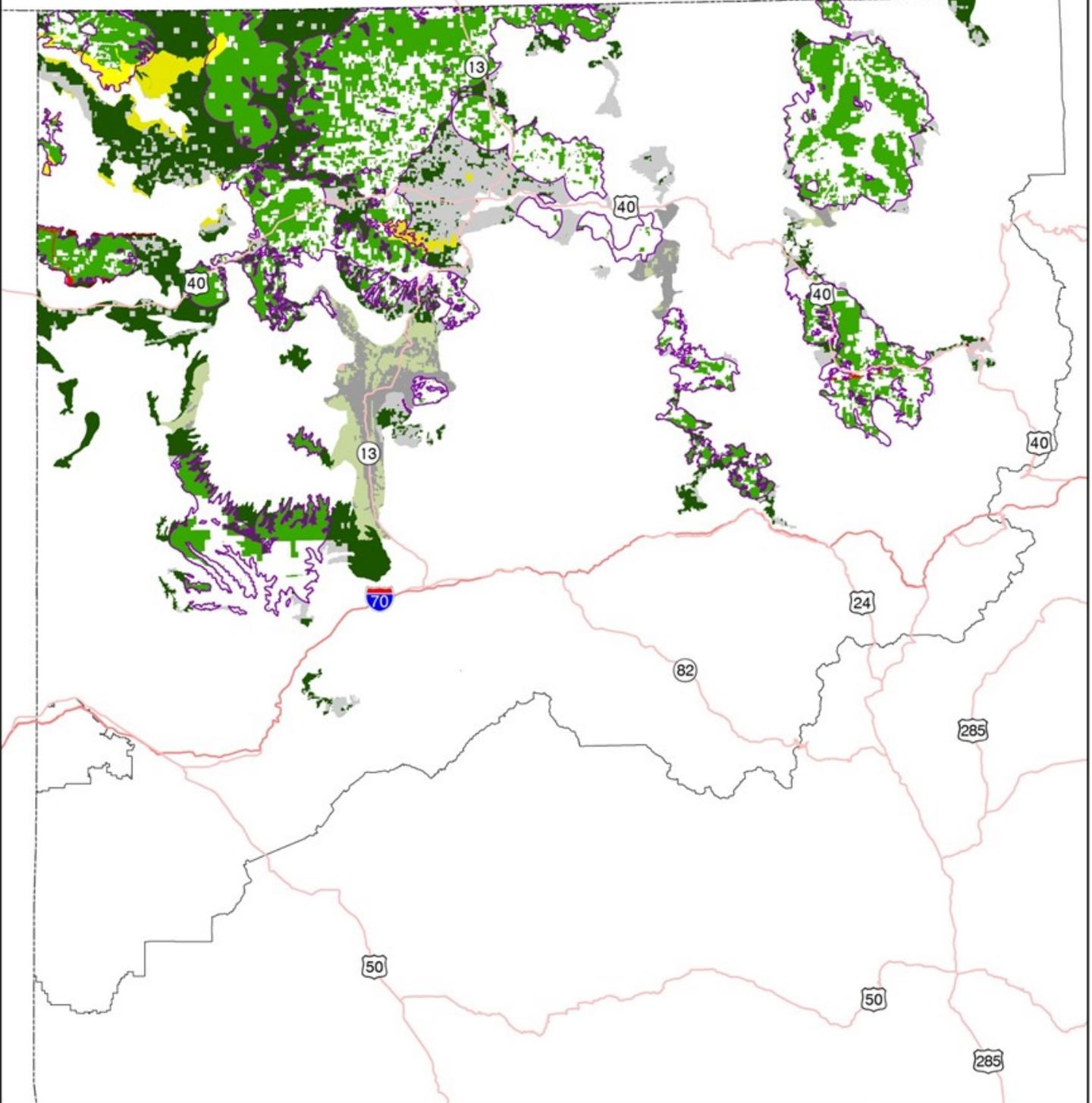


Figure 2-4: Northwest Colorado Sub-Regional Planning Area, Fluid Minerals

PHMA LCHMA GHMA	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; border: 1px solid black; background-color: white; margin-right: 5px;"></span> Outside of BLM Decision Area</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: red; margin-right: 5px;"></span> Closed</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; margin-right: 5px;"></span> Open w/ Major Stipulations (NSO)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: orange; margin-right: 5px;"></span> Open w/ Moderate Stipulations (CSU and/or TL)</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: green; margin-right: 5px;"></span> Open w/ Standard Stipulations</li> </ul>	<ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; border-bottom: 1px solid black; margin-right: 5px;"></span> Planning Area Boundary</li> <li><span style="display: inline-block; width: 15px; border-bottom: 1px dashed black; margin-right: 5px;"></span> State Boundary</li> </ul>	  
<p>No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.</p>			<p>0 12.5 25 Miles</p> <p>September 2015</p>



Note: This map depicts locatable mineral decisions for Greater Sage-Grouse protection as well as all other locatable mineral decisions existing for the management of all other resources. Please refer to the ARMPA for details regarding locatable mineral decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps

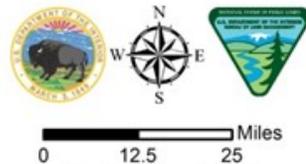


**Figure 2-5: Northwest Colorado Sub-Regional Planning Area, Locatable Minerals**

PHMA  
LCHMA  
GHMA

- Existing Withdrawals
- Recommended Withdrawals
- Locatable Minerals Open

- Planning Area Boundary
- State Boundary



September 2015



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Note: This map depicts salable mineral decisions for Greater Sage-Grouse protection as well as all other salable mineral decisions existing for the management of all other resources. Please refer to the ARMPA for details regarding salable mineral decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps

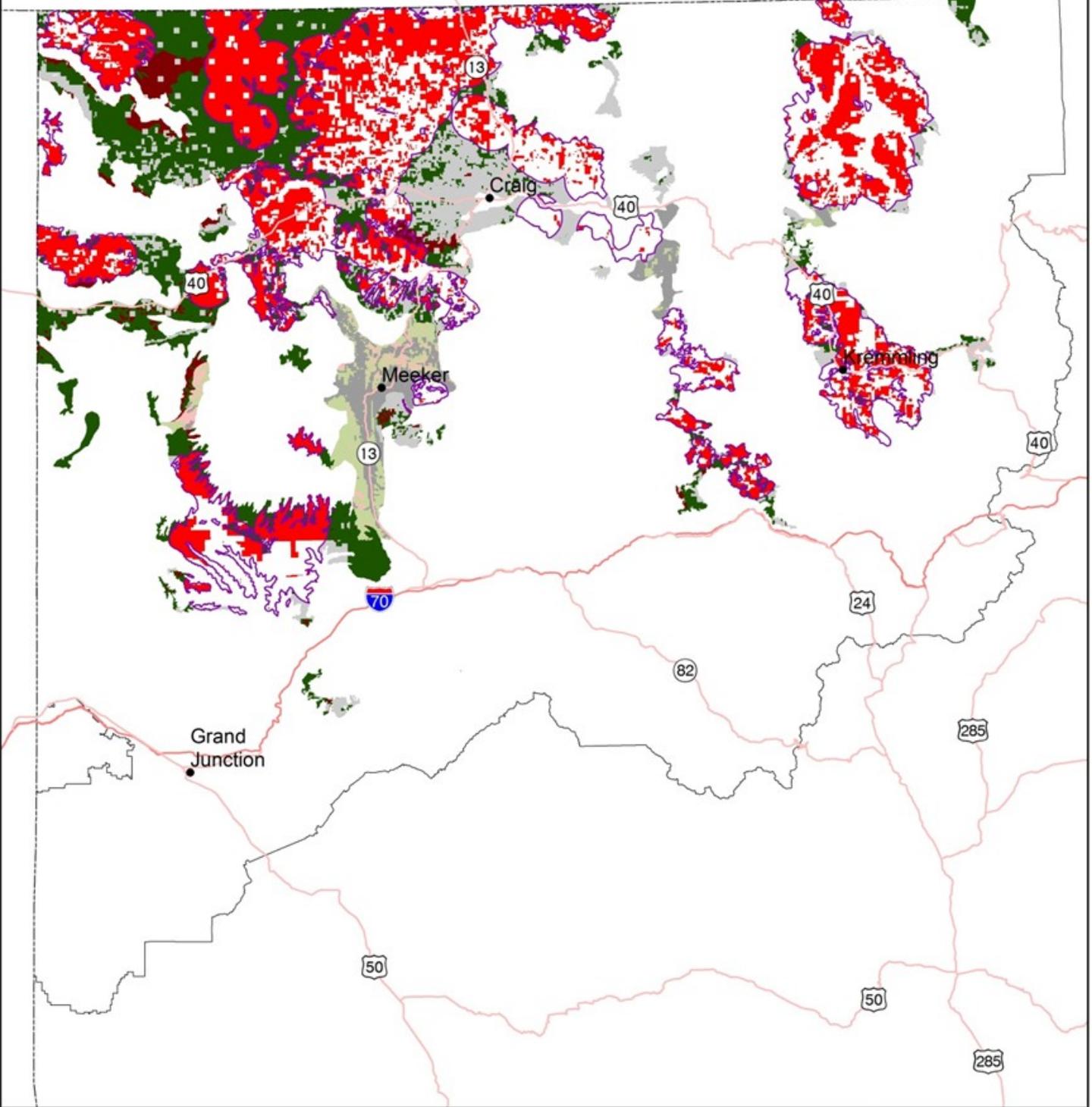


Figure 2-6: Northwest Colorado Sub-Regional Planning Area, Salable Minerals

PHMA  
LCHMA  
GHMA

- Outside BLM Decision Area
- Closed
- Open

- Planning Area Boundary
- State Boundary



0 12.5 25 Miles

September 2015

Map Area



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Note: This map depicts non-energy leasable mineral decisions for Greater Sage-Grouse protection as well as all other non-energy leasable mineral decisions existing for the management of all other resources. Please refer to the ARMPA for details regarding non-energy leasable mineral decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps

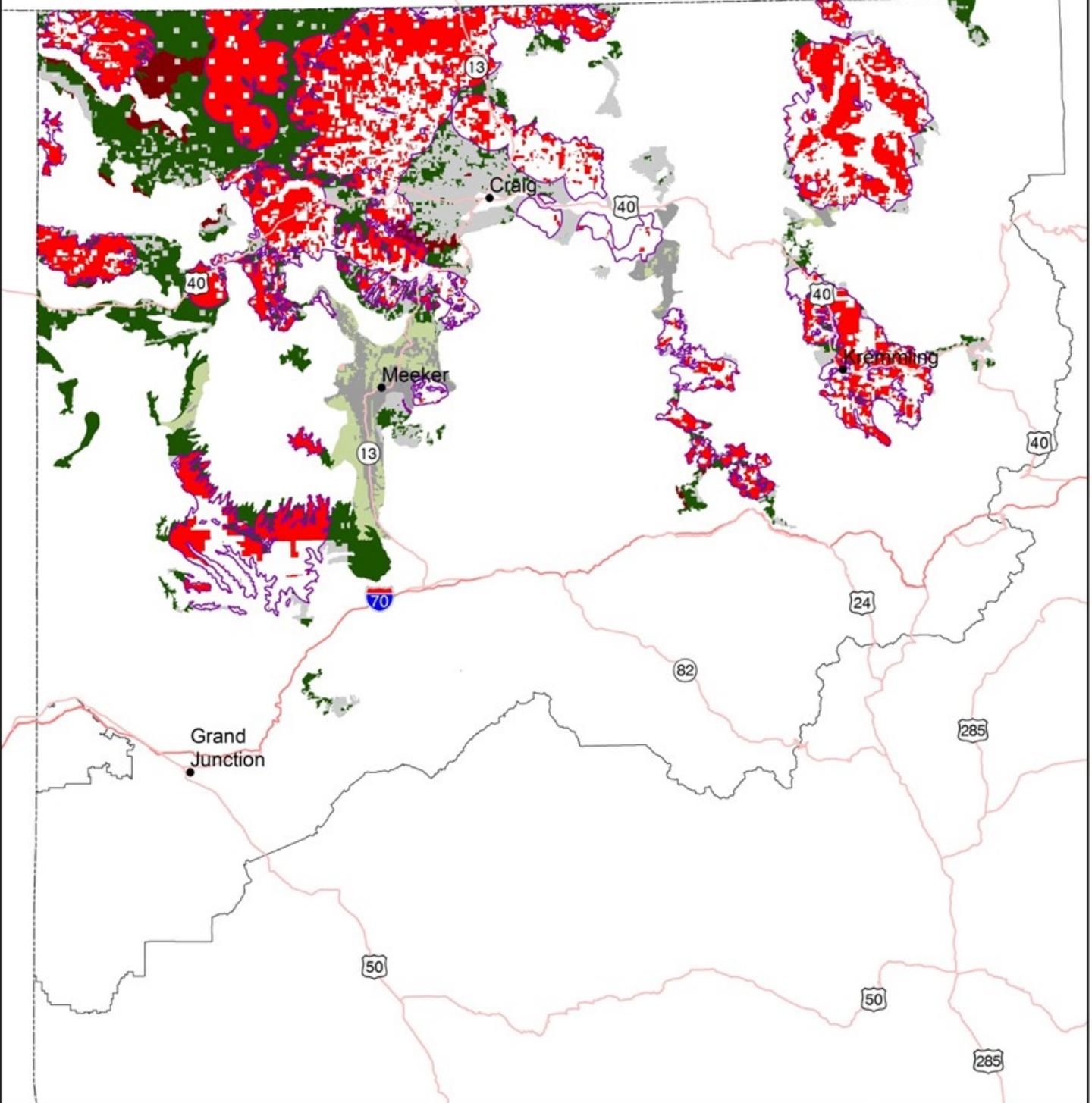


Figure 2-7: Northwest Colorado Sub-Regional Planning Area, Non-Energy Leasable Minerals

PHMA  
LCHMA  
GHMA

- Outside BLM Decision Area
- Closed
- Open

- Planning Area Boundary
- State Boundary



0 12.5 25 Miles

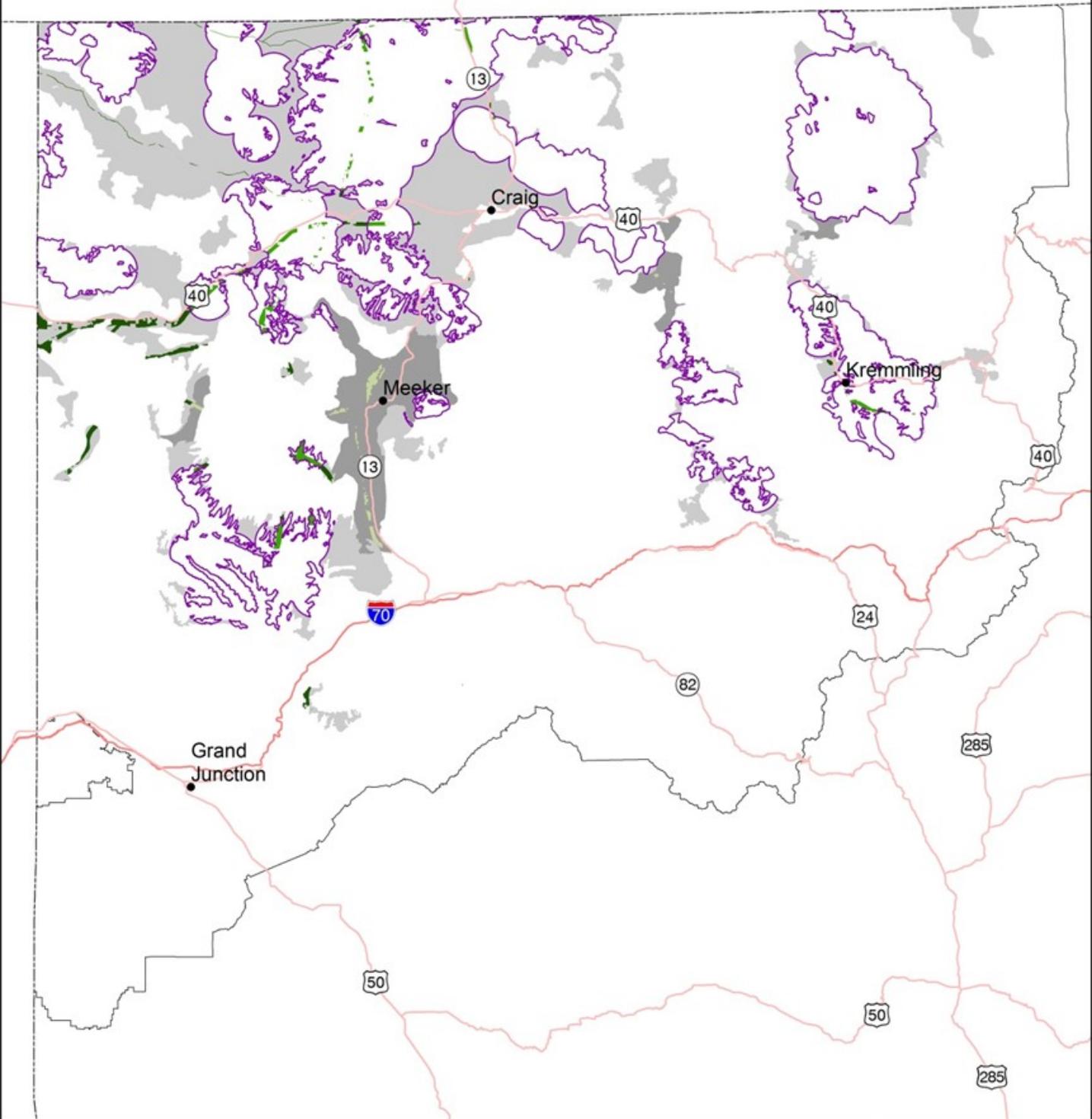
September 2015

Map Area



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Note: This map depicts designated utility corridor decisions for the management of all resources. Please refer to the ARMPA for details regarding designated utility corridor decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps



**Figure 2-8: Northwest Colorado Sub-Regional Planning Area, Designated Utility Corridors**

PHMA  
LCHMA  
GHMA

Outside BLM Decision Area  
Designated Utility Corridor

Planning Area Boundary  
State Boundary



0 12.5 25 Miles

September 2015



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Note: This map depicts designated major ROW decisions for Greater Sage-Grouse protection as well as all other designated major ROW decisions existing for the management of all other resources. Please refer to the ARMPA for details regarding designated major ROW decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps.

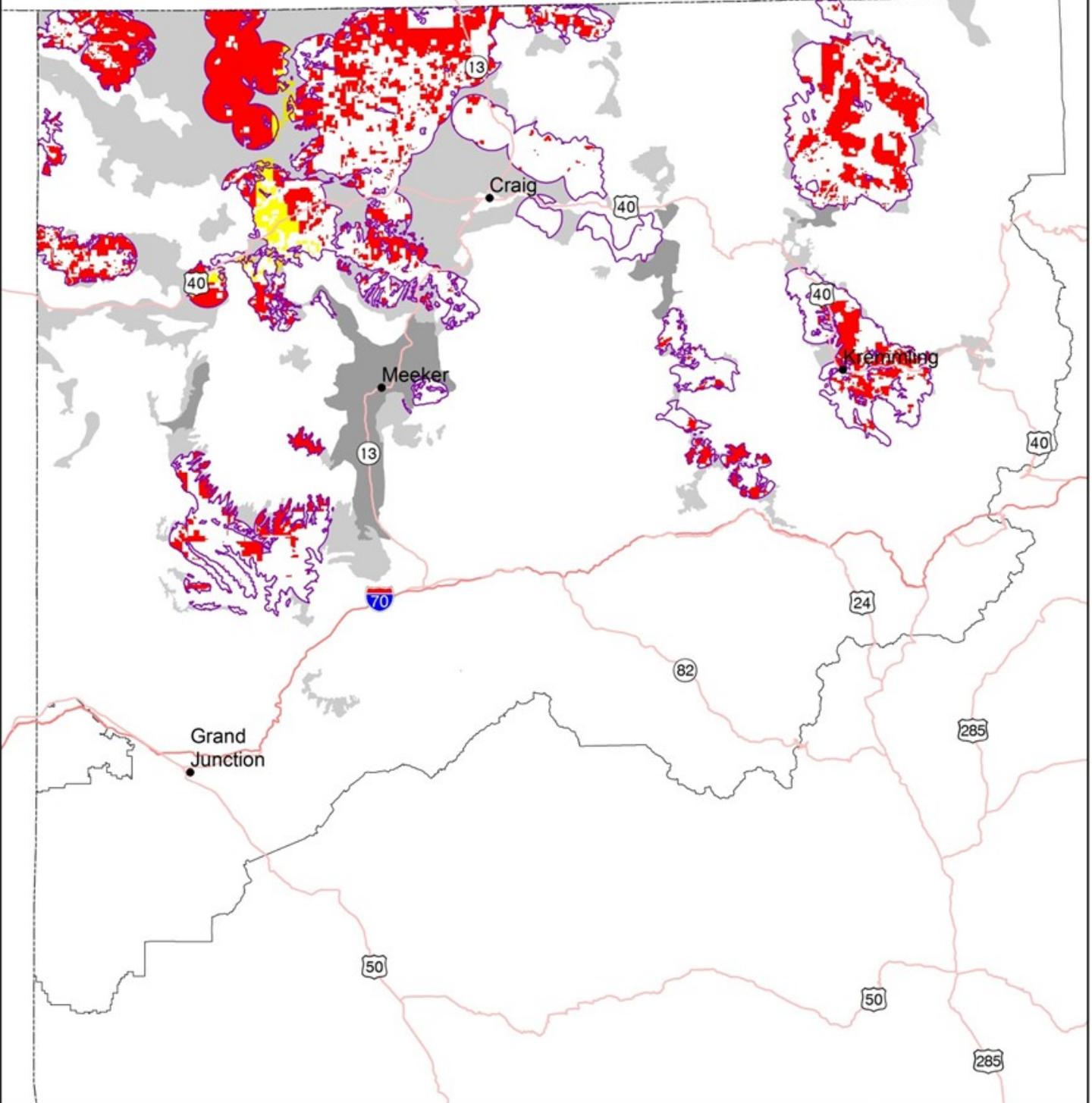
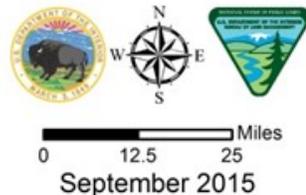


Figure 2-9a: Northwest Colorado Sub-Regional Planning Area, Major Rights-of-Way

PHMA  
LCHMA  
GHMA

- Exclusion
- Avoidance
- Outside BLM Decision Area

- Planning Area Boundary
- State Boundary



Note: This map depicts designated minor ROW decisions for Greater Sage-Grouse protection as well as all other designated minor ROW decisions existing for the management of all other resources. Please refer to the ARMPA for details regarding designated minor ROW decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps.

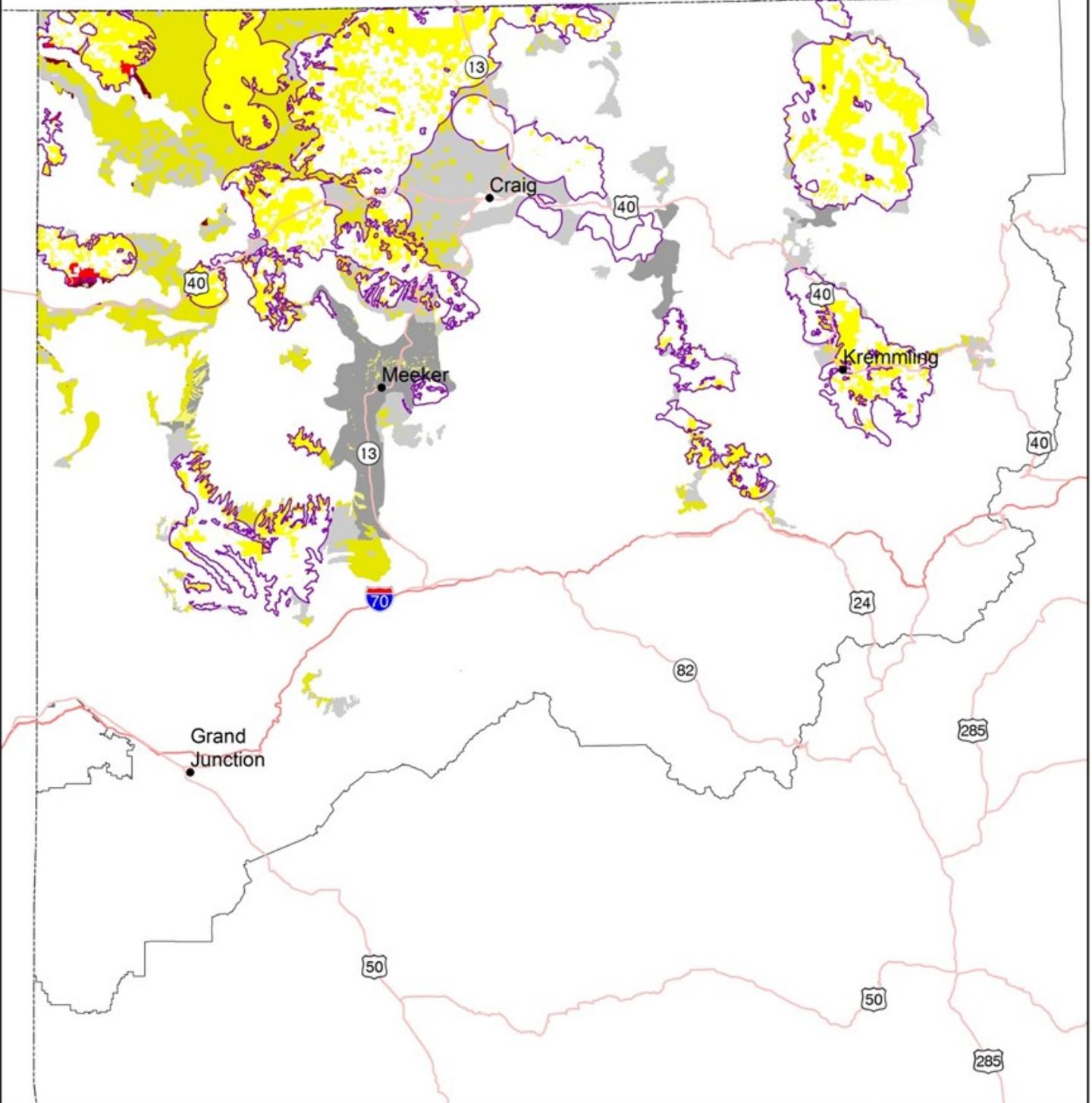


Figure 2-9b: Northwest Colorado Sub-Regional Planning Area, Minor Rights-of-Way

PHMA  
LCHMA  
GHMA

- Outside BLM Decision Area
- Exclusion
- Avoidance

- Planning Area Boundary
- State Boundary



0 12.5 25 Miles

September 2015

Map Area



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Note: This map depicts land tenure decisions for Greater Sage-Grouse protection as well as all other land tenure decisions existing for the management of all other resources. Please refer to the ARMPA for details regarding land tenure decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSG RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSG RMPA maps

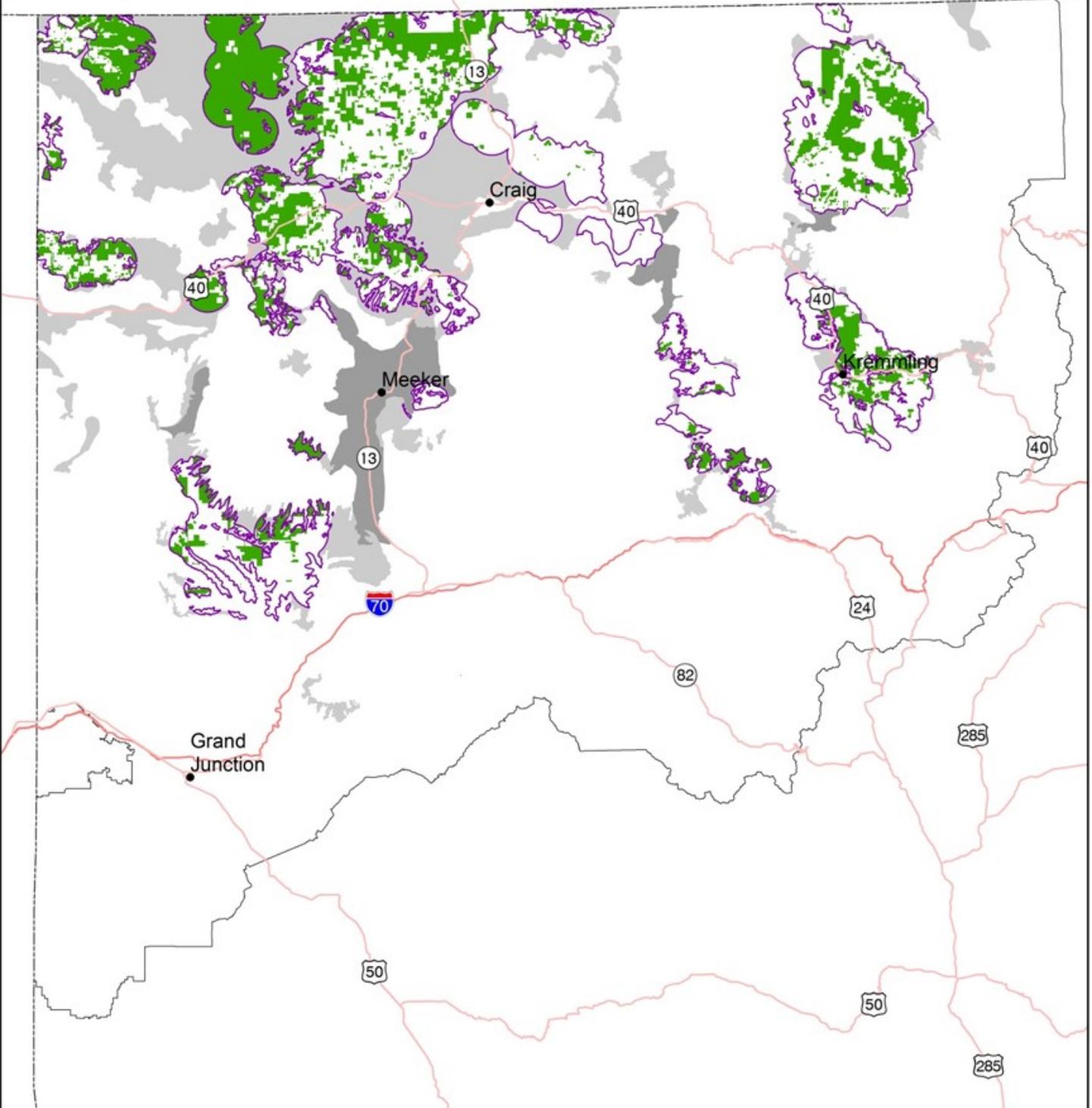


Figure 2-10: Northwest Colorado Sub-Regional Planning Area, Land Tenure

PHMA  
LCHMA  
GHMA

Outside BLM Decision Area  
Retention

Planning Area Boundary  
State Boundary



0 12.5 25 Miles

September 2015

Map Area



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

Note: This map depicts travel management decisions for Greater Sage-Grouse protection as well as all other travel management decisions existing for the management of all other resources. Please refer to the ARMPA for details regarding travel management decisions. Due to the timing of some of the BLM RMPs that will be amended by the GRSR RMPA, there may be some new No Action (Alternative A) data sets not included in the GRSR RMPA maps

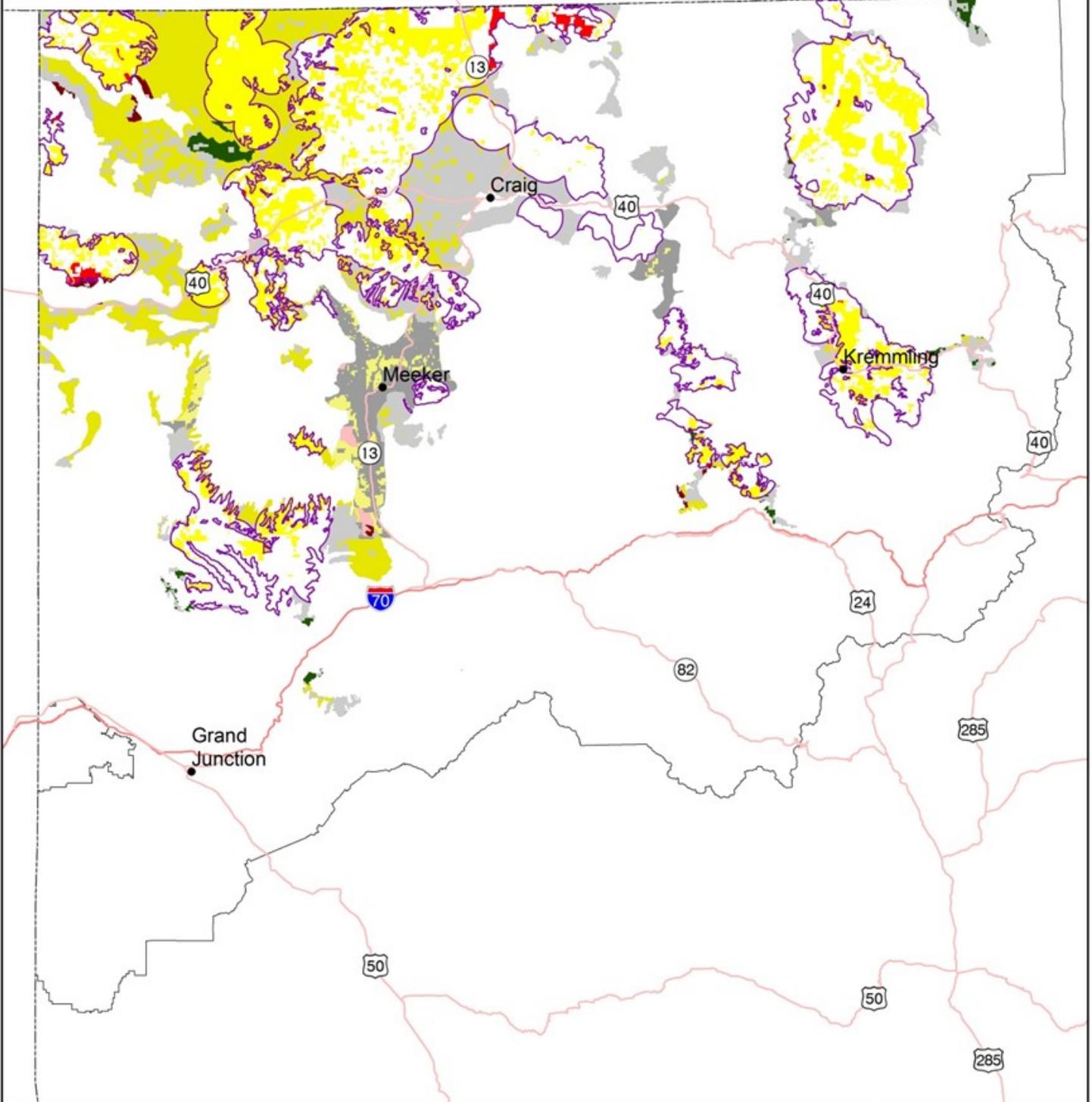


Figure 2-11: Northwest Colorado Sub-Regional Planning Area, Trails and Travel Management

PHMA  
LCHMA  
GHMA

- Outside of BLM Decision Area
- Closed
- Limited
- Open

- Planning Area Boundary
- State Boundary



0 12.5 25 Miles

September 2015

Map Area



No warranty is made by the Bureau of Land Management (BLM). The accuracy, reliability, or completeness of these data for individual use or aggregate use with other data is not guaranteed.

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# Appendix B

Buffer Distances and Evaluation of Impacts on Leks



# APPENDIX B

## BUFFER DISTANCES AND EVALUATION OF IMPACTS ON LEKS

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Evaluate impacts on leks from actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g., state wildlife agency plans), the BLM will assess and address impacts from the following activities using the lek buffer distances as identified in the United States Geological Survey's (USGS) report, *Conservation buffer distance estimates for Greater Sage-Grouse—A review* (Open File Report 2014-1239) (Manier et al. 2014). The BLM will apply the lek buffer distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek buffer distances is as follows:

- Linear features (roads) within 3.1 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks
- Tall structures (e.g., communication or transmission towers and transmission lines) within 2 miles of leks
- Low structures (e.g., fences and rangeland structures) within 1.2 miles of leks
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks
- Noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25-mile from leks

Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations and state regulations) may be appropriate for determining activity impacts. The USGS report recognized “that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range.” The USGS report also states that “various protection measures have been developed and implemented... [which have] the ability (alone or in concert with

others) to protect important habitats, sustain populations, and support multiple-use demands for public lands.” All variations in lek buffer distances will require appropriate analysis and disclosure as part of activity authorization.

In determining lek locations, the BLM will use the most recent active or occupied lek data available from the state wildlife agency.

### **B.1 FOR ACTIONS IN GENERAL HABITAT MANAGEMENT AREAS**

The BLM will apply the lek buffer distances identified above as required conservation measures, such as Conditions of Approval, to fully address the impacts on leks as identified in the NEPA analysis.

Impacts should first be avoided by locating the action outside of the applicable lek buffer distance(s) identified above.

The BLM may approve actions in General Habitat Management Areas (GHMA) that are within the applicable lek buffer distance identified above only if:

- Based on best available science, landscape features, and other existing protections, (e.g., land use allocations and state regulations), the BLM determines that a lek buffer distance other than the applicable distance identified above offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; or
- The BLM determines that impacts on GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (e.g., co-location with existing authorizations); and
- Any residual impacts within the lek buffer distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain, as outlined in the Greater Sage-Grouse Mitigation Strategy (**Appendix F**).

### **B.2 FOR ACTIONS IN PRIORITY HABITAT MANAGEMENT AREAS (PHMA)**

The BLM will apply the lek buffer distances identified above as required conservation measures, such as Conditions of Approval, to fully address the impacts on leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer distance(s) identified above.

The BLM may approve actions in PHMA that are within the applicable lek buffer distance identified above only if:

- The BLM, with input from the state fish and wildlife agency, determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than the distance identified above offers the same or greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.

Range improvements that do not impact GRSG or range improvements that provide a conservation benefit to GRSG, such as fences for protecting important seasonal habitats, meet the lek buffer requirement.

The BLM will explain its justification for determining the approved buffer distances meet these conditions in its project decision.

### **B.3 REFERENCES**

Manier, D. J., Z. H. Bowen, M. L. Brooks, M. L. Casazza, P. S. Coates, P. A. Deibert, S. E. Hanser, and D. H. Johnson. 2014. Conservation buffer distance estimates for Greater Sage-Grouse—A review. US Geological Survey Open-File Report 2014–1239. Internet website: <http://dx.doi.org/10.3133/ofr20141239>.

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# Appendix C

Required Design Features, Preferred Design  
Features, and Suggested Design Features



# APPENDIX C

## REQUIRED DESIGN FEATURES, PREFERRED DESIGN FEATURES, AND SUGGESTED DESIGN FEATURES

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**Table C-I** provides a list of preferred design features (PDFs) and required design features (RDFs).

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

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

PDFs are established guidelines followed by the BLM to be incorporated into management activities where necessary, appropriate, and/or technically feasible. “Necessary” refers to the need for the PDF given the specifics of a proposal (e.g., it is not “necessary” to apply dust abatement on roads when the soil is sandy and wet). “Appropriate” refers to the wisdom of apply the PDF (e.g., it may not be “appropriate” to locate man camps outside priority habitat management areas [PHMA] because the additional vehicle miles required by a more distant location could be more detrimental to GRSG). A PDF is “technically feasible” when it entails proven, or in some cases, emerging technology.

Suggested design features (SDFs) apply to locatable minerals.

While the list of PDFs/RDFs/SDFs in **Table C-1** is thorough, the list is not intended to be exhaustive; additional PDFs/RDFs/SDFs could be developed and implemented to help achieve resource objectives. PDFs/RDFs/SDFs include state-of-the-art measures applied on a site-specific basis to avoid, minimize, reduce, rectify, or compensate for adverse environmental or social impacts. They are applied to management actions to help achieve desired outcomes for safe, environmentally responsible resource development by preventing, minimizing, or mitigating adverse impacts and reducing conflicts. Project applicants also can propose PDFs/RDFs/SDFs for activities on public lands (e.g., for gas drilling). PDFs/RDFs/SDFs not incorporated into the permit application by the applicant may be considered and evaluated through the environmental review process and incorporated into the use authorization as conditions of approval or ROW stipulations. Standard conditions of approval and ROW stipulations from each LUP would apply to site-specific analysis. Additional PDFs/RDFs/SDFs, conditions of approval, and ROW stipulations could be developed to meet resource objectives based on local conditions and resource specific concerns.

**Table C-1  
Required Design Features, Preferred Design Features, and Suggested Design Features<sup>1</sup>**

<b>WEST NILE VIRUS All Designated Habitat (ADH)</b>	
<b>The following seven site modifications will minimize exploitation of coal bed natural gas ponds by <i>Culex tarsalis</i>:</b>	
1	RDF (ADH) Increase the size of ponds to accommodate a greater volume of water than is discharged. This will result in un-vegetated and muddy shorelines that breeding <i>Cx. tarsalis</i> avoid (De Szalay and Resh 2000). This modification may reduce <i>Cx. tarsalis</i> habitat but could create larval habitat for <i>Culicoides sonorensis</i> , a vector of blue tongue disease, and should be used sparingly (Schmidtman et al. 2000). Steep shorelines should be used in combination with this technique whenever possible (Knight et al. 2003).  PDF (ADH) When authorizing new ponds for watering livestock, evaluate the proposed design for features that reduce the potential for creating mosquito breeding habitat in conjunction with features that make the pond fit for the purpose for which it is intended.
<b>FLUID MINERAL DEVELOPMENT</b>	
<b>Fluid Mineral Roads Priority Habitat Management Areas (PHMA)</b>	
2	RDF (ADH) Design roads to an appropriate standard no higher than necessary to accommodate the intended purpose.
3	PDF (PHMA) Locate roads to avoid important areas and habitats.
4	RDF (PHMA) Coordinate road construction and use among ROW holders.
5	PDF (PHMA) Construct road crossing at right angles to ephemeral drainages and stream crossings.
6	PDF (PHMA) Establish speed limits on BLM system roads to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.
7	PDF (PHMA) Establish trip restrictions (Lyon and Anderson 2003) or minimization through use of telemetry and remote well control (e.g., Supervisory Control and Data Acquisition).
8	PDF (PHMA) Coordinate with counties on transportation management related to GRSG habitat issues.
9	PDF (PHMA) Restrict vehicle traffic to only authorized users on newly constructed routes (e.g., use signing and gates).
10	PDF (PHMA) Use dust abatement practices on roads and pads.
11	PDF (PHMA) Close and rehabilitate duplicate roads.

**Table C-1**  
**Required Design Features, Preferred Design Features, and Suggested Design Features<sup>1</sup>**

<b>Fluid Mineral Operations Priority Habitat Management Areas (PHMA)</b>	
12	PDF (PHMA) Cluster disturbances, operations (e.g., fracture stimulation and liquids gathering), and facilities.
13	PDF (PHMA) Use directional and horizontal drilling to reduce surface disturbance.
14	PDF (PHMA) Place infrastructure in already disturbed locations where the habitat has not been restored.
15	PDF (PHMA) Consider using oak (or other material) mats for drilling activities to reduce vegetation disturbance and for roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.
16	PDF (PHMA) Apply a phased development approach with concurrent reclamation.
17	PDF (PHMA) Place liquid gathering facilities outside of PHMA. Have no tanks at well locations within PHMA (minimizes perching and nesting opportunities for ravens and raptors and truck traffic). Pipelines must be under or immediately adjacent to the road (Bui et al. 2010).
18	PDF (PHMA)—Restrict the construction of facilities and fences to the minimum number and size necessary.
19	PDF (PHMA) Site and/or minimize linear ROWs to reduce disturbance to sagebrush habitats.
20	PDF (PHMA) Place new utility developments (e.g., power lines and pipelines) and transportation routes in existing utility or transportation corridors.
21	PDF (PHMA) Bury distribution power lines.
22	PDF (PHMA) Corridor power, flow, and small pipelines under or immediately adjacent to roads.
23	PDF (PHMA) Design or site permanent structures that create movement (e.g., a pump jack) to minimize impacts to GRSG.
24	PDF (PHMA)—Cover all drilling and production pits and tanks regardless of size with netting or some other BLM-approved cover method.
25	PDF (PHMA) Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids.
26	PDF (PHMA)—Clean vehicles in a manner that prevents transport of weeds.
27	PDF (PHMA) Use only closed-loop systems for drilling operations and no reserve pits.
28	PDF (PHMA) Restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007).
29	PDF (PHMA) Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat: <ul style="list-style-type: none"> <li>• Overbuild size of ponds for muddy and non-vegetated shorelines.</li> <li>• Build steep shorelines to decrease vegetation and increase wave actions.</li> <li>• Avoid flooding terrestrial vegetation in flat terrain or low-lying areas.</li> <li>• Construct dams or impoundments that restrict down slope seepage or overflow.</li> <li>• Line the channel where discharge water flows into the pond with crushed rock.</li> <li>• Construct spillway with steep sides and line it with crushed rock.</li> </ul> Treat waters with larvicides to reduce mosquito production where water occurs on the surface.
30	PDF (PHMA) Limit noise to less than 10 decibels above ambient measures (20-24 dBA) at sunrise at the perimeter of a lek during active lek season (Patricelli et al. 2010; Blickley et al. <i>In preparation</i> ).
31	PDF (PHMA) Require noise shields when drilling during the lek, nesting, brood-rearing, or wintering season.
32	RDF (PHMA) Fit transmission towers with anti-perch devices (Lammers and Collopy 2007).
33	PDF (PHMA) Require GRSG-safe fences.
34	PDF (PHMA)—Locate new compressor stations outside PHMA.  RDF (PHMA)—Design compressor stations and other production equipment so that noise emitted or measured in PHMA is no reduced to the extent possible.
35	RDF (PHMA) Clean up refuse (Bui et al. 2010).
36	PDF (PHMA) Locate man camps outside of PHMA.

**Table C-1**  
**Required Design Features, Preferred Design Features, and Suggested Design Features<sup>1</sup>**

<b>Fluid Minerals Reclamation Priority Habitat Management Areas (PHMA)</b>	
37	RDF (PHMA) Include objectives for ensuring habitat restoration to meet GRSG habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve GRSG habitat needs. See <b>Appendix H</b> , Guidelines for Implementation
38	PDF (PHMA) Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, top soiling, and revegetating cut and fill slopes.
39	PDF (PHMA)—All disturbed areas will be contoured to the original contours or at least to blend with the natural topography. Blending is defined as reducing form, line, shape, and color contrast with the disturbing activity. In visually sensitive areas, all disturbed areas shall be contoured to match the original topography. Matching is defined as reproducing the original topography and eliminating form, line, shape, and color caused by the disturbance as much as possible.
40	PDF (PHMA) Irrigate interim reclamation if necessary for establishing seedlings more quickly.
41	PDF (PHMA) Utilize mulching techniques to expedite reclamation and to protect soils.
<b>Fluid Minerals Roads General Habitat Management Areas (GHMA)</b>	
42	RDF (ADH) Design roads to an appropriate standard no higher than necessary to accommodate their intended purpose.
43	RDF (ADH) Coordinate with counties on transportation management related to GRSG habitat issues.
44	PDF (ADH) Establish speed limits to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.
45	RDF (GHMA) Coordinate road construction and use among ROW holders.
46	PDF (ADH) Construct road crossing at right angles to ephemeral drainages and stream crossings.
47	PDF (ADH) Use dust abatement practices on roads and pads.
48	PDF (ADH) Close and reclaim duplicate roads, by restoring original landform and establishing desired vegetation.
<b>Fluid Minerals Operations General Habitat Management Areas (GHMA)</b>	
49	PDF (ADH) Cluster disturbances, operations (e.g., fracture stimulation and liquids gathering), and facilities.
50	PDF (ADH) Use directional and horizontal drilling to reduce surface disturbance.
51	RDF (ADH) Clean up refuse (Bui et al. 2010).
52	PDF (ADH)—Restrict the construction of facilities and fences to the minimum number and size necessary.
53	PDF (ADH)—Cover all drilling and production pits and tanks regardless of size with netting or some other BLM-approved cover method.
54	PDF (ADH) Equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids.
55	PDF (ADH) Use remote monitoring techniques for production facilities and develop a plan to reduce the frequency of vehicle use.
56	PDF (ADH)—Clean vehicles in a manner that prevents transport of weeds.
57	PDF (ADH) Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Doherty 2007).
<b>Fluid Minerals Reclamation General Habitat Management Areas (GHMA)</b>	
58	RDF (ADH) Include restoration objectives to meet GRSG habitat needs in reclamation practices/sites (Pyke 2011). Address post reclamation management in reclamation plan such that goals and objectives are to enhance or restore GRSG habitat. See <b>Appendix H</b> , Guidelines for Implementation.

**Table C-1**  
**Required Design Features, Preferred Design Features, and Suggested Design Features<sup>1</sup>**

<b>LOCATABLE MINERALS</b>	
<b>Locatable Minerals Roads</b>	
<b>All Designated Habitat</b>	
59	SDF (ADH)—Request operators design roads to an appropriate standard no higher than necessary to accommodate their intended purpose; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
60	SDF (ADH)—Request operators locate roads to avoid important areas and habitats; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
61	SDF (ADH)—Request ROW holders coordinate road construction and use with other ROW holders; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
62	SDF (ADH)—Request operators construct road crossing at right angles to ephemeral drainages and stream crossings; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
63	SDF (ADH)—Request operators establish speed limits on BLM system roads to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
64	SDF (ADH)—Coordinate with counties on transportation management related to GRSG habitat issues.
65	SDF (ADH)—Request operators restrict vehicle traffic to only authorized users on newly constructed routes (e.g., use signing and gates); require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
66	SDF (ADH)—Request operators use dust abatement practices on roads and pads; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
67	SDF (ADH)—Request operators close and reclaim duplicate roads, by restoring original landform and establishing desired vegetation; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
<b>Locatable Minerals Operations</b>	
<b>All Designated Habitat</b>	
68	SDF (ADH)—Cluster disturbances associated with operations and facilities as close as possible; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
69	SDF (ADH)—Place infrastructure in already disturbed locations where the habitat has not been restored; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
70	SDF (ADH)—Restrict the construction of tall facilities and fences to the minimum number and amount needed; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
71	SDF (ADH)—Site and/or minimize linear ROWs to reduce disturbance to sagebrush habitats; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
72	SDF (ADH)—Request that operators place new utility developments (e.g., power lines and pipelines) and transportation routes in existing utility or transportation corridors; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
73	SDF (ADH)—Request that operators bury power lines; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
74	SDF (ADH)—Request that operators cover all pits and tanks regardless of size using fine mesh netting or other effective techniques to reduce GRSG mortality; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
75	SDF (ADH)—Request operators equip tanks and other above ground facilities with structures or devices that discourage nesting of raptors and corvids; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
76	SDF (ADH)—Request operators control the spread and effects of non-native plant species (Gelbard and Belnap 2003; Bergquist et al. 2007); require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
77	SDF (ADH)—Request operators restrict pit and impoundment construction to reduce or eliminate threats from West Nile virus (Doherty 2007); require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.

**Table C-1**  
**Required Design Features, Preferred Design Features, and Suggested Design Features<sup>1</sup>**

78	SDF (ADH)—Request that operators adhere to the PDF/RDF provisions in this table's section on West Nile Virus; require adherence as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
79	SDF (ADH)—Request operators install GRSG -safe fences around sumps; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
80	SDF (ADH)—Require operators to clean up refuse (Bui et al. 2010) so as to prevent unnecessary or undue degradation under 43 CFR 3809.
81	SDF (ADH)—Request that operators locate man camps outside PHMA; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
<b>Locatable Minerals Reclamation All Designated Habitat</b>	
82	SDF (ADH)—Include restoration objectives to meet GRSG habitat needs in reclamation practices/sites. Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve GRSG habitat needs. See <b>Appendix H</b> , Guidelines for Implementation
83	SDF (ADH) No similar action. (Interim Reclamation is a fluid mineral term that does not apply to locatable minerals.)
84	SDF (ADH)—Request operators' reclamation plans to target pre-disturbance landform and desired plant community vegetation; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
85	(ADH) No similar action. (Interim Reclamation is a fluid mineral term that does not apply to locatable minerals.)
86	SDF (ADH)—Request operators use mulching techniques to expedite reclamation; require as necessary to prevent unnecessary or undue degradation under 43 CFR 3809.
87	SDF (ADH)—Coordinate with counties on transportation management related to GRSG habitat issues.
<b>FIRE MANAGEMENT</b>	
<b>Fire Management—Fuels Management All Designated Habitat</b>	
88	PDF (ADH)—Where applicable, design fuels treatment objective to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns to address other values-at-risk.
89	PDF (ADH) Provide training to fuels treatment personnel on GRSG biology, habitat requirements, and identification of areas utilized locally.
90	PDF (ADH) Use fire prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize mortality of desirable perennial plant species and reduce risk of hydrophobicity).
91	RDF (ADH) Ensure proposed sagebrush treatments are planned with interdisciplinary input from BLM, and/or state wildlife agency biologist and that treatment acreage is conservative in the context of surrounding GRSG seasonal habitats and landscape.
92	RDF (ADH) Where appropriate, ensure that treatments are configured in a manner (e.g., strips) that promotes use by GRSG (Connelly et al. 2000).
93	RDF (ADH) Where applicable, incorporate roads and natural fuel breaks into fuel break design.
94	PDF (ADH) Power-wash all vehicles and equipment involved in fuels management activities prior to entering the area to minimize the introduction of undesirable and/or invasive plant species.
95	RDF (ADH) Design vegetation treatment in areas of high fire frequency to facilitate firefighter safety, reduce the risk of extreme fire behavior; reduce the potential of acres burned; and to reduce the fire risk to key GRSG habitats. Additionally, develop maps for GRSG habitat that spatially display current fuels treatment opportunities for suppression resources.
96	PDF (ADH) Give priority for implementing specific GRSG habitat restoration projects in annual grasslands first to sites which are adjacent to or surrounded by GRSG key habitats. Annual grasslands are second priority for restoration when the sites not adjacent to key habitat, but within 2 miles of key habitat. The third priority for annual grasslands habitat restoration projects are sites beyond 2 miles of key habitat. The intent is to focus restoration outward from existing, intact habitat.

**Table C-1**  
**Required Design Features, Preferred Design Features, and Suggested Design Features<sup>1</sup>**

97	PDF (ADH)—Restore annual grasslands to a species composition characterized by perennial grasses, forbs, and shrubs.
98	PDF (ADH) Emphasize the use of native plant species, recognizing that non-native species may be necessary depending on the availability of native seed and prevailing site conditions.
99	PDF (ADH) Remove standing and encroaching trees within at least 100 meters of occupied GRSG leks and other habitats (e.g., nesting, wintering, and brood rearing) to reduce the availability of perch sites for avian predators, as appropriate, and resources permit.
100	RDF (ADH)—Prioritize suppression immediately after firefighter and public safety commensurate with the values-at-risk.
101	PDF (ADH)—Reduce the risk of vehicle or human-caused wildfires and the spread of invasive species by planting perennial vegetation (e.g., green-strips) paralleling road ROW.
102	PDF (ADH) Strategically place and maintain pre-treated strips/areas (e.g., mowing, herbicide application, and strictly managed grazed strips) to aid in controlling wildfire should wildfire occur near key habitats or important restoration areas (such as where investments in restoration have already been made).
<b>Fire Management</b> <b>All Designated Habitat</b>	
103	RDF (ADH)—Develop state-specific GRSG reference and resource materials containing maps, a list of resource advisors, contact information, local guidance, and other relevant information. These state-specific GRSG reference and resource materials are for internal use only.
104	RDF (ADH) Provide localized maps to dispatch offices and extended attack incident commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.
105	PDF (ADH)—Prior to the fire season, provide training to GRSG resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals.
106	PDF (ADH)—Pre-position fire suppression resources based on all resource values-at-risk.
107	RDF (ADH) During periods of multiple fires, ensure line officers are involved in setting priorities.
108	PDF (ADH) Locate wildfire suppression facilities (i.e., base camps, spike camps, drop points, staging areas, and heli-bases) in areas where physical disturbance to GRSG habitat can be minimized. These include disturbed areas, grasslands, near roads/trails or in other areas where there is existing disturbance or minimal sagebrush cover. As appropriate, utilize existing fuel breaks, such as roads or discrete changes in fuel type, as control lines in order to minimize fire spread.
109	PDF (ADH) Power-wash all firefighting vehicles, to the extent possible, including engines, water tenders, personnel vehicles, and ATVs prior to deploying in or near GRSG habitat areas to minimize noxious weed spread.
110	RDF (ADH)—Eliminate unnecessary cross-country vehicle travel during fire operations in GRSG habitat.
111	PDF (ADH) Minimize burnout operations in key GRSG habitat areas by constructing direct fire line whenever safe and practical to do so.
112	PDF (ADH) Utilize retardant and mechanized equipment to minimize burned acreage during initial attack.
113	PDF (ADH) As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.

<sup>1</sup> All Designated Habitat (ADH) includes Priority Habitat Management Areas (PHMA), General Habitat Management Areas (GHMA), and Linkage/Connectivity Habitat Management Areas (LCHMA).

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# Appendix D

## Greater Sage-Grouse Monitoring Framework



# APPENDIX D

## GREATER SAGE-GROUSE MONITORING FRAMEWORK

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This framework was developed by the Interagency GRSB Disturbance and Monitoring Sub-Team.

### D.1 INTRODUCTION

The purpose of this US Bureau of Land Management (BLM) Greater Sage-grouse Monitoring Framework (hereafter, monitoring framework) is to describe the methods to monitor habitats and evaluate the implementation and effectiveness of the BLM planning strategy (BLM Instruction Memorandum 2012-044) to conserve the species and its habitat. The regulations for the BLM (43 CFR 1610.4-9) require that land use plans establish intervals and standards, as appropriate, for monitoring and evaluations, based on the sensitivity of the resource to the decisions involved. Therefore, BLM will use the methods described herein to collect monitoring data to evaluate implementation and effectiveness of the Greater Sage-Grouse (hereafter, sage-grouse) planning strategy and the conservation measures contained in land use plans. The type of monitoring data to be collected at the land use plan scale will be described in the monitoring plan which will be developed after the signing of the ROD. (For a summary of the frequency of reporting, see **Attachment A** at the end of this appendix.) Adaptive management will be informed by data collected at any and all scales.

To ensure the BLM have the ability to make consistent assessments about sage-grouse habitats across the range of the species, This framework lays out the methodology for monitoring the implementation and evaluating the effectiveness of BLM actions to conserve the species and its habitat through monitoring that informs effectiveness at multiple scales. Monitoring efforts will include data for measurable quantitative indicators of sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions. Implementation monitoring results will provide information to allow the BLM to evaluate the extent that decisions from the BLM resource management plans (RMPs) to conserve sage-grouse and its habitat have been implemented. Population monitoring information will be collected by State fish and wildlife agencies and will be incorporated into effectiveness monitoring as it is made available.

This multi-scale monitoring approach is necessary as sage-grouse are a landscape species and conservation is scale-dependent whereby conservation actions are implemented within seasonal habitats to benefit populations. The four orders of habitat selection (Johnson 1980) used in this monitoring

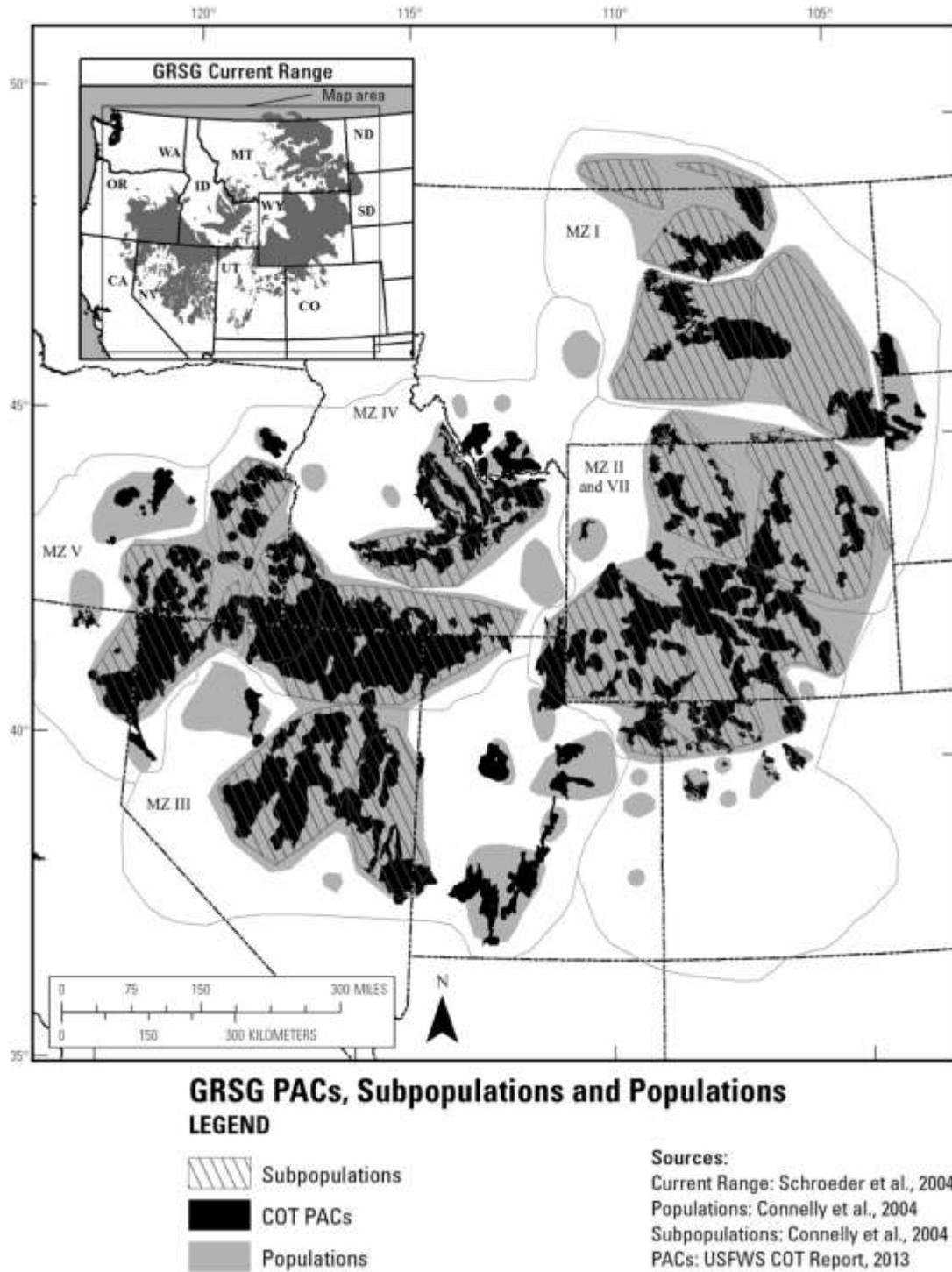
framework are described by Connelly et al. (2003) and Stiver et al. (2014) as first order (broad scale), second order (mid-scale), third order (fine scale), and fourth order (site scale) to apply them to sage-grouse habitat selection. Habitat selection and habitat use by sage-grouse occurs at multiple scales and is driven by multiple environmental and behavioral factors. Managing and monitoring sage-grouse habitats are complicated by the differences in habitat selection across the range and habitat utilization by individual birds within a given season. Therefore, the tendency to look at a single indicator of habitat suitability or only one scale limits the ability for managers to identify the threats to sage-grouse and to respond at the appropriate scale. For descriptions of these habitat suitability indicators for each scale, see the Sage-Grouse Habitat Assessment Framework (HAF; Stiver et al. 2014).

Monitoring methods and indicators in this monitoring framework are derived from the current peer-reviewed science. Range wide best-available datasets for broad and mid-scale monitoring will be acquired. If these existing datasets are not readily available or are inadequate, but are necessary to effectively inform the three measurable quantitative indicators (sagebrush availability, anthropogenic disturbance levels, and sagebrush conditions), the BLM will strive to develop datasets or obtain information to fill these data gaps. Datasets that are not readily available to inform the fine and site scale indicators will be developed. These data will be used to generate monitoring reports at the appropriate and applicable geographic scales, boundaries and analysis units: across the range of sage-grouse as defined by Schroeder et al. (2004), and clipped by Western Association of Fish and Wildlife Agencies (WAFWA) Management Zone (MZ) (Stiver et al. 2006) boundaries and other areas as appropriate for size (e.g., populations based on Connelly et al. 2004; **Figure D-1**). This broad and mid-scale monitoring data and analysis will provide context for RMP/LMP areas; states; GRSG priority habitat management areas, general habitat management areas and other sage-grouse designated management areas such as linkage/connectivity habitat management areas; and priority areas for conservation (PACs) as defined in the Greater Sage-Grouse Conservation Objectives: Final Report (COT report) (USFWS 2013). Throughout the remainder of the document, all of these areas will be referred to as “sage-grouse areas.”

This monitoring framework is divided into two sections. The broad and mid-scale methods, described in **Section D.2**, provide a consistent approach across the range of the species to monitor implementation decisions and actions, mid-scale habitat attributes (e.g., sagebrush availability and habitat degradation), and population changes to determine the effectiveness of BLM planning strategy and management decisions (see **Table D-1**). For the sage-grouse habitat fine and site scales (**Section D.3**), this framework describes a consistent approach (e.g., indicators and methods) for monitoring sage-grouse seasonal habitats. Funding, support, and dedicated personnel for broad and mid-scale monitoring will be renewed annually through the normal budget process. For an overview of the BLM multi-scale monitoring commitments, see **Attachment A** at the end of this appendix.

## **D.2 BROAD AND MID SCALES**

First order habitat selection at the broad scale describes the physical or geographical range of a species. The first order habitat, the range of the species, is defined by populations of sage-grouse associated with sagebrush landscapes based on Schroeder et al. (2004), Connelly et al. (2004), and population surveys and local adjustments based on population or habitat surveys since 2004. There is an intermediate scale between the broad and mid scales that was delineated by WAFWA from floristic provinces, within which similar environmental factors influence vegetation communities. This scale is referred to as the WAFWA sage-grouse MZs. Although no indicators are specific to this scale, these MZs are biologically meaningful as reporting units.



**Figure D-I.** Map of sage-grouse range, populations, subpopulations and PACs as of 2013

**Table D-1**  
**Indicators for Monitoring Implementation of the Strategy, Decisions, Sage-Grouse Habitat,**  
**and Sage-Grouse Populations at the Broad and Mid Scales**

Geographic Scales	Implementation	Habitat		Population (State Wildlife Agencies)
		Availability	Degradation	Demographics
Broad scale: From the range of sage-grouse to WAFWA MZs	BLM planning strategy goal and objectives	Distribution and amount of sagebrush within the range	Distribution and amount of energy, mining, and infrastructure facilities	WAFWA MZ population trend
Mid-scale: From WAFWA MZs to populations; PACs	RMP/LUP decisions	Mid-scale habitat indicators (Stiver et al. 2014); <b>Table D-2</b> (e.g., percent of sagebrush per unit area)	Distribution and amount of energy, mining, and infrastructure facilities ( <b>Table D-2</b> )	Individual population trend

Second-order habitat selection, the mid scale, includes sage-grouse populations and PACs. The second order includes at least 40 discrete populations and subpopulations (Connelly et al. 2004). Populations range in area from 150 to 60,000 square miles; PACs range from 20 to 20,400 square miles and are nested within population areas, and populations are nested within MZs.

Other mid-scale landscape indicators, such as patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. 2014) will also be assessed. The methods used to calculate these metrics will be derived from existing literature (Knick et al. 2011; Leu and Hanser 2011; Knick and Hanser 2011).

### **D.2.1 Implementation (Decision) Monitoring**

Implementation monitoring is the process of tracking and documenting the implementation (or the progress toward implementation) of land use plan decisions. The BLM will monitor implementation of project level and site-specific actions and authorizations with their associated conditions of approval/stipulations for sage-grouse spatially (as appropriate) within priority habitat, general habitat, and other sage-grouse designated management areas, at a minimum, for the Northwest Colorado GRSG ARMPA. These actions and authorizations and progress toward completing and implementing activity-level plans will be monitored consistently across all planning units and reported to BLM headquarters annually, with a summary report every 5 years, for this Northwest Colorado GRSG ARMPA.

The Implementation Monitoring Team will develop a national-level land use plan implementation monitoring and reporting structure (IMARS). It will describe how the BLM will consistently and systematically monitor and report implementation-level activity plans and implementation actions for all plans within the range of sage-grouse. The IMARS will be included in the record of decision (ROD)/approved plan. IMARS is a centralized tracking tool for collection, roll-up, and reporting of tabular and spatially explicit data. The BLM will provide data that can be integrated with other conservation efforts conducted by state and federal partners.

### D.2.2 Habitat Monitoring

In the USFWS's 2010 listing decision for the sage-grouse, USFWS identified 18 threats contributing to the destruction, modification, or curtailment of the sage-grouse's habitat or range (75 Federal Register 13910, March 23, 2010; USFWS 2010). The BLM will therefore monitor the relative extent of these threats that remove sagebrush (**Table D-2**), both spatially and temporally, on all lands within an analysis area, and to report on amount, pattern and condition at the appropriate and applicable geographic scales and boundaries. These 18 threats have been aggregated into three broad and mid-scale measures to account for whether the threat predominantly removes sagebrush or degrades habitat. The three measures are:

- Measure 1: Sagebrush availability (percent of sagebrush per unit area)
- Measure 2: Habitat degradation (percent of human activity per unit area)
- Measure 3: Density of energy and mining (facilities and locations per unit area)

**Table D-2**  
**Relationship Between the 18 Threats and the Three Habitat Disturbance Measures for Monitoring<sup>1</sup>**

USFWS Listing Decision Threat	Sagebrush Availability	Habitat Degradation	Density of Energy and Mining
Agriculture	X		
Urbanization	X		
Wildfire	X		
Conifer encroachment	X		
Treatments	X		
Invasive Species	X		
Energy (oil and gas wells and development facilities)		X	X
Energy (coal mines)		X	X
Energy (wind towers)		X	X
Energy (solar fields)		X	X
Energy (geothermal)		X	X
Mining (active locatable, leasable, and salable developments)		X	X
Infrastructure (roads)		X	
Infrastructure (railroads)		X	
Infrastructure (power lines)		X	
Infrastructure (communication towers)		X	
Infrastructure (other vertical structures)		X	
Other developed rights of ways		X	

<sup>1</sup>Data availability may preclude specific analysis of individual layers; see the detailed method for more information.

These three habitat disturbance measures will evaluate disturbance on all lands regardless of land ownership. The direct area of influence will be assessed with the goal to account for actual removal of sagebrush upon which sage-grouse depend (Connelly et al. 2000) and for habitat degradation as a surrogate for human activity. Measure 1 examines where disturbances have removed plant communities that support sagebrush (or have broadly removed sagebrush from the landscape), and therefore

monitors the change in sagebrush availability, or specifically where and how much of the sagebrush community is available within the range of sage-grouse. The sagebrush community is defined as the ecological systems that have the capability to support sagebrush vegetation and seasonal sage-grouse habitats within the range of sage-grouse (see Sagebrush Availability, below).

Measures 2 and 3 (see Habitat Degradation, below) focus on where habitat degradation is occurring using the footprint/area of direct disturbance and the number of facilities at the mid-scale to identify the relative amount of degradation per geographic unit of interest and in areas that have the capability to support sagebrush and seasonal sage-grouse use. Measure 2 is not only a quantification of footprint/area of direct disturbance but also a surrogate for those threats most likely to have ongoing activity. In addition, energy development and mining activities are typically the most intensive activities in sagebrush habitat. Therefore, Measure 3, the density of active energy development, production, and mining sites will be monitored to help identify areas of particular concern for factors such as noise, dust, and traffic that degrade sage-grouse habitat.

The methods to monitor disturbance found herein differ slightly from methods used in the Sage-Grouse Baseline Environmental Report (BER; Manier et al. 2013) that provided a baseline of datasets of disturbance across jurisdictions. One difference is that, for some threats, the data in the BER were for federal lands only. In addition, threats were assessed individually in that report, using different assumptions from those in this monitoring framework about how to quantify the location and magnitude of threats. The methodology herein builds on the BER methodology and identifies datasets and procedures to utilize the best available data across the range of the sage-grouse and to formulate a consistent approach to quantify impact of the threats through time. This methodology also describes an approach to combine the threats and calculate the three measures.

#### ***D.2.2.1 Sagebrush Availability (Measure 1)***

Sage-grouse populations have been found to be more resilient where a percentage of the landscape is maintained in sagebrush (Knick and Connelly 2011), which will be determined by sagebrush availability. This measure has been divided into two sub-measures to describe sagebrush availability on the landscape:

- Measure 1a) the current amount of sagebrush on the landscape of interest and
- Measure 1b) the amount of sagebrush on the landscape of interest compared to the amount of sagebrush the landscape of interest could ecologically support.

Measure 1a (the current amount of sagebrush on the landscape) will be calculated using this formula: [the existing updated sagebrush layer] divided by [the geographic unit of interest]. The appropriate geographic units of interest for sagebrush availability include the species' range, WAFWA Management Zones, populations, and PACs. In some cases these sage-grouse areas will need to be aggregated to provide an estimate of sagebrush availability with an acceptable level of accuracy.

Measure 1b (the amount of sagebrush for context within the area of interest) will be calculated using this formula: [the existing updated sagebrush layer (EVT)] divided by [pre Euro-American geographic extent of lands that could have supported sagebrush (BpS)]. This will provide information during evaluations of monitoring data to set the context for a given geographic unit of interest. That information could also be used for management options for restoration or mitigation.

The sagebrush base layer for the sagebrush availability measure will be based on geospatial vegetation data adjusted for the threats listed in **Table D-2**. The following sub-sections of this monitoring framework describe the methodology to determine both the current availability of sagebrush on the landscape and the context of the amount of sagebrush on the landscape at the broad and mid-scales.

#### *Establishing the Sagebrush Base Layer*

The current geographic extent of sagebrush vegetation within the range wide distribution of sage-grouse populations will be ascertained using the most recent version of the EVT layer in LANDFIRE (2010). LANDFIRE EVT was selected to serve as the sagebrush base layer for five reasons, as follows:

- It is the only nationally consistent vegetation layer that has been updated multiple times since 2001.
- The ecological systems classification within LANDFIRE EVT include multiple sagebrush type classes that, when aggregated, provide a more accurate (compared with individual classes) and seamless sagebrush base layer across jurisdictional boundaries.
- LANDFIRE performed a rigorous accuracy assessment from which to derive the range-wide uncertainty of the sagebrush base layer.
- LANDFIRE is consistently used in several recent analyses of sagebrush habitats (Knick et al. 2011; Leu and Hanser 2011; Knick and Hanser 2011).
- LANDFIRE EVT can be compared against the geographic extent of lands that are believed to have had the capability to support sagebrush vegetation BpS.

This fifth reason provides a reference point for understanding how much sagebrush currently remains in a defined geographic area compared with how much sagebrush existed historically (Measure 1b). Therefore, BLM have determined that LANDFIRE provides the best available data at broad and mid-scales to serve as a sagebrush base layer for monitoring changes in the geographic extent of sagebrush. Along with aggregating the sagebrush types into the sagebrush base layer, BLM will aggregate the accuracy assessment reports from LANDFIRE to document the cumulative accuracy for the sagebrush base layer. For the long-term, BLM through its Assessment, Inventory, and Monitoring (AIM) Program and specifically the BLM'S Landscape Monitoring Framework (Taylor et al. In press) will provide field data to the LANDFIRE program to support continuous quality improvements in their products specifically for rangeland systems to improve the LANDFIRE EVT layer.

Within the BLM, forest-wide and field office-wide existing vegetation classification mapping and inventories are available that provide a much finer level of data than provided through LANDFIRE. Where available, these finer scale products are useful for additional and complimentary mid-scale indicators and local scale analyses (see **Section D.3**, Fine and Site Scales). The fact that these products are not available everywhere limits their utility for monitoring at the broad and mid-scale where consistency of data products is necessary across broader geographies.

The sagebrush layer based on LANDFIRE EVT will allow for the mid-scale estimation of existing percent sagebrush across a variety of reporting units. This sagebrush base layer will be adjusted by changes in land cover and successful restoration for future calculations of sagebrush availability (Measures 1a and 1b).

This layer will be used to determine the trend in other landscape indicators, such as patch size and number, patch connectivity, linkage areas, and landscape matrix and edge effects (Stiver et al. 2014).

In the future, changes in sagebrush availability, generated bi-annually, will be included in the sagebrush base layer. The landscape metrics will be recalculated to examine changes in pattern and abundance of sagebrush at the various geographic boundaries. This information will be included in effectiveness monitoring (see **Section D.2.4**, Effectiveness Monitoring).

#### Data Sources to Establish and Monitor Sagebrush Availability

In much the same manner as how the LANDFIRE data was selected as the data source, described above, the criteria for selecting the datasets (**Table D-3**) for establishing and monitoring the change in sagebrush availability, Measure I, were threefold:

- Nationally consistent dataset available across the range
- Known level of confidence or accuracy in the dataset
- Dataset is continually maintained with a known update interval

**Table D-3**  
**Datasets for Establishing and Monitoring Changes in Sagebrush Availability**

<b>Dataset</b>	<b>Source</b>	<b>Update Interval</b>	<b>Most Recent Version Year</b>	<b>Use</b>
BpS v1.1	LANDFIRE	Static	2008	Denominator for sagebrush availability (1b.)
EVT v1.2	LANDFIRE	Static	2010	Numerator for sagebrush availability
Cropland data layer (CDL)	National Agricultural Statistics Service (NASS)	Annual	2012	Agricultural updates; removes existing sagebrush from numerator of sagebrush availability
National Land Cover Dataset (NLCD) percent imperviousness	Multi-Resolution Land Characteristics Consortium (MRLC)	5 years	2011, made available in March 2014	Urban area updates; removes existing sagebrush from numerator of sagebrush availability
Fire perimeters	GeoMac	Annual	2013	< 1,000 acres fire updates; removes existing sagebrush from numerator of sagebrush availability
Burn severity	Monitoring Trends in Burn Severity (MTBS)	Annual	2012, made available in April 2014	> 1,000 acres fire updates; removes existing sagebrush from numerator of sagebrush availability, except for unburned sagebrush islands

LANDFIRE EVT Version 1.2

LANDFIRE EVT represents existing vegetation types on the landscape derived from remote sensing data. Initial mapping was conducted using imagery collected in approximately 2001. Since the initial mapping, there have been two update efforts: version 1.1 represents changes up to 2008 and version 1.2 reflects changes on the landscape up to 2010. Version 1.2 will be used as the starting point to develop the sagebrush base layer.

Ecological systems from the LANDFIRE EVT to be used in the sagebrush base layer were determined by sage-grouse subject matter experts through the identification of the ecological systems that have the capability of supporting sagebrush vegetation and could provide suitable seasonal habitat for the sage-grouse (**Table D-4**). Two additional vegetation types that are not ecological systems were added to the EVT and are *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance and *Quercus gambelii* Shrubland Alliance. These alliances have species composition directly related to the Rocky Mountain Lower Montane-Foothill Shrubland ecological system and the Rocky Mountain Gambel Oak-Mixed Montane Shrubland ecological system, both of which are ecological systems in LANDFIRE BpS. However, in LANDFIRE EVT in some map zones, the Rocky Mountain Lower Montane-Foothill Shrubland ecological system and the Rocky Mountain Gambel Oak-Mixed Montane Shrubland ecological system were named *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance and *Quercus gambelii* Shrubland Alliance.

**Table D-4**  
**Ecological Systems in BpS and EVT Capable of Supporting Sagebrush Vegetation and Could Provide Suitable Seasonal Habitat for Greater Sage-Grouse**

<b>Ecological System</b>	<b>Sagebrush Vegetation that the Ecological System has the Capability to Produce</b>
Colorado Plateau Mixed Low Sagebrush Shrubland	<i>Artemisia arbuscula</i> ssp. <i>longiloba</i> <i>Artemisia bigelovii</i> <i>Artemisia nova</i> <i>Artemisia frigida</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
Columbia Plateau Scabland Shrubland	<i>Artemisia rigida</i>
Great Basin Xeric Mixed Sagebrush Shrubland	<i>Artemisia arbuscula</i> ssp. <i>longicaulis</i> <i>Artemisia arbuscula</i> ssp. <i>longiloba</i> <i>Artemisia nova</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
Inter-Mountain Basins Big Sagebrush Shrubland	<i>Artemisia tridentata</i> ssp. <i>tridentata</i> <i>Artemisia tridentata</i> ssp. <i>xericensis</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
Inter-Mountain Basins Mixed Salt Desert Scrub	<i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> <i>Artemisia spinescens</i>
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	<i>Artemisia arbuscula</i> ssp. <i>longiloba</i> <i>Artemisia nova</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> <i>Artemisia tripartita</i> ssp. <i>rupicola</i>
Columbia Plateau Low Sagebrush Steppe	<i>Artemisia arbuscula</i> <i>Artemisia arbuscula</i> ssp. <i>longiloba</i> <i>Artemisia nova</i>

**Table D-4**  
**Ecological Systems in BpS and EVT Capable of Supporting Sagebrush Vegetation and**  
**Could Provide Suitable Seasonal Habitat for Greater Sage-Grouse**

<b>Ecological System</b>	<b>Sagebrush Vegetation that the Ecological System has the Capability to Produce</b>
Inter-Mountain Basins Big Sagebrush Steppe	<i>Artemisia cana</i> ssp. <i>cana</i> <i>Artemisia tridentata</i> ssp. <i>tridentata</i> <i>Artemisia tridentata</i> ssp. <i>xericensis</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> <i>Artemisia tripartita</i> ssp. <i>tripartita</i> <i>Artemisia frigida</i>
Inter-Mountain Basins Montane Sagebrush Steppe	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> <i>Artemisia nova</i> <i>Artemisia arbuscula</i> <i>Artemisia tridentata</i> ssp. <i>spiciformis</i>
Northwestern Great Plains Mixed grass Prairie	<i>Artemisia cana</i> ssp. <i>cana</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> <i>Artemisia frigida</i>
Northwestern Great Plains Shrubland	<i>Artemisia cana</i> ssp. <i>cana</i> <i>Artemisia tridentata</i> ssp. <i>tridentata</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
Western Great Plains Sand Prairie	<i>Artemisia cana</i> ssp. <i>cana</i>
Western Great Plains Floodplain Systems	<i>Artemisia cana</i> ssp. <i>cana</i>
Columbia Plateau Steppe and Grassland	<i>Artemisia</i> spp.
Inter-Mountain Basins Semi-Desert Shrub-Steppe	<i>Artemisia tridentata</i> <i>Artemisia bigelovii</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i>
Rocky Mountain Lower Montane-Foothill Shrubland	<i>Artemisia nova</i> <i>Artemisia tridentata</i> <i>Artemisia frigida</i>
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	<i>Artemisia tridentata</i>
Inter-Mountain Basins Curl-Leaf Mountain Mahogany Woodland and Shrubland	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> <i>Artemisia arbuscula</i> <i>Artemisia tridentata</i>
<i>Artemisia tridentata</i> ssp. <i>vaseyana</i> Shrubland Alliance (EVT only)	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>
<i>Quercus gambelii</i> Shrubland Alliance (EVT only)	<i>Artemisia tridentata</i>

#### Accuracy and Appropriate Use of LANDFIRE Datasets

Because of concerns over the thematic accuracy of individual classes mapped by LANDFIRE, all ecological systems listed in **Table D-4** will be merged into one value that represents the sagebrush base layer. By aggregating all ecological systems, the combined accuracy of the sagebrush base layer (EVT) is much greater than if all categories were treated separately.

LANDFIRE performed the original accuracy assessment of their EVT product on a map zone basis. There are 20 LANDFIRE map zones that cover the historic range of sage-grouse as defined by Schroeder et al. (2004). **Attachment C** at the end of this appendix lists the user and producer accuracies for the aggregated ecological systems that make up the sagebrush base layer and also defines user and producer accuracies. The aggregated sagebrush base layer for monitoring had producer accuracies ranging from 56.7 to 100 percent and user accuracies ranging from 57.1 to 85.7 percent.

*LANDFIRE EVT data are not designed to be used at a local level.* In reporting the percent sagebrush statistic for the various reporting units (Measure 1a), the uncertainty of the percent sagebrush will increase as the size of the reporting unit gets smaller. LANDFIRE data should never be used at the pixel level (30m<sup>2</sup> resolution of raster data) for any reporting. The smallest geographic extent use of the data for this purpose is at the PAC level and for the smallest PACs the initial percent sagebrush estimate will have greater uncertainties compared with the much larger PACs.

#### Agricultural Adjustments for the Sagebrush Base Layer

The dataset for the geographic extent of agricultural lands will come from the National Agricultural Statistics Service (NASS) Cropland Data Layer (CDL) (<http://www.nass.usda.gov/research/Cropland/Release/index.htm>). CDL data are generated on an annual basis with “estimated producer accuracies for large row crops from the mid 80 to mid-90 percent” depending on the state ([http://www.nass.usda.gov/research/Cropland/sarsfaqs2.htm#Section3\\_18.0](http://www.nass.usda.gov/research/Cropland/sarsfaqs2.htm#Section3_18.0)). Readers are referred to the NASS metadata website for specific information on accuracy (<http://www.nass.usda.gov/research/Cropland/metadata/meta.htm>). CDL provided the only dataset that matches the three criteria (nationally consistent, known level of accuracy, and periodically updated) for use in this monitoring framework and represents the best available agricultural lands mapping product.

The CDL data contain both agricultural classes as well as non-agricultural classes. For this effort, as was also done in the Baseline Environmental Report (Manier et al. 2013), non-agricultural classes were removed from the original dataset. The excluded classes are:

- Barren (65 & 131)
- Deciduous Forest (141)
- Developed/High Intensity (124)
- Developed/Low Intensity (122)
- Developed/Med Intensity (123)
- Developed/Open Space (121)
- Evergreen Forest (142)
- Grassland Herbaceous (171)
- Herbaceous Wetlands (195)
- Mixed Forest (143)
- Open Water (83 and 111)
- Other Hay/Non-Alfalfa (37)

- Pasture/Hay (181)
- Pasture/Grass (62)
- Perennial Ice/Snow (112)
- Shrubland (64 and 152)
- Woody Wetlands (190)

The rule set for adjusting the sagebrush base layer for agricultural lands is that, once an area is classified as agriculture in any year of the CDL, those pixels will remain out of the sagebrush base layer, even if a new version of CDL classifies that pixel as one of the non-agricultural classes listed above. The assumption is that even though individual pixels may get classified as a non-agricultural class in any given year, the pixel has not necessarily been restored to a natural sagebrush community that would be included in **Table D-4**. It is further assumed that once an area has moved into agricultural use, it is unlikely that it would be restored to sagebrush, however, should that occur, the method and criteria for adding pixels back into the sagebrush base layer would follow those found in the Restoration Updates section of this framework.

#### Urban Adjustments for the Sagebrush Base Layer

The NLCD Percent Imperviousness was selected as the best available dataset to be used for urban updates. These data are generated on a 5-year cycle and specifically designed to support monitoring efforts. Other datasets were evaluated and lacked the spatial specificity that was captured in the NLCD product. Any new impervious pixel will be removed from the sagebrush base layer during the update process.

Although the impervious surface layer includes a number of impervious pixels outside of urban areas, there are two reasons why this is acceptable for this process. First, an evaluation of national urban area datasets did not reveal a layer that could be confidently used in conjunction with the NLCD product to screen impervious pixels outside of urban zones because unincorporated urban areas were not being included thus leaving large chunks of urban pixels unaccounted for in this rule set. Secondly, experimentation with setting a threshold on the percent imperviousness layer that would isolate rural features proved to be unsuccessful. No combination of values could be identified that would result in the consistent ability to limit impervious pixels outside urban areas. Therefore, to ensure consistency in the monitoring estimates, it was determined to include all impervious pixels.

#### Fire Adjustments for the Sagebrush Base Layer

Two datasets were selected for performing fire updates: GeoMac fire perimeters and Monitoring Trends in Burn Severity (MTBS). An existing data standard in the BLM requires all fires with sizes greater than 10 acres to be reported to GeoMac, therefore there will be many small fires less than 10 acres in size that will not be accounted for in the fire updates. In the update process using fire perimeters from GeoMac, all sagebrush pixels falling within the perimeter of fires less than 1000 acres in size will be used to update the sagebrush layer.

MTBS was selected for use as a means to account for unburned sagebrush islands during the update process of the sagebrush base layer. The MTBS program (<http://www.mtbs.gov>) is an on-going multi-year project to consistently map fire severity and fire perimeters across the US For lands in the Western US, MTBS only maps burn severity for fires greater than 1,000 acres in size. One of the burn severity classes

within MTBS is an unburned to low severity class. This burn severity class will be used to represent unburned islands of sagebrush within the fire perimeter that will be retained in the sagebrush base layer. Areas within the other severity classes within the fire perimeter will be removed from the base sagebrush layer during the update process. However, not all wildfires have the same impact on the recovery of sagebrush habitat depending largely on soil moisture and temperature regimes. For example, cooler, moister sagebrush habitat has a higher potential for recovery or, if needed restoration, than the warmer, dryer sagebrush habitat. These areas will likely be detected as sagebrush in future updates to LANDFIRE.

#### Conifer Encroachment Adjustment for the Sagebrush Base Layer

Conifer encroachment into sagebrush vegetation reduces the spatial extent of greater sage-grouse habitat (Davies et al. 2011; Baruch-Mordo et al. 2013). Conifer species that show propensity for encroaching into sagebrush vegetation which results in sage-grouse habitat loss include various juniper species, as follows (Gruell et al. 1986; Grove et al. 2005; Davies et al. 2011):

- Utah juniper (*Juniperus osteosperma*)
- Western juniper (*Juniperus occidentalis*)
- Rocky Mountain juniper (*Juniperus scopulorum*)
- Pinyon species (singleleaf pinyon [*Pinus monophylla*] and pinyon pine [*P. edulis*], ponderosa pine [*P. ponderosa*], lodgepole pine [*P. contorta*], and Douglas-fir [*Pseudotsuga menziesii*])

A rule set for conifer encroachment was developed to be used for determining the existing sagebrush base layer. To capture the geographic extent of sagebrush that is likely to experience conifer encroachment, ecological systems within LANDFIRE EVT version 1.2 (NatureServe 2011) were identified if they have the capability of supporting the conifer species (listed above) and have the capability of supporting sagebrush vegetation. Those ecological systems (**Table D-5**) were deemed to be the plant communities with conifers most likely to encroach into sagebrush vegetation. Sagebrush vegetation was defined as including sagebrush species (**Attachment B** at the end of this appendix) that provide habitat for the greater sage-grouse and are included in the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2014). An adjacency analysis was conducted to identify all sagebrush pixels that were directly adjacent to these conifer ecological systems and these immediately adjacent sagebrush pixels were removed from the sagebrush base layer.

#### Invasive Annual Grasses Adjustments for the Sagebrush Base Layer

There are no invasive species datasets from 2010 to present (beyond the LANDFIRE data) that meet our 3 criteria (nationally consistent, known level of accuracy, and periodically updated) for use in the determination of the sagebrush base layer. For a description of how invasive species land cover will be incorporated in the sagebrush base layer in the future, see *Monitoring Sagebrush Availability*, below.

#### Sagebrush Restoration Adjustments for the Sagebrush Base Layer

There are no datasets from 2010 to present that could provide additions to the sagebrush base layer from restoration treatments that meet the three criteria (nationally consistent, known level of accuracy, and periodically updated) therefore, no adjustments were made to the sagebrush base layer calculated from the LANDFIRE EVT (Version 1.2) due to restoration activities since 2010. Successful restoration treatments prior to 2010 are assumed to have been captured in the LANDFIRE refresh.

**Table D-5**  
**Ecological Systems with Conifers Most Likely to Encroach into Sagebrush Vegetation**

<b>EVT Ecological Systems</b>	<b>Coniferous Species and Sagebrush Vegetation that the Ecological System has the Capability to Produce</b>
Colorado Plateau Pinyon-Juniper Woodland	<i>Pinus edulis</i> <i>Juniperus osteosperma</i> <i>Artemisia tridentata</i> <i>Artemisia arbuscula</i> <i>Artemisia nova</i> <i>Artemisia tridentata</i> ssp. <i>tridentata</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i> <i>Artemisia bigelovii</i> <i>Artemisia pygmaea</i>
Columbia Plateau Western Juniper Woodland and Savanna	<i>Juniperus occidentalis</i> <i>Pinus ponderosa</i> <i>Artemisia tridentata</i> <i>Artemisia arbuscula</i> <i>Artemisia rigida</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i>
East Cascades Oak-Ponderosa Pine Forest and Woodland	<i>Pinus ponderosa</i> <i>Pseudotsuga menziesii</i> <i>Artemisia tridentata</i> <i>Artemisia nova</i>
Great Basin Pinyon-Juniper Woodland	<i>Pinus monophylla</i> <i>Juniperus osteosperma</i> <i>Artemisia arbuscula</i> <i>Artemisia nova</i> <i>Artemisia tridentata</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i>
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	<i>Pinus ponderosa</i> <i>Artemisia tridentata</i> <i>Artemisia arbuscula</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i>
Rocky Mountain Foothill Limber Pine-Juniper Woodland	<i>Juniperus osteosperma</i> <i>Juniperus scopulorum</i> <i>Artemisia nova</i> <i>Artemisia tridentata</i>
Rocky Mountain Poor-Site Lodgepole Pine Forest	<i>Pinus contorta</i> <i>Pseudotsuga menziesii</i> <i>Pinus ponderosa</i> <i>Artemisia tridentata</i>
Southern Rocky Mountain Pinyon-Juniper Woodland	<i>Pinus edulis</i> <i>Juniperus monosperma</i> <i>Artemisia bigelovii</i> <i>Artemisia tridentata</i> <i>Artemisia tridentata</i> ssp. <i>wyomingensis</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i>

**Table D-5**  
**Ecological Systems with Conifers Most Likely to Encroach into Sagebrush Vegetation**

<b>EVT Ecological Systems</b>	<b>Coniferous Species and Sagebrush Vegetation that the Ecological System has the Capability to Produce</b>
Southern Rocky Mountain Ponderosa Pine Woodland	<i>Pinus ponderosa</i> <i>Pseudotsuga menziesii</i> <i>Pinus edulis</i> <i>Pinus contorta</i> <i>Juniperus</i> spp. <i>Artemisia nova</i> <i>Artemisia tridentata</i> <i>Artemisia arbuscula</i> <i>Artemisia tridentata</i> ssp. <i>vaseyana</i>

#### *Monitoring Sagebrush Availability*

#### Updating the Sagebrush Availability Sagebrush Base Layer

Sagebrush availability will be updated annually by incorporating changes to the sagebrush base layer attributable to agriculture, urbanization, and wildfire. The monitoring schedule for the existing sagebrush base layer updates is as follows:

**2010 Existing Sagebrush Base Layer** = [Sagebrush EVT] minus [2006 Imperviousness Layer] minus [2009 and 2010 CDL] minus [2009/10 GeoMac Fires < 1,000 acres] minus [2009/10 MTBS Fires excluding unburned sagebrush islands] minus [Conifer Encroachment Layer]

**2012 Existing Sagebrush Update** = [Base 2010 Existing Sagebrush Layer] minus [2011 Imperviousness Layer] minus [2011 and 2012 CDL] minus [2011/12 GeoMac Fires < 1,000 acres] minus [2011/12 MTBS Fires that are greater than 1,000 acres, excluding unburned sagebrush islands within the perimeter]

**2013 and beyond Existing Sagebrush Updates** = [Previous Existing Sagebrush Update Layer] minus [Imperviousness Layer (if new data are available)] minus [Next 2 years of CDL] minus [Next 2 years of GeoMac Fires < 1,000 acres] minus [Next 2 years MTBS Fires that are greater than 1,000 acres, excluding unburned sagebrush islands within the perimeter] plus [restoration/monitoring data provided by the field]

#### Sagebrush Restoration Updates

restoration after fire, after agricultural conversion, after seedings of introduced grasses, or after treatments of pinyon pine and/or juniper, are examples of updates to the sagebrush base layer that can add sagebrush vegetation back in. When restoration has been determined to be successful through range wide, consistent, interagency fine and site-scale monitoring, the polygonal data will be used to add sagebrush pixels back into the broad and mid-scale sagebrush base layer.

#### Measure 1b – Context for the change in the amount of sagebrush in a landscape of interest

Measure 1b describes the amount of sagebrush on the landscape of interest compared with the amount of sagebrush the landscape of interest could ecologically support. Areas with the potential to support

sagebrush were derived from the BpS data layer that describes sagebrush pre Euro-American settlement (BpS v1.2 of LANDFIRE). This measure (1b) will provide information during evaluations of monitoring data to set the context for a given geographic area of interest. The information could also be used to inform management options for restoration, mitigation and inform effectiveness monitoring.

The identification and spatial locations of natural plant communities (vegetation) that are believed to have existed on the landscape (BpS) were constructed based on an approximation of the historical (pre Euro-American settlement) disturbance regime and how the historical disturbance regime operated on the current biophysical environment. BpS is composed of map units, which are based on NatureServe's (2011) terrestrial ecological systems classification.

The ecological systems within BpS used for this monitoring framework are those ecological systems that have the capability of supporting sagebrush vegetation and could provide seasonal habitat for the sage-grouse. These ecological systems are listed in **Table D-4**, with the exception of the *Artemisia tridentata* ssp. *vaseyana* Shrubland Alliance and the *Quercus gambelii* Shrubland Alliance. Ecological systems selected included sagebrush species or subspecies that are included in the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2014) and are found in Attachment B at the end of this appendix.

Attributable to the lack of any reference data, the BpS layer does not have an associated accuracy assessment. Visual inspection, however, of the BpS data reveals inconsistencies in the labeling of pixels among LANDFIRE map zones. The reason for these inconsistencies between map zones are the decision rules used to map a given ecological system will vary between map zones based on different physical, biological, disturbance, and atmospheric regimes of the region. This can result in artificial edges in the map that are an artifact of the mapping process. However, metrics will be calculated at broad spatial scales using BpS potential vegetation type, not small groupings or individual pixels; therefore, the magnitude of these observable errors in the BpS layer is minor compared with the size of the reporting units. Therefore, since BpS will be used to identify broad landscape patterns of dominant vegetation, these inconsistencies will have only a minor impact on the percent sagebrush availability calculation.

LANDFIRE BpS data are not designed to be used at a local level. In reporting the percent sagebrush statistic for the various reporting units, the uncertainty of the percent sagebrush will increase as the size of the reporting unit gets smaller. LANDFIRE data should never be used at the pixel level (30m<sup>2</sup>) for any reporting. The smallest geographic extent use of the data for this purpose is at the PAC level and for the smallest PACs the initial percent sagebrush remaining estimate will have greater uncertainties, compared with the much larger PACs.

### Tracking

The BLM will analyze and monitor sagebrush availability (Measure 1) on a bi-annual basis and it will be used to inform effectiveness monitoring and initiate adaptive management actions as necessary. The 2010 estimate of sagebrush availability will serve as the base year, and an updated estimate for 2012 will be reported in 2014 after all datasets become available. The 2012 estimate will capture changes attributable to fire, agriculture, and urban development. Subsequent updates will always include new fire and agricultural data and new urban data when available.

Restoration data that meets the criteria of adding sagebrush areas back into the sagebrush base layer will begin to be factored in as data allows. Attributable to data availability, there will be a two-year lag

(approximately) between when the estimate is generated and when the data used for the estimate becomes available (e.g., the 2014 sagebrush availability will be included in the 2016 estimate).

#### Future Plans

Geospatial data used to generate the sagebrush base layer will be available through the BLM's EGIS Web Portal and Geospatial Gateway or through the authoritative data source. Legacy datasets will be preserved so that trends may be calculated. Additionally, accuracy assessment data for all source datasets will be provided on the portal either spatially, where applicable, or through the metadata. Accuracy assessment information was deemed vital to share to help users understand the limitation of the sagebrush estimates and will be summarized spatially by map zone and included in the portal.

LANDFIRE plans to begin a remapping effort in 2015. This remapping has the potential to greatly improve overall quality of the data products primarily through the use of higher quality remote sensing datasets. Additionally, BLM and the Multi-Resolution Land Characteristics Consortium (MRLC) are working to improve the accuracy of vegetation map products for broad and mid-scale analyses through the grass/shrub mapping effort in partnership with the MRLC. The grass/shrub mapping effort applies the Wyoming multi-scale sagebrush habitat methodology (Homer et al. 2009) to spatially depict fractional percent cover estimates for five components range and West-wide. These five components are percent cover of sagebrush vegetation, percent bare ground, percent herbaceous vegetation (grass and forbs combined), annual vegetation, and percent shrubs. One of the benefits of the design of these fractional cover maps is that they facilitate monitoring "with-in" class variation (e.g., examination of declining trend in sagebrush cover for individual pixels). This "with-in" class variation can serve as one indicator of sagebrush quality that cannot be derived from LANDFIRE's EVT information. The grass/shrub effort is not a substitute for fine scale monitoring, but will leverage fine scale data to support the validation of the mapping products. An evaluation will be conducted to determine if either dataset is of great enough quality to warrant replacing the existing sagebrush layers. The earliest possible date for this evaluation will not occur until 2018 or 2019 depending on data availability.

#### **D.2.2.2 Habitat Degradation Monitoring (Measure 2)**

The measure of habitat degradation will be calculated by combining the footprints of threats identified in **Table D-2**. The footprint is defined as the direct area of influence of "active" energy and infrastructure and is used as a surrogate for human activity. Thus, the footprint of habitat degradation per sage-grouse area will be calculated. Although these analyses will try to summarize results at the aforementioned meaningful landscape units, some may be too small to appropriately report the metrics and may be combined (e.g., smaller populations and PACs within a population). Data sources for each threat are found in **Table D-6**. Specific assumptions (e.g., inclusion criteria for data and width/area assumptions for point and line features) and methodology for each threat, and the combined measure are detailed below. All datasets will be updated annually to monitor broad and mid-scale year-to-year changes and to calculate trends in habitat degradation to inform adaptive management. A 5-year summary report will be available to USFWS.

#### *Habitat Degradation Datasets and Assumptions:*

##### Energy (oil and gas wells and development facilities)

This dataset will be a compilation of two oil and gas well databases: the proprietary IHS Enerdeq database and the BLM Automated Fluid Minerals Support System (AFMSS) database (AFMSS data will be

**Table D-6**  
**Geospatial Data Sources for Habitat Degradation (Measure 2)**

<b>FWS Listing Decision Threat</b>	<b>Data Source</b>	<b>Direct Area of Influence</b>
Agriculture	National Agriculture Statistics Service	Polygon area
Urbanization	USGS Percent Imperviousness	Polygon area
Wildfire	Geospatial Multi-Agency Coordination Group; Monitoring Trends in Burn Severity	Polygon area
Conifer encroachment	LANDFIRE	Polygon area
Energy (oil and gas wells and development facilities)	IHS; BLM (AFMSS)	5 acres (2.0 hectares)
Energy (reclaimed site degradation)	IHS; BLM (AFMSS)	3 acres (1.2 hectares)
Energy (coal mines)	BLM and Forest Service data; Office of Surface Mining Reclamation and Enforcement	Polygon area
Energy (wind towers)	Federal Aviation Administration	3 acres (1.2 hectares)
Energy (solar fields)	Argonne National Laboratory	Polygon area
Energy (geothermal)	Argonne National Laboratory	Polygon area or 5 acres (2.0 hectares)
Mining (active locatable, leasable, and salable developments)	InfoMine	Polygon area or 5 acres (2.0 hectares)
Infrastructure (roads)	ESRI StreetMap Premium	40.7-240.2 feet (12.4-73.2 meters)
Infrastructure (railroads)	Federal Railroad Administration	30.8 feet (9.4 meters)
Infrastructure (power lines)	Platts Transmission Lines	100-250 feet (30.5-76.2 meters)
Infrastructure (communication towers)	Federal Communications Commission	2.5 acres (1.0 hectares)
Infrastructure (other vertical structures)	Federal Aviation Administration	2.5 acres (1.0 hectares)

used to supplement the IHS data). Point data from wells active within the last ten years from IHS and producing wells from AFMSS will be considered as a 5-acre (2.0-hectare) footprint (BLM WO 2014) centered on the well point. Plugged and abandoned wells will be removed, though only if the date of well abandonment was prior to the first day of the reporting year (i.e., for the 2010 reporting year, a well must be plugged and abandoned by December 31, 2009, to be removed).

Additional Measure: Reclaimed Energy-related Degradation

This dataset will include those wells that have been plugged and abandoned in an effort to measure energy-related degradation that has been reclaimed but not necessary fully restored to sage-grouse habitat. This measure will establish a baseline by using wells that have been plugged and abandoned within the last ten years from the IHS and AFMSS datasets.

Time lags for lek attendance in response to infrastructure have been documented to be delayed by 2 to 10 years from energy development activities (Harju et al. 2010), while reclamation actions may require two or more years from the final abandonment notice. Sagebrush seedling establishment may take six or more years from the point of seeding, depending on variables such as annual precipitation, annual temperature, and soil type and depth (Pyke 2011). This ten-year period is conservative, assuming some level of habitat improvement ten years after plugging. However, research by Hemstrom et al. (2002) proposes an even longer period of greater than 100 years for recovery of sagebrush habitats even with active restoration approaches. Direct area of influence will be considered 3 acres (1.2 hectares<sup>1</sup>). This additional layer/measure could be used at the broad- and mid-scale to identify areas where sagebrush habitat and/or potential sagebrush habitat is likely still degraded and where further investigation at the fine or site-scale would be warranted to: (1) quantify the level of reclamation already conducted, and (2) evaluate the amount of restoration still required (for sagebrush habitat recovery). At a particular level (e.g., population or PACs), these areas and the reclamation efforts/success could be used to inform reclamation standards associated with future developments. Once these areas have transitioned from reclamation standards to meeting *restoration* standards, they can be added back into the sagebrush availability layer using the same methodology as described for adding restoration treatment areas lost to fire and agriculture conversion (see the *Sagebrush Restoration Updates* section). This dataset will be updated annually with new plugged and abandoned well from the IHS dataset.

#### Energy (coal mines)

Currently there is no comprehensive dataset available that identifies the footprint of active coal mining across all jurisdictions. Therefore, point and polygon datasets will be used each year to identify coal mining locations. Data sources will be identified and evaluated annually and will include at a minimum: BLM coal lease polygons, US Energy Information Administration mine occurrence points, US Office of Surface Mining Reclamation and Enforcement (OSMRE) coal mining permit polygons (as available), and USGS Mineral Resources Data System (MRDS) mine occurrence points. These data will inform where active coal mining may be occurring. Aerial imagery will then be used to manually digitize active coal mining surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from ESRI and/or Google will be utilized to locate (generally at 1:50,000 and below) and digitize (generally at 1:10,000 and below) active coal mine footprints. Coal mine location data source and imagery date will be documented for each digitized coal footprint polygon at the time of creation. Sub-surface facility locations (polygon or point location as available) will also be collected, if available, and included in density calculations, and added to the active surface activity layer as appropriate (if actual footprint can be located).

#### Energy (wind energy facilities)

This dataset will be a subset of the Federal Aviation Administration Digital Obstacles point file to include points where "Type\_" = "WINDMILL." Direct area of influence of these point features will be measured by converting to a polygon dataset of 3 acres (1.2 hectares) centered on each tower point (BLM Wind Energy Programmatic Environmental Impact Statement, 2005). Additionally, the BLM will use Platts Power Plants and Generating Units database for transformer stations associated with wind energy sites.

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<sup>1</sup>J. Perry, BLM, Washington Office, personal communication via e-mail with Frank Quamen, BLM, National Operations Center, regarding reclaimed energy monitoring, February 12, 2014.

Energy (solar energy facilities)

This dataset will include solar plants in existence or under construction, as compiled with the proprietary Platts in the Power Plants and Generating Units database. The point data will be buffered to represent a 3-acre (1.2-hectare) direct area of influence.

Energy (geothermal energy facilities)

This dataset will include geothermal plants in existence or under construction as compiled with the proprietary I.H.S and Platts Power Plants and Generating Units databases. The point data will be buffered to represent a 3-acre (1.2-hectare) direct area of influence.

Mining (active developments; locatable, leasable, saleable)

This dataset will include active mining locations as compiled with the proprietary InfoMine database. Other data sources will be evaluated as they are identified or become available. The point data will be buffered to represent a 5-acre (2.0-hectare) direct area of influence, unless actual surface disturbance is available.

Infrastructure (roads)

This dataset will be compiled from the proprietary ESRI StreetMap Premium for ArcGIS. Dataset features that will be used are interstates, major roads, and surface streets to capture most paved and “crowned and ditched” roads, while not including “two-track” and 4-wheel-drive routes. These minor roads, while not included in the broad- and mid-scale monitoring, may support a volume of traffic that can have deleterious effects on sage-grouse leks.

It may be appropriate to consider the frequency and type of use of roads in a NEPA analysis for a proposed project. This fine-/project-scale analysis will require more site-specific data than is identified in this monitoring framework. The direct influence area for roads will be represented by 240.2 feet, 84.0 feet, and 40.7 feet (73.2 meters, 25.6 meters, and 12.4 meters) total widths, centered on the line feature for interstates, major roads, and surface streets, respectively (Knick et al. 2011). The most current dataset will be used for each monitoring update.<sup>2</sup>

Infrastructure (railroads)

This dataset will be a compilation of Federal Railroad Administration (FRA) Rail Lines of the USA dataset. Non-abandoned rail lines will be used; abandoned rail lines will not be used. The direct influence area for railroads will be represented by a 30.8-foot (9.4-meter) total width (Knick et al. 2011) centered on non-abandoned railroad line feature.

Infrastructure (power lines)

This line dataset will be a compilation from EV Energy Map, Platts/Global Energy of transmission lines, substations, electric power generation plants, and energy distribution control facilities. Linear features in the dataset attributed as “buried” will be removed from the disturbance calculation. Only “in service” lines will be used, not “proposed” lines. direct area of influence will be determined by the kV designation: 1 to 199 kV (100 feet/30.5 meters), 200 to 399 kV (150 feet/45.7 meters), 500 to 699 kV

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<sup>2</sup> This is a related but different dataset as was used in the Summary of Science, Activities, Programs, and Policies That Influence the Rangewide Conservation of Greater Sage-Grouse (Manier et al. 2013). Individual BLM planning units may utilize different roads layers for fine- and site-scale monitoring.

(200 feet/61.0 meters), and 700 or greater kV (250 feet/76.2 meters), based on average ROW and structure widths.

#### Infrastructure (communication towers)

This point dataset will be compiled from the Federal Communications Commission (FCC) communication towers point file; all duplicate points will be removed. It will be converted to a polygon dataset by using a direct area of influence of 2.47 acres (1.0 hectare) centered on each communication tower point (Knick et al. 2011).

#### Infrastructure (other vertical structures)

This point dataset will be compiled from the Federal Aviation Administration (FAA) Digital Obstacles point file. Points where “Type\_” = “WINDMILL” will be removed. Duplicate points from the FCC communication towers point file will be removed. Remaining features will be converted to a polygon dataset using a direct area of influence of 2.47 acres (1.0 hectare), centered on each vertical structure point (Knick et al. 2011).

#### Other developed rights-of-ways

Currently no additional data sources for other rights-of-ways have been identified; roads, power lines, railroads, pipelines, and other known linear features are represented in categories above. Our newly purchased IHS data does contain pipeline information, but further investigation is needed to determine if the dataset is comprehensive. If additional features representing human activities are identified, they will be added to monitoring reports using similar assumptions to the threats above.

#### *Habitat Degradation Threat Combination and Calculation*

The threats targeted for measuring human activity from **Table D-2** will be converted to direct area of influence polygons, as described for each threat above. These threat polygon layers will be combined and features dissolved to create one overall polygon layer representing footprints of human activity in the range of sage-grouse. However, individual datasets will be preserved to ascertain which types of threats may be contributing to overall habitat degradation. Percentages will be calculated as follows (this measure has been divided into three sub-measures to describe habitat degradation on the landscape):

- Measure 2a) Footprint by landscape unit—Divide area of the active/direct footprint within a sage-grouse area by the total area of the sage-grouse area (percent disturbance in landscape unit)
- Measure 2b) Active/direct footprint by historic sagebrush potential—Divide area of the active footprint that coincides with areas of historic sagebrush potential (BpS calculation from habitat availability) within a given landscape unit by the total area with sagebrush potential within the landscape unit (percent disturbance on potential historic sagebrush in landscape unit)
- Measure 2c) Active/direct footprint by current sagebrush—Divide area of the active footprint that coincides with areas of existing sagebrush (EVT calculation from habitat availability) within a given landscape unit by the total area that is current sagebrush within the landscape unit. (percent disturbance on current sagebrush in landscape unit)

### **D.2.2.3 Density of Energy and Mining (Measure 3)**

The measure of density of energy and mining will be calculated by combining the locations of threats identified in **Table D-2**. This will provide an estimate of intensity of human activity or intensity of habitat degradation. The number energy facilities and mining locations will be summed and divided by the area of meaningful landscape units to calculate density of these activities. Data sources for each threat are found in **Table D-6**. Specific assumptions (e.g., inclusion criteria for data and width/area assumptions for point and line features) and methodology for each threat, and the combined measure are detailed below. All datasets will be updated annually to monitor broad and mid-scale year-to-year changes and 5-year (or longer) trends in habitat degradation.

*Density of Energy and Mining Datasets and Assumptions:*

Energy (oil and gas wells and development facilities)

[See **Section D.2**]

Energy (coal mines)

[See **Section D.2**]

Energy (wind towers)

[See **Section D.2**]

Energy (solar energy facilities)

[See **Section D.2**]

Energy (geothermal energy facilities)

[See **Section D.2**]

Mining (active developments; locatable, leasable, salable)

[See **Section D.2**]

*Density of Energy and Mining Threat Combination and Calculation:*

Datasets for energy and mining will be collected in two primary forms: point locations (e.g., wells) and polygon areas (e.g., surface coal mining). The following rule set will be used to calculate density for meaningful landscape units including standard grids and per polygon:

- 1) Point locations will be preserved; no additional points will be removed beyond the methodology described above. Energy facilities in close proximity (an oil well close to a wind tower) will be retained.
- 2) Polygons will not be merged, nor features further dissolved. thus, overlapping facilities will be retained, such that each individual threat will be a separate polygon data input for the density calculation.
- 3) The analysis unit (polygon or 640 acre section in a grid) will be the basis for counting the number of mining or energy facilities per unit area. Within the analysis unit all point features will be summed, and any individual polygons will be counted as one (e.g.; a coal mine will be counted as one facility within population). Where polygon features overlap multiple units (polygons or pixels), the facility will be counted as one in each unit where the polygon

occurs (e.g., a polygon crossing multiple 640 acre sections would be counted as 1 in each 640-acre section for a density per 640-acre section calculation).

- 4) In methodologies with different sized units (e.g., MZs and populations), raw counts will be converted to densities by dividing by the total area of the unit. Typically this will be measured as facilities per 640 acres.
- 5) For uniform grids, raw facility counts will be reported. Typically this number will also be converted to facilities per 640 acres.
- 6) Reporting may include summaries beyond the simple ones above. Zonal statistics may be used to smooth smaller grids to help with display and conveying information about areas within meaningful landscape units that have high energy and/or mining activity.
- 7) Additional statistics for each defined unit may also include adjusting the area to only include area with the historic potential for sagebrush (BpS) or areas currently sagebrush (EVT).

Key habitat degradation individual datasets and threat combination datasets will be available through BLM's EGIS Web Portal and Geospatial Gateway. Legacy datasets will be preserved, so that trends may be calculated.

### **D.2.3 Population (Demographics) Monitoring**

State wildlife management agencies are responsible for monitoring sage-grouse populations within their respective states. WAFWA will coordinate this collection of annual population data by state agencies. These data will be made available to BLM through the Sage-Grouse Implementation Memorandum of Understanding (2013) signed by WAFWA, BLM, Forest Service, NRCS, USGS, Farm Service Agency, and USFWS.

An amendment to the MOU (2014) will outline a process, timeline, and responsibilities for regular data sharing of sage-grouse population and/or habitat information. The Landscape Conservation Management and Analysis Portal (LC MAP) will be used as the instrument for state wildlife agencies to annually submit population data and analyses that will be accessed by the BLM through a data sharing agreement. Population areas were refined from the Greater Sage-grouse Conservation Objectives: Final Report (COT) report by individual state wildlife agencies to create a consistent naming nomenclature for future data analyses. These population data will be used for analysis at the applicable scale to supplement habitat effectiveness monitoring of management actions and inform the adaptive management responses.

### **D.2.4 Effectiveness Monitoring**

Effectiveness monitoring will provide the information to evaluate BLM actions to reach the objective of the planning strategy (BLM Instruction Memorandum 2012-044), to conserve sage-grouse populations and its habitat, and the objectives in this Northwest Colorado GRSB ARMPA. Effectiveness monitoring methods described here will encompass multiple larger scales, from areas as large as the WAFWA MZ to the scale of this ARMPA. Effectiveness information used for these larger scale evaluations includes all lands in the area of interest regardless of surface ownership/management and will help inform where finer scale evaluations are needed, such as population areas smaller than an RMP or PACs within an RMP (described in **Section D.2**). The information will also include the trend of disturbance within these areas of interest, which informs the need to initiate adaptive management responses as described in this Northwest Colorado GRSB ARMPA.

Effectiveness monitoring reported for these larger areas provides the context to then conduct effectiveness monitoring at finer scales and helps focus scarce resources to areas experiencing habitat loss, degradation, or population declines. These large area evaluations would not exclude the need for concurrent finer scale evaluations where habitat or population anomalies have been identified through some other means.

To determine the effectiveness of the sage-grouse planning strategy, the BLM will evaluate the answers to the following questions and will prepare a broad- and mid-scale effectiveness report:

1. Sagebrush Availability and Condition:
  - a. What is the amount of sagebrush availability and the change in the amount and condition of sagebrush?
  - b. What is the existing amount of sagebrush on the landscape and the change in the amount relative to the pre Euro-American historical distribution of sagebrush (BpS)?
  - c. What is the trend and condition of the indicators describing sagebrush characteristics important to sage-grouse?
2. Habitat Degradation and Intensity of Activities:
  - a. What is the amount of habitat degradation and the change in that amount?
  - b. What is the intensity of activities and the change in the intensity?
  - c. What is the amount of reclaimed energy-related degradation and the change in the amount?
3. What is the population estimation of sage-grouse and the change in the population estimation?
4. How is the BLM contributing to changes in the amount of sagebrush?
5. How is the BLM contributing to disturbance?

The compilation of broad and mid-scale data (and population trends as available) into an effectiveness monitoring report will occur on a 5-year reporting schedule, which may be accelerated to respond to critical emerging issues (in consultation with USFWS and state wildlife agencies). In addition, effectiveness monitoring results will be used to identify emerging issues and research needs and will be consistent with and inform the BLM adaptive management strategy (see “Adaptive Management” section of the EIS).

To determine the effectiveness of the sage-grouse objectives of this Northwest Colorado GRSG ARMPA, the BLM will evaluate the answers to the following questions and prepare a plan effectiveness report:

1. Is this plan meeting the sage-grouse habitat objectives?
2. Are sage-grouse areas within the land use plan meeting, or making progress towards meeting, land health standards, including the special status species/wildlife habitat standard?
3. Is the plan meeting the disturbance objectives within sage-grouse areas?

4. Are the sage-grouse populations within this plan boundary and within the sage-grouse areas increasing, stable, or declining?

The effectiveness monitoring report for this ARMPA will occur on a 5-year reporting schedule (see **Attachment A** at the end of this appendix), or more often if habitat or population anomalies identify the need for an evaluation to facilitate adaptive management or respond to critical emerging issues. Data will be made available through the BLM's EGIS Web Portal and the Geospatial Gateway.

*Methods:* At the broad and mid- biological scales (PACs and above) the BLM will summarize the vegetation, disturbance, and population data (when available). Although the analysis will try to summarize results for PACs within each sage-grouse population, some populations may be too small to appropriately report the metrics and may need to be combined to provide an estimate with an acceptable level of accuracy or they will be flagged for more intensive monitoring by the appropriate landowner or agency. The BLM will then analyze monitoring data to detect the trend in the amount of sagebrush; the condition of the vegetation in the sage-grouse areas (MacKinnon et al. 2011); The trend in the amount of disturbance; The change in disturbed areas due to successful restoration; and The amount of new disturbance the BLM has permitted. This information could be supplemented with population data to understand the correlation between habitat and PACs within a population when population data are available. This overall effectiveness evaluation must consider the lag effect response of populations to habitat changes (Garton et al. 2011).

*Calculating Question 1, Planning Strategy Effectiveness:* The amount of sagebrush available in the large area of interest will utilize the information from Measure 1a (**Section D.2.2.1, Sagebrush Availability**) and calculate the change from the 2012 baseline to the end date of the reporting period. To calculate the change in the amount of sagebrush on the landscape to compare with the historical areas with potential to support sagebrush, the information from Measure 1b (**Section D.2.2.1, Sagebrush Availability**) will be utilized. To calculate the trend in the condition of sagebrush at the mid-scale, 3 sources of data will be utilized: the BLM Grass/ Shrub mapping effort (**Section D.2.2.1, Sagebrush Availability [Measure 1], Monitoring Sagebrush Availability, Future Plans**); the results from the calculation of the landscape indicators such as patch size (described below); and the BLM Landscape Monitoring Framework (LMF) and sage-grouse intensification effort (also described below). The LMF and sage-grouse intensification effort data is collected in a statistical sampling framework that allows calculation of indicator values at multiple scales.

Beyond the importance of sagebrush availability to sage-grouse, the mix of sagebrush patches on the landscape at the broad and mid-scale provides the life requisite of space for sage-grouse dispersal needs (see the Habitat Assessment Framework [Stiver et al. 2014]). The configuration of sagebrush habitat patches and the land cover or land use between the habitat patches at the broad and mid scales also defines suitability. There are three significant habitat indicators that influence habitat use, dispersal, and movement across populations: the size and number of habitat patches, the connectivity of habitat patches (linkage areas), and habitat fragmentation (scope of unsuitable and non-habitats between habitat patches). The most appropriate commercial software to measure patch dynamics, connectivity, and fragmentation at the broad and mid scales will be utilized, using the same data layers derived for sagebrush availability.

The BLM initiated the LMF in 2011 in cooperation with NRCS. The objective of the LMF effort is to provide non-biased estimates of vegetation and soil condition and trend using a statistically balanced

sample design across BLM-administered lands. Recognizing that sage-grouse populations are more resilient where the sagebrush plant community has certain characteristics unique to a particular life stage of sage-grouse (Knick and Connelly 2011; Stiver et al. 2014), a group of sage-grouse habitat and sagebrush plant community subject matter experts identified those vegetation indicators collected at LMF sampling points that inform sage-grouse habitat needs. The experts represented BLM, USFWS, WAFWA, NRCS, ARS, state wildlife agencies, and academia. The common indicators that were identified include: species composition, foliar cover, height of the tallest sagebrush and herbaceous plant, intercanopy gap, percent of invasive species, sagebrush shape, and bare ground. To increase the precision of estimates of sagebrush conditions within the range of sage-grouse, additional plot locations in occupied sage-grouse habitat (sage-grouse intensification) were added in 2013. The common indicators are also collected on sampling locations in the NRCS Rangeland Monitoring Survey.

The sage-grouse intensification baseline data will be collected over a 5-year period, and an annual sage-grouse intensification report will be prepared describing the status of the indicators. Beginning in year 6, the annual status report will be accompanied with a trend report, which will be available on an annual basis thereafter contingent upon continuation of the current monitoring budget. This information, in combination with the Grass/ Shrub mapping information, the mid-scale habitat suitability indicator measures, and the sagebrush availability information will be used to answer Question 1 of the Planning Strategy Effectiveness Report.

*Calculating Question 2, Planning Strategy Effectiveness:* The amount of habitat degradation and the intensity of the activities in the area of interest will utilize the information from Measures 2 and 3 (**Section D.2.2.2, Habitat Degradation Monitoring [Measure 2]**). The amount of reclaimed energy-related degradation will be collected by the Field Office on plugged and abandoned and oil/gas well sites. The data will demonstrate that the reclaimed sites have yet to meet the habitat restoration objectives for sage-grouse habitat. This information, in combination with the amount of habitat degradation, will be used to answer Question 2 of the Planning Strategy Effectiveness Report.

*Calculating Question 3, Planning Strategy Effectiveness:* The change in sage-grouse estimated populations will be calculated from data provided by the state wildlife agencies, when available. This population data (**Section D.2.3, Population [Demographics] Monitoring**) will be used to answer Question 3 of the Planning Strategy Effectiveness Report.

*Calculating Question 4, Planning Strategy Effectiveness:* The estimated contribution by the BLM to the change in the amount of sagebrush in the area of interest will utilize the information from Measure 1a (**Section D.2.2.1, Sagebrush Availability**). This measure is derived from the national data sets that remove sagebrush (Sagebrush Availability, **Table D-2**). To determine the relative contribution of the BLM management, the current Surface Management Agency geospatial data layer will be used to differentiate the amount of change for each management agency for this measure in area of interest. This information will be used to answer Question 4 of the Planning Strategy Effectiveness Report.

*Calculating Question 5, Planning Strategy Effectiveness:* The estimated contribution by the BLM to the change in the amount of disturbance in the area of interest will utilize the information from Measure 2a (Section **D.2.2.2, Habitat Degradation Monitoring [Measure 2], Habitat Degradation Threat Combination and Calculation**) and Measure 3 (**Section D.2.2.3, Density of Energy and Mining [Measure 3]**). These measures are all derived from the national disturbance data sets that degrade habitat (Habitat Degradation, **Table D-2**). To determine the relative contribution of the BLM management, the current

Surface Management Agency geospatial data layer will be used to differentiate the amount of change for each management agency for these two measures in area of interests. This information will be used to answer Question 5 of the Planning Strategy Effectiveness Report.

Answering the 5 questions that determine the effectiveness of the BLM planning strategy will identify areas that appear to be meeting the objectives of the strategy and will facilitate identification of population areas for more detailed analysis. Conceptually, if the broad scale monitoring identifies increasing sagebrush availability and improving vegetation conditions, decreasing disturbance, and a stable or increasing population for the area of interest, there is evidence the objectives of the planning strategy to maintain populations and their habitats have been met. Conversely, where information indicates sagebrush is decreasing and vegetation conditions are degrading, disturbance in sage-grouse areas is increasing, and populations are declining relative to the baseline, there is evidence the objectives of the planning strategy are not being achieved. This would likely result in a more detailed analysis and could be the basis for implementing more restrictive adaptive management measures.

At the ARMPA area, the BLM will summarize the vegetation, disturbance, and population data to determine if the ARMPA is meeting the plan objectives. Effectiveness information used for these evaluations includes BLM surface management areas and will help inform where finer scale evaluations are needed, such as seasonal habitats, corridors, or linkage areas. The information should also include the trend of disturbance within the sage-grouse areas, which informs the need to initiate adaptive management responses, as described in this Northwest Colorado GRSG ARMPA.

*Calculating Question 1, Land Use Plan Effectiveness:* The condition of vegetation and the allotments meeting land health standards in sage-grouse areas will both be used as part of the determination of the effectiveness of the ARMPA in meeting the vegetation objectives in sage-grouse habitat set forth in this ARMPA. The collection of this data will be the responsibility of the BLM Field Office or Forest Service Ranger District. In order for this data to be consistent and comparable, common indicators, consistent methods, and a, unbiased sampling framework should be implemented, following the principles in the AIM Strategy (Toevs et al. 2011; MacKinnon et al. 2011), in the BLM Technical Reference Interpreting Indicators of Rangeland Health (Pellant et al. 2005), and the Habitat Assessment Framework (Stiver et al. 2014), or other approved WAFWA MZ consistent guidance to measure and monitor sage-grouse habitats. The analysis of this information will be used to answer Question 1 of the Land Use Plan Effectiveness Report.

*Calculating Question 2, Land Use Plan Effectiveness:* The amount of habitat disturbance in sage-grouse areas identified in this LUP will be used as part of the determination of the effectiveness of the LUP in meeting the disturbance objectives set forth in this LUP. National data sets can be used to calculate the amount of disturbance, but BLM Field Office data will likely increase the accuracy of this estimate. This information will be used to answer Question 2 of the Land Use Plan Effectiveness Report.

*Calculating Question 3, Land Use Plan Effectiveness:* The change in estimated sage-grouse populations will be calculated from data provided by the state wildlife agencies, when available and will part of the determination of effectiveness. This population data (**Section D.2.3, Population [Demographics] Monitoring**) will be used to answer Question 3 of the Land Use Plan Effectiveness Report.

Results of the effectiveness monitoring process for the land use plan will be used to inform the need for finer scales investigations, initiate adaptive management actions as described in **Chapter 2, Section**

**2.6.1 of the Proposed LUPA/Final EIS**, Adaptive Management, initiate causation determination, and/or determine if changes to management decisions are warranted. The measures used at the broad and mid-scales will provide a suite of characteristics from which the effectiveness of the adaptive management strategy will be evaluated.

### **D.3 FINE AND SITE SCALES**

Fine scale (third order) habitat selected by sage-grouse is described as the physical and geographic area within home ranges including breeding, summer, and winter periods. At this level, habitat suitability monitoring should address factors that affect sage-grouse use of, and movements between, seasonal use areas. The habitat monitoring at fine and site scale (fourth order) should focus on indicators to describe seasonal home ranges for sage-grouse associated with a lek, or lek group within a population or subpopulation area. Fine and site scale monitoring should inform LUP effectiveness monitoring (see **Section D.2.4**, Effectiveness Monitoring) and the hard and soft triggers identified in the adaptive management section of the land use plan.

Site-scale habitat selected by sage-grouse is described as the more detailed vegetation characteristics of seasonal habitats. Habitat suitability characteristics include canopy cover and height of sagebrush and the associated understory vegetation as well as vegetation associated with riparian areas, wet meadows, and other mesic habitats adjacent to sagebrush that may support sage-grouse habitat needs during different stages in their annual cycle.

As described in the conclusion (**Section D.4**, below), details and application of monitoring at the fine and site scales will be described in the implementation-level monitoring plan of the Northwest Colorado GRSG ARMPA. The need for fine and site-scale specific habitat monitoring will vary by area depending on proposed projects, existing conditions, habitat variability, threats, and land health. Examples of fine and site-scale monitoring include: habitat vegetation monitoring to assess current habitat conditions; monitoring and evaluating the success of projects targeting sage-grouse habitat enhancement and/or restoration; and habitat disturbance monitoring to provide localized disturbance measures to inform proposed project review and potential mitigation for project impacts. Monitoring plans should incorporate the principles outlined in the BLM AIM Strategy (Toevs et al. 2011) and AIM-Monitoring: A Component of the Assessment, Inventory, and Monitoring Strategy (Taylor, et al. In press). Approved monitoring methods are:

- BLM Core Terrestrial Indicators and Methods (MacKinnon et al. 2011)
- BLM Technical Reference Interpreting Indicators of Rangeland Health (Pellant et al. 2005)
- Sage-Grouse Habitat Assessment Framework (Stiver et al. 2014)

Other state-specific disturbance tracking models are the BLM Wyoming Density and Disturbance Calculation Tool (<http://ddct.wygisc.org/>) and the BLM White River Data Management System (WRDMS), in development with the USGS.

Population monitoring data (in cooperation with state wildlife agencies) should be included during evaluation of the effectiveness of actions taken at the fine and site scales.

Fine- and site-scale sage-grouse habitat suitability indicators for seasonal habitats are identified in the Habitat Assessment Framework (Stiver et al. 2014). It has incorporated the Connelly et al. (2000) sage-

grouse guidelines and many of the core indicators in the assessment, inventory, and monitoring (AIM) strategy (Toevs et al. 2011). There may be a need to develop adjustments to height and cover or other site suitability values described in the Habitat Assessment Framework and any such adjustments should be ecologically defensible. However, to foster consistency, adjustments to site suitability values at the local scale should be avoided, unless there is a strong scientific justification for doing so and that justification should be provided. WAFWA MZ adjustments must be supported by regional plant productivity and habitat data for the floristic province. If adjustments are made to the site-scale indicators, they must be made using data from the appropriate seasonal habitat designation (breeding/nesting, brood-rearing, winter) collected from sage-grouse studies found in the relevant area and peer reviewed by the appropriate wildlife management agencies and researchers.

When conducting land health assessments, at a minimum, the BLM should follow Interpreting Indicators of Rangeland Health (Pellant et al. 2005) and the BLM Core Terrestrial Indicators and Methods, (MacKinnon et al. 2011). If the assessment is being conducted in sage-grouse areas, the BLM should collect additional data to inform the Habitat Assessment Framework indicators that have not been collected using the above methods. Implementation of the principles outlined in the AIM strategy will allow the data to be used to generate unbiased estimates of condition across the area of interest. It will facilitate consistent data collection and roll-up analysis among management units, will be useful to provide consistent data to inform the classification and interpretation of imagery, and will provide condition and trend of the indicators describing sagebrush characteristics important to sage-grouse habitat (see **Section D.2.4**, Effectiveness Monitoring).

#### **D.4 CONCLUSION**

This Greater Sage-grouse Monitoring Framework was developed for all of the final environmental impact statements involved in sage-grouse planning. As such, it describes the monitoring activities at the broad and mid-scales and sets the stage for BLM to collaborate with partners/other agencies to develop the Northwest Colorado GRSG ARMPA Monitoring Plan using this Greater Sage-Grouse Monitoring Framework as a guide.

#### **D.5 THE GREATER SAGE-GROUSE DISTURBANCE AND MONITORING SUB-TEAM MEMBERSHIP**

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**APPENDIX D, ATTACHMENT A – AN OVERVIEW OF MONITORING COMMITMENTS**

	Broad and Mid Scales					Fine and Site Scales
	Implementation	Sagebrush Availability	Habitat Degradation	Population	Effectiveness	
<b>How will the data be used?</b>	Tracking and documenting implementation of land use plan decisions and inform adaptive management	Tracking changes in land cover (sagebrush) and inform adaptive management	Tracking changes in disturbance (threats) to sage-grouse habitat and inform adaptive management	Tracking trends in sage-grouse populations (and/or leks; as determined by state wildlife agencies) and inform adaptive management	Characterizing the relationship among disturbance, implementation actions, and sagebrush metrics and inform adaptive management	Measuring seasonal habitat, connectivity at the fine scale, and habitat conditions at the site scale, calculating disturbance and inform adaptive management
<b>Who is collecting the data?</b>	BLM FO and FS Forest	NOC and NIFC	National data sets (NOC), BLM FOs and FS Forests as applicable	State wildlife agencies through WAFWA	Comes from other broad and mid-scale monitoring types, analyzed by the NOC	BLM FO and SO, FS Forests and RO (with partners) including disturbance
<b>How often are the data collected, reported and made available to FWS?</b>	Collected and reported annually; summary every 5 years	Updated and changes reported annually; summary reports every 5 years	Collected and changes reported annually; summary reports every 5 years	State data reported annually per WAFWA MOU; summary reports every 5 years	Collected and reported every 5 years (coincident with LUP evaluations)	Collection and trend analysis ongoing, reported every 5 years or as needed to inform adaptive management
<b>What is the spatial scale?</b>	Summarized by LUP with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by PACs (size dependent) with flexibility for reporting by other units	Summarized by MZ, and LUP with flexibility for reporting by other units (e.g., PAC)	Variable (e.g., projects and seasonal habitats)
<b>What are the potential personnel and budget impacts?</b>	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment	At a minimum, current skills and capacity must be maintained; data mgmt. cost are TBD	At a minimum, current skills and capacity must be maintained; data mgmt. and data layer purchase cost are TBD	No additional personnel or budget impacts for BLM	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment	Additional capacity or re-prioritization of ongoing monitoring work and budget realignment
<b>Who has primary and secondary responsibilities for reporting?</b>	1) BLM FO & SO; FS Forest & RO 2) BLM & FS Planning	1) NOC 2) WO	1) NOC 2) BLM SO, FS RO & appropriate programs	1) WAFWA & state wildlife agencies 2) BLM SO, FS RO, NOC	1) Broad and mid-scale at the NOC, LUP at BLM SO	1) BLM FO & FS Forests 2) BLM SO & FS RO
<b>What new processes/tools are needed?</b>	National implementation data sets and analysis tools	Updates to national land cover data	Data standards and roll-up methods for these data	Standards in population monitoring (WAFWA)	Reporting methodologies	Data standards data storage; and reporting

**APPENDIX D, ATTACHMENT B – LIST OF ALL SAGEBRUSH SPECIES AND SUBSPECIES INCLUDED IN THE SELECTION CRITERIA FOR BUILDING THE EVT AND BPS LAYERS**

- *Artemisia arbuscula* subspecies *longicaulis*
- *Artemisia arbuscula* subspecies *longiloba*
- *Artemisia bigelovii*
- *Artemisia nova*
- *Artemisia papposa*
- *Artemisia pygmaea*
- *Artemisia rigida*
- *Artemisia spinescens*
- *Artemisia tripartita* subspecies *rupicola*
- *Artemisia tripartita* subspecies *tripartita*
- *Tanacetum nuttallii*
- *Artemisia cana* subspecies *bolanderi*
- *Artemisia cana* subspecies *cana*
- *Artemisia cana* subspecies *viscidula*
- *Artemisia tridentata* subspecies *wyomingensis*
- *Artemisia tridentata* subspecies *tridentata*
- *Artemisia tridentata* subspecies *vaseyana*
- *Artemisia tridentata* subspecies *spiciformis*
- *Artemisia tridentata* subspecies *xericensis*
- *Artemisia tridentata* variety *pauciflora*
- *Artemisia frigida*
- *Artemisia pedatifida*

**APPENDIX D, ATTACHMENT C – USER AND PRODUCER ACCURACIES FOR AGGREGATED  
ECOLOGICAL SYSTEMS WITHIN LANDFIRE MAP ZONES**

<b>LANDFIRE Map Zone Name</b>	<b>User Accuracy</b>	<b>Producer Accuracy</b>	<b>% of Map Zone within Historic Schroeder</b>
Wyoming Basin	76.9%	90.9%	98.5%
Snake River Plain	68.8%	85.2%	98.4%
Missouri River Plateau	57.7%	100.0%	91.3%
Grand Coulee Basin of the Columbia Plateau	80.0%	80.0%	89.3%
Wyoming Highlands	75.3%	85.9%	88.1%
Western Great Basin	69.3%	75.4%	72.9%
Blue Mountain Region of the Columbia Plateau	85.7%	88.7%	72.7%
Eastern Great Basin	62.7%	80.0%	62.8%
Northwestern Great Plains	76.5%	92.9%	46.3%
Northern Rocky Mountains	72.5%	89.2%	42.5%
Utah High Plateaus	81.8%	78.3%	41.5%
Colorado Plateau	65.3%	76.2%	28.8%
Middle Rocky Mountains	78.6%	73.3%	26.4%
Cascade Mountain Range	57.1%	88.9%	17.3%
Sierra Nevada Mountain Range	0.0%	0.0%	12.3%
Northwestern Rocky Mountains	66.7%	60.0%	7.3%
Southern Rocky Mountains	58.6%	56.7%	7.0%
Northern Cascades	75.0%	75.0%	2.6%
Mogollon Rim	66.7%	100.0%	1.7%
Death Valley Basin	0.0%	0.0%	1.2%

There are two anomalous map zones with 0% user and producer accuracies attributable to no available reference data for the ecological systems of interest.

**Producer's accuracy** is a reference-based accuracy that is computed by looking at the predictions produced for a class and determining the percentage of correct predictions. In other words, if I know that a particular area is sagebrush (I've been out on the ground to check), what is the probability that the digital map will correctly identify that pixel as sagebrush? **Omission Error** equates to excluding a pixel that should have been included in the class (i.e., omission error = 1 - producer's accuracy).

**User's accuracy** is a map-based accuracy that is computed by looking at the reference data for a class and determining the percentage of correct predictions for these samples. For example, if I select any sagebrush pixel on the classified map, what is the probability that I'll be standing in a sagebrush stand when I visit that pixel location in the field? **Commission Error** equates to including a pixel in a class when it should have been excluded (i.e., commission error = 1 - user's accuracy).

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# Appendix E

## Methodology for Calculating Disturbance Caps



## APPENDIX E

# METHODOLOGY FOR CALCULATING DISTURBANCE CAPS

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In USFWS's 2010 listing decision for Greater Sage-Grouse (GRSG), the USFWS identified 18 threats contributing to the destruction, modification, or curtailment of GRSG habitat or range (75 FR 13910 2010). The 18 threats have been aggregated into 3 measures:

- Sagebrush Availability (percent of sagebrush per unit area)
- Habitat Degradation (percent of human activity per unit area)
- Density of Energy and Mining (facilities and locations per unit area)

Habitat Degradation and Density of Energy and Mining will be evaluated under the Disturbance Cap and Density Cap respectively and are further described in this appendix. The three measures, in conjunction with other information, will be considered during the NEPA process for projects authorized or undertaken by the BLM.

### E.1 DISTURBANCE CAP

This land use plan has incorporated a 3 percent disturbance cap within GRSG Priority Habitat Management Areas (PHMA) and the subsequent land use planning actions if the cap is met:

*If the 3 percent anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG Priority Habitat Management Areas (PHMA) in any given Biologically Significant Unit, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872 and valid existing rights) will be permitted by BLM within GRSG PHMA in any given Biologically Significant Unit until the disturbance has been reduced to less than the cap.*

*If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the General Mining Law of 1872 and valid existing rights).*

The disturbance cap applies to the PHMA within both the Biologically Significant Units and at the project authorization scale (Colorado MZ). For the Biologically Significant Units, west-wide habitat degradation (disturbance) data layers (**Table E-1**) will be used at a minimum to calculate the amount of disturbance and to determine if the disturbance cap has been exceeded as the land use plans (LUP) are being implemented. Locally collected disturbance data will be used to determine if the disturbance cap has been exceeded for project authorizations, and may also be used to calculate the amount of disturbance in the Biologically Significant Units.

Although locatable mine sites are included in the degradation calculation, mining activities under the 1872 mining law may not be subject to the 3 percent disturbance cap. Details about locatable mining activities will be fully disclosed and analyzed in the NEPA process to assess impacts on GRSG and their habitat as well as to BLM goals and objectives, and other BLM programs and activities.

Formulas for calculations of the amount of disturbance in the PHMA in a Biologically Significant Unit and in a proposed project area are as follows:

- For the Biologically Significant Units:  

$$\text{Percent Degradation Disturbance} = (\text{combined acres of the 12 degradation threats}^1) \div (\text{acres of all lands within the PHMA in a Biologically Significant Unit}) \times 100.$$
- For the Project Analysis Area:  

$$\text{Percent Degradation Disturbance} = (\text{combined acres of the 12 degradation threats}^3 \text{ plus the 7 site scale threats}^4) \div (\text{acres of all lands within the PHMA in the project analysis area}) \times 100.$$

The denominator in the disturbance calculation formula consists of all acres of lands classified as PHMA within the analysis area (Biologically Significant Unit or project area). Areas that are not GRSG seasonal habitats, or are not currently supporting sagebrush cover (e.g., due to wildfire), are not excluded from the acres of PHMA in the denominator of the formula. Information regarding GRSG seasonal habitats, sagebrush availability, and areas with the potential to support GRSG populations will be considered along with other local conditions that may affect GRSG during the analysis of the proposed project area.

## E.2 DENSITY CAP

This land use plan has also incorporated a cap on the density of energy and mining facilities at an average of 1 facility per 640 acres in the PHMA in a project authorization area. If the disturbance density in the PHMA in a proposed project area is on average less than 1 facility per 640 acres, the analysis will proceed through the NEPA process incorporating mitigation measures into an alternative. If the disturbance density is greater than an average of 1 facility per 640 acres, the proposed project will either be deferred until the density of energy and mining facilities is less than the cap or co-located it into existing disturbed area (subject to applicable laws and regulations, such as the General Mining Law of 1872 and valid existing rights). Facilities included in the density calculation (**Table E-3**) are:

- Energy (oil and gas wells and development facilities)
- Energy (coal mines)

<sup>3</sup> See **Table E-1**

<sup>4</sup> See **Table E-2**

- Energy (wind towers)
- Energy (solar fields)
- Energy (geothermal)
- Mining (active locatable, leasable, and saleable developments)

### **E.3 PROJECT ANALYSIS AREA METHOD FOR PERMITTING SURFACE DISTURBANCE ACTIVITIES**

- Determine potentially affected occupied leks by placing a four mile boundary around the proposed area of physical disturbance related to the project. All occupied leks located within the four mile project boundary and within PHMA will be considered affected by the project.
- Next, place a four mile boundary around each of the affected occupied leks.
- The PHMA within the four mile lek boundary and the four mile project boundary creates the project analysis area for each individual project. If there are no occupied leks within the four-mile project boundary, the project analysis area will be that portion of the four-mile project boundary within the PHMA.
- Digitize all existing anthropogenic disturbances identified in **Table E-1** and the 7 additional features that are considered threats to GRSG (**Table E-2**). Using 1 meter resolution NAIP imagery is recommended. Use existing local data if available.
- Calculate percent existing disturbance using the formula above. If existing disturbance is less than 3 percent, proceed to next step. If existing disturbance is greater than 3 percent, defer the project.
- Add proposed project disturbance footprint area and recalculate the percent disturbance. If disturbance is less than 3 percent, proceed to next step. If disturbance is greater than 3 percent, defer project.
- Calculate the disturbance density of energy and mining facilities (listed above). If the disturbance density is less than 1 facility per 640 acres, averaged across project analysis area, proceed to the NEPA analysis incorporating mitigation measures into an alternative. If the disturbance density is greater than 1 facility per 640 acres, averaged across the project analysis area, either defer the proposed project or co-locate it into existing disturbed area.
- If a project that would exceed the degradation cap or density cap cannot be deferred due to valid existing rights or other existing laws and regulations, fully disclose the local and regional impacts of the proposed action in the associated NEPA.

**Table E-1**  
**Anthropogenic Disturbance Types for Disturbance Calculations**  
**Data Sources are Described for the West-Wide Habitat Degradation Estimates**

<b>Degradation Type</b>	<b>Subcategory<sup>1</sup></b>	<b>Data Source</b>	<b>Direct Area of Influence<sup>1</sup></b>	<b>Area Source</b>
<b>Energy (oil and gas)</b>	Wells	IHS; BLM (AFMSS)	5.0 acres (2.0 hectares)	BLM WO-300
	Power Plants	Platts (power plants)	5.0 acres (2.0 hectares)	BLM WO-300
<b>Energy (coal)</b>	Mines	BLM; USFS; Office of Surface Mining Reclamation and Enforcement; USGS Mineral Resources Data System	Polygon area (digitized)	Esri/Google Imagery
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
<b>Energy (wind)</b>	Wind Turbines	Federal Aviation Administration	3.0 acres (1.2 hectares)	BLM WO-300
	Power Plants	Platts (power plants)	3.0 acres (1.2 hectares)	BLM WO-300
<b>Energy (solar)</b>	Fields/Power Plants	Platts (power plants)	7.3 acres (3.0 hectares)/MW	National Renewable Energy Laboratory
<b>Energy (geothermal)</b>	Wells	IHS	3.0 acres (1.2 hectares)	BLM WO-300
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
<b>Mining</b>	Locatable Developments	InfoMine	Polygon area (digitized)	Esri Imagery
<b>Infrastructure (roads)</b>	Surface Streets (Minor Roads)	Esri StreetMap Premium	40.7 feet (12.4 meters)	USGS
	Major Roads	Esri StreetMap Premium	84.0 feet (25.6 meters)	USGS
	Interstate Highways	Esri StreetMap Premium	240.2 feet (73.2 meters)	USGS
<b>Infrastructure (railroads)</b>	Active Lines	Federal Railroad Administration	30.8 feet (9.4 meters)	USGS
<b>Infrastructure (power lines)</b>	1-199 kV Lines	Platts (transmission lines)	100 feet (30.5 meters)	BLM WO-300
	200-399 kV Lines	Platts (transmission lines)	150 feet (45.7 meters)	BLM WO-300
	400-699 kV Lines	Platts (transmission lines)	200 feet (61.0 meters)	BLM WO-300
	700+ kV Lines	Platts (transmission lines)	250 feet (76.2 meters)	BLM WO-300
<b>Infrastructure (communication)</b>	Towers	Federal Communications Commission	2.5 acres (1.0 hectares)	BLM WO-300

<sup>1</sup> kV=kilovolts; ac=acre; ha=hectare; ft=feet; m=meters; MW=megawatts

Table copied from the GRSG Monitoring Framework

**Table E-2**  
**The Seven Site Scale Features Considered Threats to GRSG Included in the Disturbance Calculation for Project Authorizations**

1. Coal Bed Methane Ponds
2. Meteorological Towers
3. Nuclear Energy Facilities
4. Airport Facilities and Infrastructure
5. Military Range Facilities and Infrastructure
6. Hydroelectric Plants
7. Recreation Areas Facilities and Infrastructure
<b>Definitions:</b>
<b>1. Coal Bed Methane and other Energy-related Retention Ponds</b> – The footprint boundary will follow the fence line and includes the area within the fence line surrounding the impoundment. If the pond is not fenced, the impoundment itself is the footprint. Other infrastructure associated with the containment ponds (e.g., roads and well pads) will be captured in other disturbance categories.
<b>2. Meteorological Towers</b> – This feature includes long-term weather monitoring and temporary meteorological towers associated with short-term wind testing. The footprint boundary includes the area underneath the guy wires.
<b>3. Nuclear Energy Facilities</b> – The footprint boundary includes visible facilities (e.g., fence and road) and undisturbed areas within the facility’s perimeter.
<b>4. Airport Facilities and Infrastructure (public and private)</b> –The footprint boundary of will follow the boundary of the airport or heliport and includes mowed areas, parking lots, hangers, taxiways, driveways, terminals, maintenance facilities, beacons and related features. Indicators of the boundary, such as distinct land cover changes, fences and perimeter roads, will be used to encompass the entire airport or heliport.
<b>5. Military Range Facilities and Infrastructure</b> – The footprint boundary will follow the outer edge of the disturbed areas around buildings and includes undisturbed areas within the facility’s perimeter.
<b>6. Hydroelectric Plants</b> – The footprint boundary includes visible facilities (e.g., fence and road) and undisturbed areas within the facility’s perimeter.
<b>7. Recreation Areas and Facilities</b> – This feature includes all sites/facilities larger than 0.25-acre in size. The footprint boundary will include any undisturbed areas within the site/facility.

**Table E-3**  
**Relationship Between the 18 Threats and the 3 Habitat Disturbance Measures for**  
**Monitoring and Disturbance Calculations**

<b>USFWS Listing Decision Threat</b>	<b>Sagebrush Availability</b>	<b>Habitat Degradation</b>	<b>Energy and Mining Density</b>
Agriculture	X		
Urbanization	X		
Wildfire	X		
Conifer encroachment	X		
Treatments	X		
Invasive Species	X		
Energy (oil and gas wells and development facilities)		X	X
Energy (coal mines)		X	X
Energy (wind towers)		X	X
Energy (solar fields)		X	X
Energy (geothermal)		X	X
Mining (active locatable, leasable, and saleable developments)		X	X
Infrastructure (roads)		X	
Infrastructure (railroads)		X	
Infrastructure (power lines)		X	
Infrastructure (communication towers)		X	
Infrastructure (other vertical structures)		X	
Other developed rights-of-way		X	

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# Appendix F

## Greater Sage-Grouse Mitigation Strategy



# APPENDIX F

## GREATER SAGE-GROUSE MITIGATION STRATEGY

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### F.1 GENERAL

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

Actions that result in habitat loss and degradation include those identified as threats that contribute to Greater Sage-Grouse disturbance as identified by US Fish and Wildlife Service in its 2010 listing decision (75 Federal Register 13910, March 23, 2010) and shown in **Table D-2** in the Monitoring Framework (**Appendix D**).

The BLM, via the WAFWA Management Zone Greater Sage-Grouse Conservation Team, will develop a WAFWA Management Zone Regional Mitigation Strategy that will inform the NEPA decision-making process, including the application of the mitigation hierarchy for BLM management actions and third-party actions that result in habitat loss and degradation. A robust and transparent Regional Mitigation Strategy will contribute to GRSG habitat conservation by reducing, eliminating, or minimizing threats and compensating for residual impacts to GRSG and its habitat.

The BLM's Regional Mitigation Manual, MS-1794, serves as a framework for developing and implementing a Regional Mitigation Strategy. The following sections provide additional guidance specific to the development and implementation of a WAFWA Management Zone Regional Mitigation Strategy.

## F.2 DEVELOPING A WAFWA MANAGEMENT ZONE REGIONAL MITIGATION STRATEGY

The BLM, via the WAFWA Management Zone Greater Sage-Grouse Conservation Team, will develop a WAFWA Management Zone Regional Mitigation Strategy to guide the application of the mitigation hierarchy for BLM management actions and third-party actions that result in habitat loss and degradation. The Regional Mitigation Strategy should consider any state-level GRSG mitigation guidance that is consistent with the requirements identified in this appendix. The Regional Mitigation Strategy should be developed in a transparent manner, based on the best science available and standardized metrics.

As described in **Chapter 2 of the Proposed LUPA/Final EIS**, the BLM will establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, Team) to help guide the conservation of GRSG, within 90 days of the issuance of the Record of Decision. The Regional Mitigation Strategy will be developed within one year of the issuance of the Record of Decision.

The Regional Mitigation Strategy should include mitigation guidance on avoidance, minimization, and compensation, as follows:

- Avoidance
  - Include avoidance areas (e.g., right-of-way avoidance/exclusion areas, no surface occupancy areas) already included in laws, regulations, policies, and/or land use plans (e.g., Resource Management Plans, Forest Plans, and State Plans); and
  - Include any potential, additional avoidance actions (e.g., additional avoidance best management practices).
- Minimization
  - Include minimization actions (e.g., required design features and best management practices) already included in laws, regulations, policies, land use plans, and/or land-use authorizations; and
  - Include any potential, additional minimization actions (e.g., additional minimization best management practices).
- Compensation
  - Include discussion of impact/project valuation, compensatory mitigation options, siting, compensatory project types and costs, monitoring, reporting, and funds administration. Each of these topics is discussed in more detail below.
    - Residual Impact and Compensatory Mitigation Project Valuation Guidance
      - A standardized method should be identified for estimating residual impacts and valuing compensatory mitigation projects.
      - This method should consider the quality of habitat, scarcity of the habitat, and the size of the impact/project.
      - For compensatory mitigation projects, consideration of durability (see glossary) and timelines (see glossary) may require adjustment of the valuation.

- Compensatory Mitigation Options
  - Options for implementing compensatory mitigation should be identified, such as:
    - Utilizing certified mitigation/conservation bank or credit exchanges
    - Contributing to an existing mitigation/conservation fund
    - Authorized-user conducted mitigation projects
- Compensatory Mitigation Siting
  - Sites should be in areas that have the potential to yield the greatest conservation benefit to the GRSG, regardless of land ownership.
  - Sites should be sufficiently durable (see glossary).
  - Sites identified by existing plans and strategies (e.g., fire restoration plans, invasive species strategies, and healthy land focal areas) should be considered, if those sites have the potential to yield the greatest benefit to GRSG and are durable.
- Compensatory Mitigation Project Types and Costs
  - Project types should be identified that help reduce threats to GRSG (e.g., protection, conservation, and restoration projects).
  - Each project type should have a goal and measurable objectives.
  - Expected costs for these project types, within the WAFWA Management Zone, should be identified, including the costs to monitor and maintain the project for the duration of the impact.
- Compensatory Mitigation Compliance and Monitoring
  - Mitigation projects should be inspected to ensure they are implemented as designed, and if not, there should be methods to enforce compliance.
  - Mitigation projects should be monitored to ensure that the goals and objectives are met and that the benefits are effective for the duration of the impact.
- Compensatory Mitigation Reporting
  - Standardized, transparent, scalable, and scientifically defensible reporting requirements should be identified for mitigation projects.
  - Reports should be compiled, summarized, and reviewed in the WAFWA Management Zone in order to determine if GRSG conservation has been achieved and/or to support adaptive management recommendations.
- Compensatory Mitigation Program Implementation Guidelines

- Guidelines for implementing the state-level compensatory mitigation program should include holding and applying compensatory mitigation funds, operating a transparent and credible accounting system, certifying mitigation credits, and managing reporting requirements.

### **F.3 INCORPORATING THE REGIONAL MITIGATION STRATEGY INTO NEPA ANALYSES**

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

### **F.4 IMPLEMENTING A COMPENSATORY MITIGATION PROGRAM**

The BLM need to ensure that compensatory mitigation is strategically implemented to provide a net conservation gain to the species, as identified in the Regional Mitigation Strategy. In order to align with existing compensatory mitigation efforts, this compensatory mitigation program will be managed at a state level (as opposed to a WAFWA Management Zone, a Field Office, or a Forest), in collaboration with our partners (e.g., federal, tribal, and state agencies).

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

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# Appendix G

Stipulations Applicable to Fluid Mineral Leasing and  
Land Use Authorizations



# **APPENDIX G**

## **STIPULATIONS APPLICABLE TO FLUID MINERAL LEASING AND LAND USE AUTHORIZATIONS**

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This appendix lists the stipulations for fluid mineral leasing (e.g., oil, gas, and geothermal) referred to throughout this ARMPA. Stipulations outlined in this appendix also apply to fluid mineral leasing on lands overlying federal mineral estate, which includes federal mineral estate underlying BLM lands, privately owned lands, and state-owned lands.

Upon completion of the EIS and ARMPA, the list of stipulations that are included in the decision would supersede the relevant stipulations attached to the existing LUPs. Those program areas/stipulations that are not considered in this ARMPA (not relevant to GRSG and GRSG habitat) would continue in full force and effect where they apply (within individual BLM field offices or the Routt National Forest). The stipulations would not apply to activities and uses where they are contrary to laws, regulations, or specific program guidance.

### **G.1 DESCRIPTION OF STIPULATIONS**

Three types of stipulations could be applied to leasing authorizations and would also be applied as terms and conditions for land use authorizations: 1) No Surface Occupancy (NSO); 2) Controlled Surface Use (CSU); and 3) Timing Limitations (TL). Notice to Lessees (NTLs), Lease Notices (LNs) and Conditions of Approval (COAs), which are applied to existing leases, are also described below.

#### **G.1.1 No Surface Occupancy (NSO)**

Use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect GRSG and GRSG habitat. In areas open to fluid mineral leasing with NSO stipulations, fluid mineral leasing activities are permitted, but surface-disturbing activities cannot be conducted on the surface of the land unless an exception, modification, or waiver is granted. Access to fluid mineral deposits would require drilling from outside the boundaries of the NSO stipulation.

#### **G.1.2 Controlled Surface Use (CSU)**

A CSU stipulation is a category of moderate constraint that allows some use and occupancy of public land while protecting identified resources or values. A CSU stipulation allows the BLM to require

additional conditions be met to protect a specified resource or value in addition to standard lease terms and conditions.

### **G.1.3 Timing Limitations (TL)**

Areas identified for TLs, a moderate constraint, are closed to fluid mineral exploration and development during identified time frames. Construction, drilling, completions, and other operations considered to be intensive in nature are not allowed. Intensive maintenance, such as work overs on wells, is not permitted. Administrative activities are allowed at the discretion of the BLM Authorized Officer.

### **G.1.4 Notice to Lessees (NTL)**

A notice to lessee is a written notice issued by the BLM Authorized Officer. Notices to lessees implement regulations and operating orders, and serve as instructions on specific item(s) of importance within a state, district, or area.

### **G.1.5 Lease Notice (LN)**

A Lease Notice provides more detailed information concerning limitations that already exist in law, lease terms, regulations or operational orders. An LN also addresses special items that the lessee should consider when planning operations.

### **G.1.6 Condition of Approval (COA)**

Conditions of Approval are enforceable conditions or provisions under which an Application for Permit to Drill (APD) is approved.

## **G.2 EXCEPTIONS, MODIFICATIONS, AND WAIVERS**

An exception exempts the holder of the lease from the stipulation on a one-time basis. A modification changes the language or provisions of a stipulation due to changed conditions or new information either temporarily or for the term of the lease. A modification may or may not apply to all other sites within the leasehold. A waiver permanently exempts the surface stipulation for a specific lease, planning area, or resource based on absence of need, such as a determination that protection of winter use is unnecessary for maintenance or recovery of a species.

### **G.2.1 Exception, Modification, or Waiver Process**

An exception, modification, or waiver may be granted at the discretion of the BLM Authorized Officer if the specific criteria described below are met. In order to implement an action that would not normally be allowed because of a stipulation, the proponent must submit a written request for an exception, modification, or waiver and provide the data necessary to demonstrate that specific criteria have been met. Prior to any modification or waiver of a lease stipulation, a 30-day public notice and comment period may be required.

## **G.3 STIPULATIONS APPLICABLE TO LAND USE AUTHORIZATIONS**

Restrictions on land use authorizations (e.g., rights-of-way [ROWs]) are administered through the identification of exclusion and avoidance areas. Exclusion areas are unavailable for location of ROWs under any conditions. Avoidance areas are to be avoided when practicable due to identified resource values but may be available with special stipulations. Those ROW terms and conditions that would be attached to authorizations sited in areas identified as avoidance areas are described below.

<b>Management Action #46</b>	<b>Stipulation Type: No Surface Occupancy (NSO)</b>
<b>Objective:</b> Manage fluid minerals to avoid, minimize, and compensate for: 1) direct disturbance, displacement, or mortality of GRSG; 2) direct loss of habitat, or loss of effective habitat through fragmentation; and 3) cumulative landscape-level impacts.	
<b>Management Action</b>	No Surface Occupancy in PHMA
<b>Stipulation Description</b>	<p>Apply <b>NSO-46e(I)</b> stipulation to leases in PHMA.</p> <p>Include the following notification for limits on surface disturbance and disruption:</p> <p><i>This lease is subject to NSO and does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas. In areas open to fluid mineral leasing with NSO stipulations, fluid mineral leasing activities are permitted, but surface-disturbing activities cannot be conducted on the surface of the land unless an exception, modification, or waiver is granted.</i></p> <p><i>Surface occupancy or use will be restricted to no more than 1 disruptive facility per 640 acres, and the cumulative value of all applicable surface disturbances, existing or future, must not result in greater than 3 percent loss of the sagebrush habitat within PHMA (as measured by Colorado Management Zone).</i></p> <p><b>Waivers, modifications, and exceptions:</b></p> <p>No <b>waivers</b> or <b>modifications</b> to fluid mineral lease NSO stipulation will be granted. The BLM Authorized Officer may grant an exception to this NSO stipulation only where the proposed action:</p> <ul style="list-style-type: none"> <li>(i) Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or</li> <li>(ii) Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG.</li> </ul> <p>Exceptions based on conservation gain (ii) may only be considered in: (a) PHMA of mixed ownership where federal minerals underlie less than 50 percent of the total surface; or (b) areas of BLM-administered lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this RMP [revision or amendment]. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.</p> <p>The BLM Authorized Officer may approve any exceptions to this lease stipulation only with the concurrence of the BLM State Director. The BLM Authorized Officer may not grant an exception unless the applicable state wildlife agency, USFWS, and BLM unanimously find that the proposed action satisfies (i) or (ii). A team of one field biologist or other GRSG expert shall initially make such</p>

	<p>finding from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.</p>
<p><b>Management Action</b></p>	<p>No Surface Occupancy within 2 miles of active leks in GHMA</p>
<p><b>Stipulation Description</b></p>	<p>Apply <b>NSO-46e(2)</b> stipulation within 2 miles of active leks in GHMA</p> <p><b>Waivers, modifications, and exceptions:</b></p> <p><b>Waiver:</b> No waivers are authorized unless the area or resource mapped as possessing the attributes protected by the stipulation is determined during collaboration with the State of Colorado to lack those attributes or potential attributes. A 30-day public notice and comment period is required before waiver of a stipulation. Waivers would require BLM State Director approval.</p> <p><b>Exception:</b> In consultation with the State of Colorado, an exception to occupancy of the surface associated with <b>GRSG NSO-46e(2) in GHMA</b> could be granted on a one-time basis (any occupancy must be removed within 1 year of approval) based on an analysis of the following factors:</p> <ul style="list-style-type: none"> <li>Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors including, but not limited to, average male lek attendance and/or important seasonal habitat</li> <li>An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation (see <b>Chapter 2, Section 2.6.3 of the Proposed LUPA/Final EIS</b>, Regional Mitigation)</li> <li>An evaluation of the proposed lease activities in relation to the site-specific terrain and habitat features. For example, in the vicinity of leks, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.</li> </ul> <p><b>Modification:</b> In consultation with the State of Colorado, a modification (changes to the stipulation either temporarily or for the term of either part of or the entire lease) to <b>GRSG NSO-46e(2)</b> could be granted based on an analysis of the following factors:</p> <ul style="list-style-type: none"> <li>Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors including, but not limited to, average male lek attendance and/or important seasonal habitat</li> <li>An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or</li> </ul>

	<p>off-site mitigation (see <b>Chapter 2, Section 2.6.3 of the Proposed LUPA/Final EIS</b>, Regional Mitigation)</p> <p>An evaluation of the proposed lease activities in relation to the site-specific terrain and habitat features. For example, in the vicinity of leks, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.</p>
<b>Management Action</b>	<p>Limit surface disturbance to 3 percent of PHMA</p> <p>Limit density of infrastructure to 1 per 640 acres</p>
<b>Stipulation Description</b>	<p><b>Apply Lease Notice (GRSG LN-46e) for leases in PHMA:</b></p> <p>Include the following notification for limits on surface disturbance and disruption:</p> <p><i>This lease is subject to NSO and does not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing oil and natural gas. In areas open to fluid mineral leasing with NSO stipulations, fluid mineral leasing activities are permitted, but surface-disturbing activities cannot be conducted on the surface of the land unless an exception, modification, or waiver is granted.</i></p> <p><i>Surface occupancy or use will be restricted to no more than 1 disruptive facility per 640 acres, and the cumulative value of all applicable surface disturbances, existing or future, must not result in greater than 3 percent loss of the sagebrush habitat within PHMA (as measured by Colorado Management Zone).</i></p>
<b>Management Action #46</b>	<b>Stipulation Type: Timing Limitation</b>
<b>Management Action</b>	No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15)
<b>Purpose</b>	Manage fluid minerals to avoid, minimize, and compensate for direct disturbance, displacement, or mortality of GRSG during lekking, nesting, and early brood-rearing
<b>Stipulation Description</b>	<p><b>Apply Timing Limitation (GRSG TL-46e) within 4 miles of active leks during lekking, nesting, and early brood-rearing (March 1 to July 15).</b></p> <p><b>Waiver:</b> No waivers are authorized unless the area or resource mapped as possessing the attributes protected by the stipulation are determined during collaboration with Colorado Parks and Wildlife to lack those attributes or potential attributes. A 30-day public notice and comment period is required before waiver of a stipulation. Waivers would require BLM State Director approval.</p> <p><b>Exception/Modification:</b> In consultation with the State of Colorado, a modification or an exception to <b>GRSG TL-46</b> could be granted based on an analysis of the following factors:</p> <p>Location of proposed lease activities in relation to critical</p>

	<p>GRSG habitat areas as identified by factors including, but not limited to, average male lek attendance and/or important seasonal habitat</p> <p>An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation (see <b>Chapter 2, Section 2.6.3 of the Proposed LUPA/Final EIS</b>, Regional Mitigation)</p> <p>An evaluation of the proposed lease activities in relation to the site-specific terrain and habitat features. For example, within 4 miles of a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors</p>
<b>Management Action #47</b>	<b>Stipulation Type: Condition of Approval</b>
<b>Management Action</b>	<p>On existing leases within 1 mile of active leks, disturbance, disruptive activities, and occupancy are precluded.</p> <p>If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 disruptive facility per 640 acres, and/or 3 percent disturbance cap, use the criteria below to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in <b>Appendix F</b> (Greater Sage-Grouse Mitigation Strategy).</p> <p>In PHMAs and within 4 miles of an active lek, the criteria below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG.</p> <p>Based on site-specific conditions, prohibit construction, drilling, and completion within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15). In consultation with the State of Colorado, this timing limitation may be adjusted based on application of the criteria below.</p> <p><b>Criteria</b> (see <b>Chapter 2 of the Proposed LUPA/Final EIS</b> for additional detail on these criteria):</p> <p style="padding-left: 40px;">Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors including, but not limited to, average male lek attendance and/or important seasonal habitat</p> <p style="padding-left: 40px;">An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation (see <b>Chapter 2, Section 2.6.3 of the Proposed LUPA/Final EIS</b>, Regional Mitigation)</p> <p style="padding-left: 40px;">An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat</p>

	<p>features. For example, within 4 miles of a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado Management Zone 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines.</p> <p>To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.</p>
<b>Management Action #10</b>	<b>Avoidance criteria</b>
GRSG PHMA ROW Avoidance	<p>In GRSG PHMA or GHMA managed as avoidance, ROWs/Special Use Authorizations may be issued after documenting that the ROWs/Special Use Authorizations would not adversely affect GRSG populations based on the following criteria:</p> <p>Location of proposed activities in relation to critical GRSG habitat areas as identified by factors including, but not limited to, average male lek attendance and/or important seasonal habitat</p> <p>An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation (see <b>Chapter 2, Section 2.6.3 of the Proposed LUPA/Final EIS</b>, Regional Mitigation)</p> <p>An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 of from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.</p> <p>Any new projects within PHMA would be subject to the 3 percent disturbance cap as described in <b>Appendix H</b>, Guidelines for Implementation. If the 3 percent disturbance cap is exceeded in PHMA in any Colorado Management Zone, no new ROW would be authorized in PHMA within that Colorado Management Zone, unless site-specific analysis documents no impact on GRSG.</p>

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# Appendix H

Guidelines for Implementation and Adaptive Management



# APPENDIX H

## GUIDELINES FOR IMPLEMENTATION AND ADAPTIVE MANAGEMENT

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### H.1 INTRODUCTION

This appendix provides guidelines for the implementation of the Northwest Colorado ARMPA, including Adaptive Management. The goals and objectives of the ARMPA address threats to GRSG and GRSG habitat and include management actions designed to maintain and enhance populations and distribution of GRSG. The specific management actions provide details by resource program. BLM programs include objectives designed to avoid direct disturbance of GRSG habitat or displacement of GRSG, and conditions under which it is necessary to minimize and mitigate the loss of habitat and habitat connectivity. To implement the ARMPA, the BLM would assess all proposed land uses or activities in PHMA and GHMA that potentially could result in direct habitat disturbance.

The following steps identify the screening process by which the BLM will review proposed activities or projects in PHMA and GHMA. This process will provide a consistent approach and ensure that authorization of these projects, if granted, will appropriately mitigate impacts and be consistent with the ARMPA goals and objectives for GRSG. The following steps provide for a sequential screening of proposals. However, Steps 2 through 6 can be done concurrently.

The screening process is meant to apply to externally generated projects that would cause discrete anthropogenic disturbances. See **Section H.3, Restoration/Reclamation of Landscape-Scale Disturbances – Objectives for GRSG Habitat**, for guidelines regarding landscape-scale disturbances such as wildfire and habitat restoration.

### H.2 SCREENING PROCESS

#### H.2.1 Step 1 – Determine Proposal Adequacy

This screening process is initiated upon formal submittal of a proposal for authorization for use of BLM lands to the field office/ranger district. The actual documentation of the proposal would include, at a minimum, a description of the location, scale of the project, and timing of the disturbance. The acceptance of the proposal(s) for review would be consistent with existing protocol and procedures for

each type of use. Upon a determination that the proposed project would affect GRSG or GRSG habitat, the District Sage-Grouse Coordinator would be notified.

### **H.2.2 Step 2 – Evaluate Proposal Consistency with LUPA**

The District Sage-Grouse Coordinator and the field office interdisciplinary team would evaluate whether the proposal would be allowed as prescribed in the ARMPA. For example, some activities or types of development are prohibited in PHMA or GHMA. Evaluation of projects will also include an assessment of the current state of the adaptive management hard and soft triggers (see Adaptive Management, below). If the proposal is for an activity that is specifically prohibited, the applicant should be informed that the application is being rejected since it would not be an allowable use, regardless of the design of the project.

### **H.2.3 Step 3 – Determine if GRSG Habitat Can be Avoided**

If the project can be relocated so that it would not have an impact on GRSG and GRSG habitat and still achieve objectives of the proposal, relocate the proposed activity and proceed with the appropriate process for review, decision, and implementation (NEPA and decision record).

### **H.2.4 Step 4 – Determine Proposal Consistency with Density and Disturbance Limitations**

If the proposed activity occurs within a PHMA, the District Sage-Grouse Coordinator would evaluate whether the disturbance from the activity exceeds 3 percent in the Colorado Management Zone using the Disturbance Analysis and Reclamation Tracking System database or a local disturbance database (see Disturbance Cap Guidance, below). If current disturbance within the activity area or the anticipated disturbance from the proposed activity exceeds this threshold (see Adaptive Management, Disturbance Cap Trigger, below), the project would be deferred until such time as the amount of disturbance within the area has been reduced below the threshold (see **Section H.3**, Restoration/Reclamation of Landscape-Scale Disturbances – Objectives for GRSG Habitat, for description of reclamation criteria), redesigned so as to not result in any additional surface disturbance (collocation), or redesigned to move it outside of PHMA.

The Northwest Colorado BLM has completed an inventory of all PHMA by Colorado Management Zone and would track actual disturbance using a local data management system and/or Disturbance Analysis and Reclamation Tracking System. The data management system would be used to inventory, prioritize, and track disturbance data within the decision area, including those projects that cross field office boundaries. The data would be used to determine the actual disturbance by Colorado Management Zone. Data from Colorado Parks and Wildlife, local working groups, and BLM would be used in conjunction with the disturbance inventory to determine future management actions.

#### ***Disturbance Cap Guidance***

For a detailed description of calculating the disturbance cap, see **Appendix E** (Methodology for Calculating Disturbance Caps).

In Northwest Colorado, the disturbance cap would be defined as habitat loss and/or degradation measured as the 3 percent disturbance cap in PHMAs calculated by Colorado Management Zone. Additionally, density of development would be limited to 1 per 640 acres calculated by Colorado Management Zone. In Colorado, Management Zones were developed in cooperation with Colorado Parks and Wildlife, USFWS, and Forest Service and represent biologically significant units based on the six identified Colorado populations, lek complexes, and associated seasonal habitat use.

The ARMPA disturbance cap would apply to anthropogenic disturbance in priority habitat management areas. Anthropogenic disturbance refers to physical removal of habitat, including, but not limited to, paved highways, graded gravel roads, transmission lines, substations, wind turbines, oil and gas wells, pipelines, and mines.

Percentages would be calculated for each Colorado GRSG Management Zone, subject to the criteria listed below that describes the types of projects that would count toward the disturbance cap. Only physical disturbance would be inventoried for the 3 percent disturbance cap. Disruptive impacts, such as wildfire, would be considered in the site-specific analysis when surface-disturbing proposals are being considered.

Types of anthropogenic disturbance that *would be* counted toward the disturbance cap under the ARMPA include the following:

- Any anthropogenic disturbance on BLM surface lands
- Projects on private land in the public record because they entail a federal nexus due to funding or authorizations. Specifically included would be energy development, rights-of-way, or range projects approved by the BLM because they have components on both public and private land. Also included would be anthropogenic disturbance on private surface attributable to the authorized recovery of federal minerals
- Industrial operations on any surface ownership with a readily apparent impact on GRSG habitat
- Any disturbance data volunteered by private land owners

Types of projects that *would not be* counted toward the disturbance cap under the ARMPA include the following:

- Disturbance on individual sites such as stands of pinyon/juniper determined lacking in GRSG habitat potential
- Disturbance on private lands other than what has been described above. The BLM would not inventory or evaluate private property not linked to a specific project with a federal nexus. Private residences would not be inventoried or evaluated. Infrastructure on private land associated with family farm or ranch operations would not constitute “an industrial operation with a readily apparent impact on GRSG habitat.” Base property associated with grazing permits would not be considered a federal nexus in this context. Conservation easements would not trigger a federal nexus, and be cause for inventory of private lands. Conservation-oriented activities associated with US Department of Agriculture, Natural Resources Conservation Service would also not be counted.

The disturbance cap is an important component of the ARMPA adaptive management plan. If the 3 percent cap is exceeded in a Colorado Management Zone, more restrictive measures would be in effect (see **Chapter 2, Section 2.6.1 of the Proposed LUPA/Final EIS**, Adaptive Management, Disturbance Cap Trigger).

### **Reclamation Criteria for Anthropogenic Disturbances**

In order for disturbance to be considered reclaimed and no longer counted against the Northwest Colorado disturbance cap, the following requirements would be insisted upon:

- Reclamation requirements would be consistent with the existing Northwest Colorado land use decisions and regulations.
- Reclamation success criteria in GRSG habitat would be contingent on evidence of successful establishment of desired forbs and sagebrush. Reclaimed acreage would be expected to progress without further intervention to a state that meets GRSG cover and forage needs (see **Table H-1**) based on site capability and seasonal habitat, as described in the Colorado Greater Sage Grouse Conservation Plan (Colorado Greater Sage-grouse Steering Committee 2008).
- Depending on site condition, the BLM may require a specific seed component and/or sagebrush (i.e., material collected on site or seed propagated from “local” collections) where appropriate to accelerate the redevelopment of sagebrush.

### **H.2.5 Step 5 – Determine Projected Sage-Grouse Population and Habitat Impacts**

If it is determined that the proposed project may move forward, based on Steps 1 through 3, above, then the BLM would analyze whether the project would have a direct or indirect impact on GRSG populations or habitat within PHMA or GHMA. The analysis would include an evaluation of the following:

- Review of GRSG Habitat delineation maps
- Use of the US Geological Survey report *Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review* (Manier et al. 2014) to assess potential project impacts based upon the distance to the nearest lek, using the most recent active lek (as defined by Colorado Parks and Wildlife; see Glossary) data available from the state wildlife agency. This assessment would be based upon the buffers identified below for the following types of projects:
  - Linear features within 3.1 miles of leks
  - Infrastructure related to energy development within 3.1 miles of leks
  - Tall structures (e.g., communication or transmission towers and transmission lines) within 2 miles of leks
  - Low structures (e.g., rangeland improvements) within 1.2 miles of leks
  - All other surface disturbance not associated with linear features, energy development, tall structures, or low structures within 3.1 miles of leks
  - Noise and related disruption activities (including those that do not result in habitat loss) at least 0.25-mile from leks
- Review and application of current science recommendations
- Reviewing the Baseline Environment Report (Manier et al. 2013), which identifies areas of direct and indirect effects for various anthropogenic activities

- Consultation with agency or state wildlife agency biologist
- Evaluating consistency with (at a minimum) state GRSG regulations
- Other methods needed to provide an accurate assessment of impacts
- If the proposal will not have a direct or indirect impact on either the habitat or population, document the findings in the NEPA analysis and proceed with the appropriate process for review, decision, and implementation of the project.

### H.2.6 Step 6 – Determine Minimization Measures

If impacts on GRSG or GRSG habitat cannot be avoided by relocating the project, then consider the tools above to apply appropriate minimization measures. Minimization measures could include timing limitations, noise restrictions, and design modifications.

### H.2.7 Step 7 – Apply Compensatory Mitigation or Reject / Defer Proposal

If screening of the proposal (Steps 1 through 6) has determined that direct and indirect impacts cannot be eliminated through avoidance or minimization, evaluate the proposal to determine if compensatory mitigation can be used to offset the remaining adverse impacts and achieve GRSG goals and objectives (see **Appendix F**, Greater Sage-Grouse Mitigation Strategy). If the impacts cannot be effectively mitigated, the project would be rejected or deferred.

## H.3 RESTORATION/RECLAMATION OF LANDSCAPE-SCALE DISTURBANCES – OBJECTIVES FOR GRSG HABITAT

For landscape-scale disturbances, including wildfire, livestock grazing, and habitat treatments, the objective is to maintain a minimum of 70 percent of lands capable of producing sagebrush with a minimum of 15% sagebrush canopy cover, or a similar standard consistent with specific ecological site conditions in PHMA. See **Table H-1**.

**Table H-1**  
**Seasonal Habitat Desired Conditions for Greater Sage-Grouse**

ATTRIBUTE	INDICATORS	DESIRED CONDITON
<b>BREEDING AND NESTING</b> <sup>1,2,3</sup> (Seasonal Use Period March 1-June 15) <b>Apply 4 miles from active leks.</b> <sup>15</sup>		
Lek Security	Proximity of trees <sup>4</sup>	Trees or other tall structures are none to uncommon within 1.86 miles of leks <sup>5,6</sup>
	Proximity of sagebrush to leks <sup>5</sup>	Adjacent protective sagebrush cover within 328 feet of lek <sup>5</sup>
Cover	Seasonal habitat extent <sup>6</sup>	>80% of the breeding and nesting habitat
	Sagebrush canopy cover <sup>5,6,7,17</sup> Arid sites Mesic sites	15 to 30% 20 to 30% <sup>17</sup>
	Sagebrush height <sup>6,17</sup> Arid sites <sup>5,6,9</sup> Mesic sites <sup>5,6,10</sup>	11.8 to 31.5 inches (30-80 cm) 15.7 to 31.5 inches (40-80 cm)
	Predominant sagebrush shape <sup>5</sup>	>50% in spreading <sup>11</sup>
	Perennial grass canopy cover <sup>5,6,17</sup> Arid sites <sup>6,9</sup> Mesic sites <sup>6,10,17</sup>	≥10% ≥20% <sup>17</sup>

**Table H-1**  
**Seasonal Habitat Desired Conditions for Greater Sage-Grouse**

ATTRIBUTE	INDICATORS	DESIRED CONDITION
	Perennial grass and forb height <sup>5,6,7</sup>	>6 inches <sup>6, 16, 17</sup>
	Perennial forb canopy cover <sup>5,6,7</sup> Arid sites <sup>9</sup> Mesic sites <sup>10</sup>	≥5% <sup>5,6,17</sup> ≥15% <sup>5,6,17</sup>
<b>BROOD-REARING/SUMMER<sup>1</sup> (Seasonal Use Period June 16-October 31)</b>		
Cover	Seasonal habitat extent <sup>6</sup>	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover <sup>5, 6,7, 17</sup> Arid sites Mesic sites	10 to 25% 10 to 25%
	Sagebrush height <sup>6,7, 17</sup> Arid sites Mesic sites	11.8 to 31.5 inches (30 to 80 cm) 13.8 to 31.5 inches (35 to 80 cm)
	Perennial grass canopy cover and forbs <sup>6,7,17</sup> Arid sites Mesic sites	>15% <sup>17</sup> >25% <sup>17</sup>
	Riparian areas (both lentic and lotic systems)	Proper Functioning Condition <sup>13</sup>
	Upland and riparian perennial forb availability <sup>5,6</sup>	Preferred forbs are common with several preferred species present <sup>12</sup>
<b>WINTER<sup>1</sup> (Seasonal Use Period November 1-February 28)</b>		
Cover and Food	Seasonal habitat extent <sup>5,6,7</sup>	>80% of the winter habitat
	Sagebrush canopy cover above snow <sup>5,6,7,17</sup>	>20% Arid, 25% Mesic <sup>17</sup>
	Sagebrush height above snow <sup>5,6,7</sup>	>10 inches <sup>14</sup>

<sup>1</sup> Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.

<sup>2</sup> Doherty 2008

<sup>3</sup> Holloran and Anderson. 2005

<sup>4</sup> Baruch-Mordo et al. 2013

<sup>5</sup> Stiver et. al. 2014

<sup>6</sup> Connelly et al. 2000

<sup>7</sup> Connelly et al. 2003

<sup>9</sup> 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).

<sup>10</sup> ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).

<sup>11</sup> Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree- or columnar shaped (Stiver et. al. 2014).

<sup>12</sup> Preferred forbs are listed in Habitat Assessment Framework Table III-2 (Stiver et. al. 2014). Overall, total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.

<sup>13</sup> Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting greater sage-grouse habitat requirements.

<sup>14</sup> The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

<sup>15</sup> Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.

<sup>16</sup> Measured as “droop height”; the highest naturally growing portion of the plant.

<sup>17</sup> Colorado Greater Sage-grouse Steering Committee 2008

These habitat objectives in **Table H-1** summarize the characteristics that research has found represent the seasonal habitat needs for GRSG. The specific seasonal components identified in the table were adjusted based on local science and monitoring data to define the range of characteristics used in this sub-region. Thus, the habitat objectives provide the broad vegetative conditions the BLM strive to obtain across the landscape that indicate the seasonal habitats used by GRSG. These habitat indicators are consistent with the rangeland health indicators used by the BLM.

The habitat objectives will be part of the GRSG habitat assessment to be used during land health evaluations (see **Appendix D**, Greater Sage-Grouse Monitoring Framework). These habitat objectives are not obtainable on every acre within the designated GRSG habitat management areas. Therefore, the determination of whether the objectives have been met will be based on the specific site's ecological ability to meet the desired condition identified in **Table H-1**.

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

#### **H.4 ADAPTIVE MANAGEMENT**

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

In relation to the BLM's National Greater Sage-grouse Planning Strategy, adaptive management would help identify if GRSG conservation measures presented in this EIS contain the needed level of certainty for effectiveness. Principles of adaptive management are incorporated into the conservation measures in the LUPA to ameliorate threats to a species, thereby increasing the likelihood that the conservation measure and LUPA would be effective in reducing threats to that species. The following provides the BLM's adaptive management strategy for the Northwest Colorado Greater Sage-Grouse LUPA. In making amendments to this LUP, the BLM and will coordinate with USFWS as the BLM continues to meet their objective of conserving, enhancing, and restoring GRSG habitat by reducing, minimizing, or eliminating threats to that habitat.

##### **H.4.1 Adaptive Management and Monitoring**

This EIS contains a monitoring framework (**Appendix D**, Greater Sage-grouse Monitoring Framework) that includes an effectiveness monitoring component. The agencies intend to use the data collected from the effectiveness monitoring to identify any changes in habitat conditions related to the goals and objectives of the LUPA and other range-wide conservation strategies (US Department of the Interior 2004; Stiver et al. 2006; USFWS 2013). The information collected through the monitoring framework would be used by the BLM to determine when adaptive management hard and soft triggers (discussed below) are met.

Adjustments to PHMA or GHMA boundaries should be made if BLM biologists, in coordination with state of Colorado biologists, determine site-specific conditions warrant such changes to more accurately depict existing or potential GRSG habitat. The appropriate planning process (i.e., plan maintenance or plan amendment) would be used, as determined on a case-by-case basis considering site-specific issues.

#### **H.4.2 Adaptive Management Triggers**

##### ***Soft Triggers***

Soft triggers represent an intermediate threshold indicating that management changes are needed at the project/implementation level to address habitat and population losses. If a soft trigger is identified, the BLM would apply more conservative or restrictive implementation conservation measures to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. For example, monitoring data within an already federally authorized project area within a given GRSG population area indicates that there has been a slight decrease in GRSG numbers in this area. Data also suggest the decline may be attributed to GRSG collisions with monitoring tower guy-wires from this federally authorized project. The BLM then receives an application for a new tower within the same GRSG population area. The response would be to require the new authorization's tower guy-wires to be flagged. Monitoring data then show the decline is curtailed. The adaptive management soft trigger response is to require future applications to flag for guy-wires. These types of adjustments would be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines). While there should be no expectation of hitting a hard trigger, if unforeseen circumstances occur that trip either a habitat or population hard trigger, more restrictive management would be required.

##### ***Hard Triggers***

Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives as set forth in the BLM ARMPA. The hard trigger and the proposed management response to this trigger are presented below.

The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.

#### **H.4.3 Northwest Colorado Adaptive Management Plan**

The Northwest Colorado Adaptive Management Plan includes an overarching adaptive management strategy consistent with national policy that includes soft and hard triggers for specific populations and an approach for developing responses. These triggers are not specific to any particular project, but identify habitat and population thresholds. The BLM in cooperation with USFWS and the State of Colorado, have identified appropriate triggers. Triggers would be based on the two key metrics that would be monitored: habitat loss and/or population declines.

##### ***Soft Triggers***

Soft triggers represent an intermediate threshold indicating that management changes are needed at the LUPA implementation level to address habitat or population losses. If a soft trigger is tripped, the BLM would change management to a more conservative or restrictive implementation conservation measure to mitigate for the specific causal factor in the decline of populations and/or habitats, with consideration of local knowledge and conditions. These adjustments should be made to preclude tripping a "hard" trigger (which signals more severe habitat loss or population declines).

During implementation of this LUPA, population trends would be monitored by the Northwest Colorado Sage-Grouse Statewide Implementation Team, which would be made up of existing local population GRSG working groups (e.g., Northwest Colorado, Parachute-Piceance-Roan, Middle Park, and North Park), BLM biologists, and Colorado Department of Natural Resources, Parks and Wildlife biologists. This group would meet annually and would evaluate the health of each population and make recommendations to the BLM on any changes to fine site management. This statewide implementation team would also evaluate the effects to GRSG habitat and populations due to BLM permitted activities throughout the previous year(s) and make recommendations for changes in management or locations that should be avoided, for example. This group would also evaluate the effectiveness of mitigation and make recommendations on alternative mitigation strategies and locations, such as the Colorado Habitat Exchange. This team would also evaluate important locations each year, such as lek sites.

Restrictive management prescriptions would help ensure a greater degree of certainty of effectiveness in ameliorating a targeted threat so that there is less of a need to prescribe a detailed adaptive management decision strategy within the ARMPA to demonstrate certainty of effectiveness. The Northwest Colorado LUPA includes conditions under which activities could be permitted in GRSG habitat and criteria for granting exceptions, modifications, or waivers for lease stipulations. Soft triggers for restrictive management actions would include evaluation of the effectiveness of the minimization, mitigation, and location of permitted activities in the context of the PAC.

#### ***Disturbance Cap Trigger***

The disturbance cap trigger represents a threshold indicating that more restrictive action is necessary to prevent further degradation of GRSG habitat.

In Northwest Colorado, the disturbance cap trigger would be defined as habitat loss and/or degradation measured as the 3 percent disturbance cap in PHMA calculated by biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ).

If the 3 percent anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within PHMA in any given biologically significant unit, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872 and valid existing rights) would be permitted by BLM within PHMA in any given biologically significant unit until the disturbance has been reduced to less than the cap.

If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance would be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the General Mining Law of 1872 and valid existing rights).

Habitat disturbance would be monitored by the BLM and if the disturbance cap thresholds are exceeded in any PAC or Colorado MZ, more restrictive management would be implemented. The BLM would not grant modifications, exceptions, or waivers for existing lease stipulations if the intermediate trigger has been met. In addition, the BLM would defer new leasing in the Colorado MZ/PAC until the habitat is reclaimed and back under the disturbance cap.

### **Hard Trigger**

In the event that soft triggers and disturbance caps prove to be ineffective, the hard trigger represents a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives. The hard trigger is intentionally set at or below the normal range of variation to provide a threshold of last resort should either chronic degradation or a catastrophic event occur. The hard trigger is not intended to be an on-again/off-again toggle that would be exceeded periodically throughout the life of the LUPA. Colorado GRSG occur in six distinct populations. Two of these populations (Northwest Colorado and North Park) account for about 88 percent of the males in Colorado. Northwest Colorado includes Colorado MZs I through 10. North Park includes Colorado MZ 11. The remaining four populations are smaller by an order of magnitude, and, even in the aggregate, do not provide the significant numbers of GRSG necessary to contribute meaningfully to the hard trigger, and, in some cases, lack the long-term population trend information necessary to support trigger implementation. All six populations are important to GRSG conservation in Colorado; however, only the Northwest Colorado and North Park populations are large enough to reliably indicate the level of severe decline intended by this hard trigger. While the hard triggers focus on the two largest populations, all six populations should be rigorously managed via the soft triggers. If soft triggers work as intended, a hard trigger should never be breached.

#### *Development of the Hard Trigger*

The hard trigger is based on two metrics: GRSG lek (high male) counts and habitat loss.

*Lek Counts.* The lek count threshold is determined from the 25 percent quartile of the high male count in each of the Northwest Colorado and North Park populations over the period of years for which consistent lek counts are available: 17 years from 1998 to 2014 for Northwest Colorado and 41 years from 1974 to 2014 for North Park. The 25 percent quartiles were determined using the annual high male counts rather than the 3-year running average to ensure that normal variation in lek counts is above the threshold. The hard trigger for Northwest Colorado is 1,575 counted males, and for North Park is 670 counted males.

*Habitat Loss.* The habitat loss threshold is determined by 30 percent cumulative loss of PHMA, measured independently in Northwest Colorado and North Park. For the purpose of the hard trigger, habitat loss will be measured from the date of the ROD on this LUPA. Hard trigger habitat loss includes both anthropogenic (i.e., the disturbance cap) and non-anthropogenic forms of habitat loss (e.g., wildfire). The 30 percent habitat loss calculation is limited to loss of PHMA in each of Northwest Colorado and North Park populations; GHMA and any habitat loss in the other four populations are not included in the hard trigger. Restored or recovered habitat is not considered in this threshold, although it is tracked and summarized by the BLM's data management system.

#### *Breaching the Hard Trigger*

In order for the hard trigger to be breached, both the lek count (1,575 males in Northwest Colorado and 670 males in North Park) and habitat loss thresholds must be breached in both the Northwest Colorado and North Park populations simultaneously. In any other set of circumstances (e.g., when a threshold is violated in a single population), the management response will be as described in the *Soft Trigger* section, above.

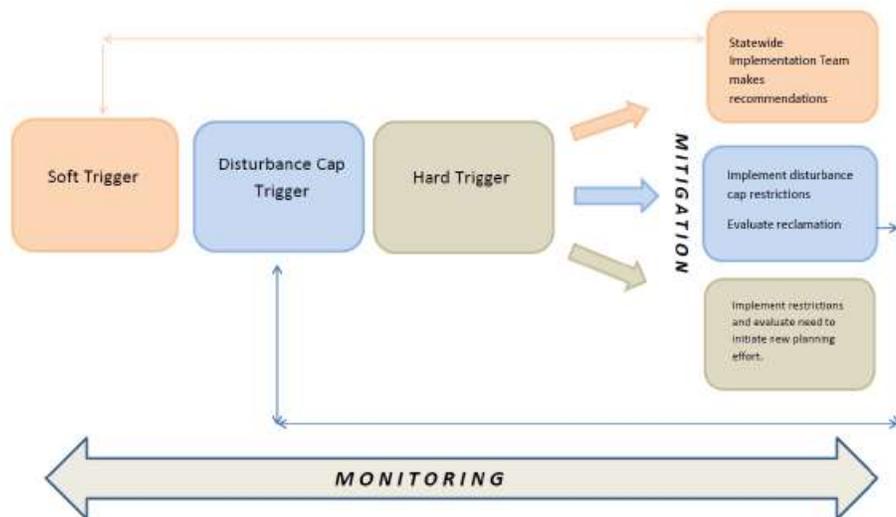
*Lek Counts.* The lek count threshold is compared to the 3-year running average of the high male count in Northwest Colorado and North Park, measured independently. The 3-year running average value is

used because it is considered to be more indicative of the population trend than annual high male counts. The 3-year running average in Northwest Colorado and North Park must fall below the threshold concurrently for this portion of the hard trigger to be breached. The Colorado Department of Natural Resources, Parks and Wildlife will conduct lek counts and provide this information annually to the statewide implementation team as described in the *Soft Trigger* section, above.

*Habitat Loss.* The habitat loss threshold is measured by 30 percent cumulative loss of PHMA, beginning when the ROD on this LUPA is signed. The loss will be measured independently in Northwest Colorado and North Park. The BLM will track anthropogenic and non-anthropogenic habitat loss. The statewide implementation team as described in the *Soft Trigger* section, above, will review summary information, above.

*Hard Trigger Response*

Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Northwest Colorado Greater Sage-Grouse Statewide Implementation Team will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter the “causal factor assessment”).



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